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# PERSONALITY CHARACTERISTICS (EPPS) OF ANTARCTIC VOLUNTEERS

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## Personality Characteristics (EPPS) of Antarctic Volunteers<sup>1</sup>

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The United States relies entirely upon volunteers to staff a number of vital national programs such as space and nuclear submarines. Psychological predispositions and motivations of volunteers for hazardous or unusual kinds of duty assignments are of theoretical interest to psychologists and of practical interest to personnel managers. The nature and intensity of psychological needs in members of work and living groups, particularly in situations of long term isolation and confinement, may significantly affect individual adjustment, group cooperation, and productivity.

The present study is concerned with personality characteristics, as measured by the Edwards Personal Preference Schedule (EPPS), of two groups of volunteers for assignments which involved unusual hazard, hardship, and prolonged isolation and confinement. These volunteers were civilian scientists and technicians and Navy support personnel who applied and were accepted for one year's duty at United States scientific stations in Antarctica during the International Geophysical Year (1957-58).

The Edwards Personal Preference Schedule is a forced-choice personality inventory designed to measure the manifest needs of relatively

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normal individuals. The inventory is described, and the fifteen need scales are defined in the test manual (Edwards, 1959). The scores obtained represent the number of preferences indicated with respect to each psychological need.

A number of previous studies have suggested differences between populations on many of the EPPS variables (Allen, 1957; Allen & Dallek, 1957; Izard, 1960; Satz & Allen, 1961). Izard (1960) reported that experienced engineers and engineering students differed from liberal arts college students on a number of scales suggesting relatively greater affective investment in objects and tasks than in interpersonal relationships. Koponen (1960) provided some evidence that mean scores for a number of EPPS scales varied among age and income groups. Heilizer and Trehub (1962) in a study of similarities and differences in profiles of the fifteen mean scale scores for eight populations found that three college student samples formed one cluster, and three hospitalized patient groups and Edwards' male and female general adult normative groups formed a second cluster. The authors noted the possibility that age and educational differences among their groups may have contributed to these findings.

In the present study, the investigators were interested in the following questions:

- (1) How do Navy volunteers for Antarctic duty differ in personality characteristics (EPPS) from Edwards' male general adult and college normative groups?
- (2) How do civilian scientist and technician volunteers differ from Edwards' male general adult and college normative groups?

(3) How do Navy and civilian volunteers differ from each other?

(4) How do the EPPS scale intercorrelations for Antarctic volunteers compare with those for other groups?

#### Procedure

The EPPS was administered as part of the psychiatric screening of Navy and civilian applicants for Antarctic service during the International Geophysical Year. In the United States Antarctic research program, supported by the National Science Foundation and the United States Navy, civilian scientists and technicians were directly engaged in research projects while Navy personnel provided necessary logistic support. Small groups at several isolated stations lived and worked together in a confined and restricted environment for approximately a year.

A total of 242 Navy volunteers and 37 civilian volunteers who subsequently wintered-over in Antarctica were subjects for the study. Median age was approximately 25 for the Navy group and approximately 29 for the civilian group; 59% of the Navy group and 52% of the civilians were unmarried; 8% of the Navy sample and 67% of the civilians were college graduates.

EPPS scale means for the two Antarctic volunteer groups were compared with norms for Edwards' general adult and college populations (Edwards, 1959). Edwards' general adult normative group consisted of 4,031 male heads of households from both urban and rural areas of 1181 counties in 48 states, who were members of a consumers' purchase panel for market surveys. Edwards' college group consisted of high school graduates with some college, from both private and public institutions,

who were enrolled in day and evening liberal arts classes, majoring in a wide variety of subjects and ranging in age from 15 to 54 years, with the majority in the 20 to 24 age category.

Intercorrelations among the EPPS variables were computed for the two Antarctic groups separately and in combination. The resulting intercorrelation matrices were compared with each other and with those published by Edwards (1959) for his college male and female normative group and by Allen (1957) for an undergraduate male group.

Significant positive correlations ( $p < .05$ ) for the Antarctic volunteer combined group were inspected for the presence of clusters of variables. Although more elaborate techniques such as factor analysis or "nuclear structure analysis" (Heilizer & Trehub, 1962) might have been employed, the simple method applied seemed to reveal some meaningful structure in these data.

### Results

#### Comparison of Navy Volunteers with Edwards' Normative Groups

Navy volunteers differed from the Edwards college sample on all of the need scales beyond the .001 level of confidence. The difference on the Consistency scale was also significant ( $p < .05$ ). Most of the differences were small, however, averaging 1.89 raw score units for the need scales. Larger raw score differences did appear however, for the Endurance (Navy higher) and Dominance (Navy lower) scales.

Comparison of Navy mean scores with Edwards' general adult norms is presented in Table 1. Significant differences were obtained on twelve of the fifteen need scales. A relatively large difference is evident for the Heterosexuality scale.

Table 1  
 EPPS Means, Standard Deviations, and *t* Tests for Differences:  
 Navy Volunteer and General Adult Groups

	General Adult		Navy	
	Mean	S D	Mean	S D
Ach	14.79	4.14	14.61	4.08
Def	14.19 <sup>***</sup>	3.91	13.09	3.43
Ord	14.69 <sup>***</sup>	4.87	12.50	4.29
Exh	12.75	3.99	13.50 <sup>**</sup>	3.63
Aut	14.02 <sup>***</sup>	4.38	12.31	4.44
Aff	14.51 <sup>**</sup>	4.32	13.69	4.19
Int	14.18	4.42	14.90 <sup>*</sup>	4.50
Suc	10.78 <sup>***</sup>	4.71	9.06	4.20
Dom	14.50	5.27	14.61	4.84
Aba	14.59 <sup>**</sup>	5.13	13.65	4.38
Nur	15.67 <sup>***</sup>	4.97	12.84	4.71
Chg	13.87	4.76	17.31 <sup>***</sup>	3.92
End	16.97	4.90	17.41	4.76
Het	11.21	7.70	19.64 <sup>***</sup>	6.02
Agg	13.06 <sup>***</sup>	4.60	10.81	4.28
Con	11.35	1.96	11.18	2.11
N	4031		232	

\*Difference between means is significant beyond the .05 level.

\*\*Difference is significant beyond the .01 level.

\*\*\*Difference is significant beyond the .001 level.

## Comparison of Civilian Volunteers with Edwards' Normative Groups

Civilian volunteers scored significantly higher than the general male adult sample on Ach, Aff, Int, Dom, Chg, and Het and significantly lower on Ord, Aut, Aba, Nur, and Agg. Edwards' male college sample differed significantly from his general adult sample on the same scales in the same direction with the exception of Aut and Agg. Civilian volunteers did, however, score significantly lower than the college sample on Exh, Aut, Het, and Agg scales and higher on Def, Ord, and End.

## Comparison of Navy and Civilian Volunteer Groups

Means, standard deviations, and  $t$  tests are shown in Table 2. Civilians scored significantly higher on the Ach, Dom, and Aff scales and lower on the Het, Exh, and Aba scales. There were fewer significant differences between the Antarctic groups and the average magnitude of differences over the fifteen scales was smaller than in the other comparisons. The only very large difference appeared on the Heterosexuality scale.



Table 2  
 EPPS Means, Standard Deviations, and  $t$  Tests for Differences:  
 Navy and Civilian Volunteer Groups

	Navy		Civilian	
	Mean	S. D.	Mean	S. D.
Ach	14.61	4.08	16.46*	4.34
Def	13.09	3.43	13.49	3.52
Ord	12.50	4.29	12.65	4.78
Exh	13.50*	3.63	12.22	3.17
Aut	12.31	4.44	11.49	3.66
Aff	13.69	4.19	15.92**	3.98
Int	14.90	4.50	16.24	4.74
Suc	9.06	4.20	10.08	4.52
Dom	14.61	4.84	17.11**	4.19
Aba	13.65*	4.38	11.89	4.57
Nur	12.84	4.71	13.89	4.76
Chg	17.31	3.92	16.62	3.35
End	17.41	4.76	16.43	5.09
Het	19.64***	6.02	15.43	6.06
Agg	10.81	4.28	9.95	4.92
Con	11.18	2.11	11.95*	1.58
N	232		37	

\*Difference between means is significant beyond the .05 level.

\*\*Difference is significant beyond the .01 level.

\*\*\*Difference is significant beyond the .001 level.

Similarity of profiles among the four comparison groups is indicated by the intercorrelations of scale means shown in Table 3. The Navy and civilian volunteer groups appear most similar by this measure, civilian and college male normative groups next in similarity, and male general adult and college groups least similar. The profiles of the Navy and general adult samples also were unrelated while Navy and college groups were highly related.

Table 3  
Intercorrelation of EPPS Scale Means For Males<sup>a</sup>

	<u>Civ</u>	<u>Gen. Adult</u>	<u>College</u>
Military	.78**	.27	.65**
Civilian		.48	.68**
"General Adult"			.05

<sup>a</sup> Pearson product-moment correlations; \*\* level of significance: .01.

Table 4 summarizes the personality variables that uniquely characterize the Antarctic volunteer groups, that is, distinguish them from both of the Edwards normative groups. Both Navy and civilian Antarctic groups scored significantly lower than Edwards' normative groups on Autonomy and Aggression, the two variables which Edwards (1959) found to be most negatively correlated with the Cooperativeness (-.29, -.37) and Agreeableness (-.36, -.51) scales of the Guilford-Martin Personnel Inventory (1943).

Table 4  
 Personality Characteristics that Distinguish  
 Antarctic Volunteers<sup>a</sup>

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<u>Military and Civilian</u>	
Low Autonomy	
Low Aggression	
<u>Military Only</u>	<u>Civilian Only</u>
Low Affiliation	- - - - -
Low Succorance	
Low Nurturance	
High Change	
High Heterosexuality	

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<sup>a</sup>  
 Means are significantly different ( $p < .001$ ) from both of Edwards' male normative groups.

#### Possible Influence of Age and Education Levels upon EPPS Scores

From study of earlier normative data, particularly that of Koponen, it seemed likely that age, education, and socioeconomic level might be related to many of the EPPS differences among groups reported in the literature. Koponen (1960) reported that many of the fifteen scales showed a linear relationship to age. For example, younger groups were higher on Heterosexuality, Change, and Exhibition, whereas older groups were higher on Order and Deference.

In the present study an attempt was made to examine the possible influence of age and education by noting the rank order of the four comparison groups on mean age and education compared with their rank order on the test scales. The four groups ranked on age from highest to lowest as follows: general adult, civilian, Navy, and college. The groups ranked on education level as follows: civilian, college, Navy and general adult.

There was perfect positive rank order correlation with age on two of the scales, Order and Deference, and perfect negative rank order correlation with education on two other scales, Intraception and Abasement. Koponen (1960) also had reported the Order and Deference scales to be related to age while Intraception and Abasement were related to income levels.

It was possible to examine the influence of age more directly by correlating this variable with EPPS scale scores for the Navy sample (N=220). Correlations significant beyond the .05 level of significance were: Def (.23), Ord (.15), Aut (-.23), Dom (.30) and Aba (-.16). Since age and education are not significantly correlated in the Navy population, these results may reflect the influence of age alone. Precise data on education level was not available for study on the Antarctic volunteer samples.

#### EPPS Intercorrelation Pattern for Antarctic Groups

The intercorrelation matrix for the Navy volunteer sample bears great similarity to that for Edwards' (1959) college normative sample. Edwards attributes relative independence to the EPPS variables, and our

data tend to support this observation as correlations were generally low.

It was apparent from inspection of the intercorrelation matrices that correlations among certain scales, though low, were consistently above chance. Positive correlations among the fifteen scales ( $p < .05$ ) were diagrammed in order to reveal relationships. From the diagram it was evident that three clusters or groups of variables could be discriminated with no significant negative correlations within and no significant positive correlations between the components. Figure 1 presents scale relationships for the combined volunteer samples. The obtained need clusters were designated "Activity", "Affection", and "Control" for purposes of further exposition. The scales forming the "Activity" cluster suggest an orientation toward independence and activity. The "Affection" cluster suggests concern with interpersonal relationships, and the "Control" cluster indicates concern with regulating or controlling self and environment.

Inspection of the intercorrelation matrices published by Edwards (1959) and Allen (1957) indicated significant positive intercorrelations among Affiliation, Succorance, and Nurturance, among Order, Endurance, and Deference, and between Change and Autonomy. It was noted that these groups of scales comprised the nuclei of our three clusters.

Similar relationships were revealed by Wright's (1957) factor analysis of the EPPS for a college sample. The first extracted factor was largely a bipolar one, consisting of our "Affection" and "Activity" clusters, and the second extracted factor had several variables in common with

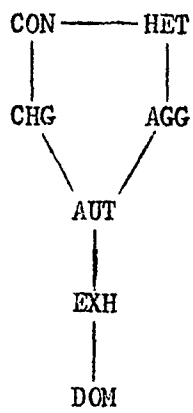
Figure 1

Significant Positive Correlations  
Among EPPS Variables for Antarctic Volunteers\*

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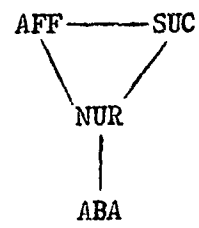
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"Activity"

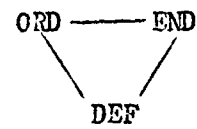


Active

"Affection"



"Control"



Passive

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\* Correlations between scales are significant beyond the .05 level; N=269.

our "Control" cluster. Furthermore, the EPPS clusters distinguished in the present study appear to be related conceptually to the triad of interpersonal needs delineated by Schutz (1958).

#### Discussion

The picture of the Antarctic volunteer that emerges from our study is that of an unusually cooperative (low Autonomy) and friendly (low Aggression) individual, who would appear to be adapted to living and working in small isolated groups. Navy volunteers, however, are also characterized by avoidance of close interpersonal involvements, (low Affiliation, Succorance, and Nurturance), desire for novelty and adventure (high Change), and emphasis upon heterosexual relationships. Compared with both general adult and college groups, Antarctic Navy personnel scored significantly lower on all "Affection" variables. There were no significant differences for "Control" variables and mixed results for "Activity" variables.

Applying the cluster framework to other EPPS experimental studies yields a number of suggestive relationships. In a study by Brown and Goodstein (1962) comparing high and low depression groups, the high depression group had elevated scores on many components of our "Affection" cluster and lower scores on "Activity" cluster scales. Vestre (1962), studying schizophrenic patients, found that subjects higher in verbal conditionability had lower scores on components of our "Activity" cluster and higher scores on components of our "Affection" and "Control" clusters. Izard (1962), studying personality change during college years, found significant mean increments in components of the "Activity" cluster and decrements in components of the "Affection" and "Control" clusters.

Summary

(1) The Navy Antarctic volunteer sample differed from the Edwards male college normative sample on all of the EPPS scales and from Edwards' male general adult sample on twelve of the fifteen EPPS scales.

(2) The civilian volunteer sample differed from Edwards' general adult sample on eleven of the fifteen EPPS scales; however, the mean scale scores (profiles) of the civilian group and Edwards' college sample were highly correlated.

(3) The Navy and civilian volunteer groups differed on relatively few variables and the differences tended to be relatively small.

(4) Age and education appear to be correlated with a number of EPPS variables and should be examined in comparative studies.

(5) The intercorrelation matrix for Antarctic volunteers closely resembles that for Edwards' normative sample. Psychologically meaningful clusters of EPPS scales with apparent high consistency over several populations were described.



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Ford & Gunderson

18

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