**PSYCHOLOGICAL PERSPECTIVES
ON HEALTH AND DISEASE**

**VOLUME 1
DETERMINANTS OF SOMATIC AND MENTAL HEALTH**

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Editor

UEHS Press

Warsaw
2019

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Immune Power Personality Questionnaire – rationale, development, and psychometric properties

Introduction

As early as 1964, Solomon and Moos suggested a theoretical model integrating the possible relationships between emotions, immunity, and disease. They made a claim that certain personality factors may make a person more susceptible to disease through the impact of the nervous system on the immune system. In reference to this, Antonovsky (1987) proposed that there might exist personality characteristics which enhance immunity and make a person resistant to negative consequences of psychological stress on physical health. In line with this claim, Antonovsky postulated the concept of the *sense of coherence* – a general personality orientation which also stimulates the immune system to work more effectively and reduce the risk of illness.

Following research in salutogenesis, commenced by Antonovsky, Dreher (1996) proposed a similar concept based on his systematic review of studies that identified specific personality characteristics associated with physiological resilience. He identified seven personality traits which, together, build up what he labelled the *immune power personality* (IPP). While discussing immunologically strong personality traits in detail, Dreher (1996) supplemented their descriptions with findings from empirical studies containing, among others, measurements of immunological parameters and case studies, which were to additionally provide evidence for their relationship with better health.

Dreher (1996, p. 2) believes that the IPP characterizes people who perceive stressful situations or crises as opportunities for development without engaging in avoidance; such people are flexible and highly adaptive to the environment and social situations; they can find joy and meaning in everyday life.

Immune power personality traits distinguished by Dreher (1996) are associated with more effective coping with stressful everyday events and constitute the so-called "healthy traits" that protect against distress. These traits can be treated as personal resources that allow the individual to cope with their own emotions as well as social situations, and to enjoy well-being and health.

According to Dreher (1996), the traits that make up the IPP can be strengthened. This proves that they are not fixed and immutable elements of personality that only some people inherit, but are considered by Dreher as resources and so-called "healthy capacities," possessed from birth and expressed in an individual way. They can be understood as traits or dispositions for a particular behaviour that occur in individuals on a certain continuum.

Despite its name indicating associations with the physiological aspect of human functioning, the IPP is a complex theoretical construct including constellations of various traits for which a connection with mental and physical health has been demonstrated.

Each of the features described in Dreher's (1996) concept is directly or indirectly related to a stronger and more efficient immune system. These features are:

Attend, connect, and express (ACE)—The concept of the ACE factor is related to the research of the American psychologist Gary E. Schwartz, who recognized that the ability to notice, connect together, and express internal states of the body is associated with more efficient cardiovascular and immune system functioning (qtd. in Dreher, 1996, p. 2-3).

Capacity to confide—the ability to reveal secrets, traumas, deepest thoughts, feelings, and memories (Dreher, 1996, p. 96-124). In numerous studies on the disclosure of traumatic experiences (e.g., Pennebaker et al., 1995, 1988; Pennebaker & O'Heeron, 1984), Pennebaker has demonstrated that individuals who reveal their secrets, traumas, and emotions and confide in others have faster immune responses, healthier psychological profiles, and develop fewer illnesses (see Dreher, 1996).

Hardiness—includes three components: (a) sense of control over quality of life, health, and social conditions; (b) sense of commitment to work, creative activities, and relationships; and (c) sense of challenge – perceiving stress more as a challenge than a threat. People who display high levels of hardiness suffer less from chronic diseases and report fewer of them. Individuals with a hardy character also have a more powerful immune system (Dreher, 1996). Hardiness is thus a constellation of personality traits that function as immune resources during stressful events (Kobasa & Puccetti, 1983, p. 840). People with a hardy personality show a high degree of involvement and control, and tend to perceive stressors as challenges.

Assertiveness—the ability to be assertive in expressing needs, thoughts, opinions, and feelings while also taking into account the feelings and needs of others, the ability to accept praise and criticism, and the ability to refuse and disagree (Dreher, 1996, p. 175). Solomon's research, aimed at identifying psychological factors affecting immunity in AIDS patients, noted that assertiveness was strongly correlated with higher immune cells activity. Interestingly, this effect influenced not only one, but many types of immune cells considered crucial in the fight against HIV infection (qtd. in Dreher, 1996, p. 170–171).

Affiliative trust—positive desires and loving relationships based on respect and trust, in contrast to the motive of affiliation, which only defines the need for people to create relationships (see Dreher, 1996). Affiliative trust is the easiness of establishing deeper relationships (e.g., friendships) with other people and is associated with positive expectations regarding these relationships. In contrast to the experience of love, which positively affects the immune system, a sense of loneliness, as proved by, among others, Kiecolt-Glaser et al. (1984) in psychiatric patients, is associated with lowered activity of immune cells.

Healthy helping—helping others, whether significant others or strangers (Dreher, 1996, p. 255–287). People who help not only friends and family, but also strangers, have a healthier immune system, feel less back pain and feel significantly better compared to people who are not involved in helping others (see Dreher, 1996, p. 258–260; 283).

Self-complexity—characteristic of people whose personality has a variety of well-developed elements (including, among others, social

roles, relationships with other people, activities, interests, and identity), and is versatile and integrated at the same time (Dreher, 1996, p. 289). Such individuals think about themselves in many categories, assume many social roles, have many interests, and, at the same time, are able to integrate them.

It should be noted that tools that would provide an integrated methodology of measuring all seven IPP traits have not been developed thus far.

Material and Methods

The development of the Immune Power Personality Questionnaire (IPPPQ) is presented in Figure 1, showing the six stages of research.

Figure 1. Development plan of the Immune Power Personality Questionnaire.

Results and Discussion

After individually reviewing the available studies and concepts for each of the studied properties, operational definitions of the seven IPP traits were developed (Step 1). The previously defined IPP traits were then reconstructed in the form of questionnaire items (Step 2). On the basis of the definitions and the existing literature, indicators of each of the traits were searched for in the form of behaviours, beliefs, and emotions. This way, preliminary experimental scales were constructed, separately for each of the seven traits. The developed versions used a four-point scale, from *definitely agree* to *definitely disagree* (Step 3). Questionnaire item pools (about 300 items total) were subjected to linguistic and content analysis using the method of competent raters. Students of the 4th year of the MA psychology program at the University of Finance and Management in Warsaw with the specialization in health psychology were selected as competent raters. Each of the competent judges received forms with the definitions of a given trait and its associated questionnaire items. The raters assessed the conformity of each item's content with the given definition. The assessments were made on a 10-point scale, where higher values meant higher relevance. The aim of this stage was

to determine how accurately the individual test items operationalized the definitions of the IPP traits. High accuracy of a given item was evidenced by high average grades issued by the raters and high compliance of the raters' assessments. The results obtained this way were later used as one of the criteria for selecting items for the final version of the questionnaire (Step 4). Pilot Study I (Step 5) was conducted using the entire initial item pool, separately for each trait, in seven different samples. Table 1 presents the basic sociodemographic characteristics of the samples in which initial sets of items for each IPP feature were tested.

Table 1

Pilot Study I Sample Descriptives

Sample	Trait	Sex								
		Female			Male		Age			
		<i>N</i>	<i>N</i>	%	<i>N</i>	%	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
1	Attend, connect, and express	83	63	75.9	20	24.1	15	61	29.3	10.86
2	Capacity to confide	50	35	70	15	30	19	73	30.74	13.98
3	Hardiness	51	30	58.8	21	41.2	19	46	24.53	5.33
4	Assertiveness	88	48	54.5	40	45.5	18	55	25.3	7.92
5	Affiliative trust	68	30	44.1	38	55.9	19	60	32.56	12.72
6	Healthy helping	72	41	56.9	31	43.1	19	69	34.35	13.18
7	Self-complexity	53	22	41.5	31	58.5	18	71	33.82	11.96

The selection of the item pool in the experimental version of the IPPQ was made based on the combined application of criteria resulting from the assessments of competent raters and Pilot Study I.

– For content validity testing of items performed using the raters' assessments, it was assumed that the final pool for a given feature will include those items that are characterized by the highest average values and, simultaneously, the highest possible rater score, measured by the standard deviation value of the assessments .

– For the criterion from the pilot studies, it was assumed that for each feature, the items that reduce the reliability of the scale (i.e., Cronbach's α value for the scale would increase after removing the

item) will be rejected. Applying this criterion, items reducing reliability were systematically eliminated one by one until further elimination did not lead to an increase in reliability.

A total of 63 items were selected this way. They were included in the experimental test version, containing items for all IPP traits on one sheet (IPPQ v. 1).

Pilot Study II

Items selected in the previous stage were placed on one sheet, but their arrangement was made so that the items concerning a given trait would not be directly adjacent to each other. Pilot Study II, which also included the Social Approval Questionnaire (Drwal & Wilczyńska, 1980), had two aims:

- 1) Reverification of the items' psychometric properties and subscales in a condition where the items are placed on one test sheet and

- 2) Assessment of the relationship between the IPPQ results and the variable of social approval.

The study was conducted on a sample of 211 people (153 women, 58 men; $M_{age} = 35.05$, $SD = 13.79$)

The properties of the distribution of the IPPQ v. 1 scales were satisfactory. All subscale scores and the global score had distributions which did not differ significantly from the normal. The skew rates were close to low, and the kurtosis values were acceptable (kurtosis exceeded 1.0 only for the global score).

All scales of the IPPQ v. 1 showed statistically significant positive correlations with the variable of social approval. The strongest correlations were recorded for the scales of healthy assistance, affiliative trust, and for the global score. Correlations for these subscales reached values close to 0.50. The analysis of the correlation matrix between individual items and the variable of social approval showed that many items were statistically significantly correlated with social approval, reaching correlations of over 0.40 in the case of a few items. Therefore, the items were revised further, removing those items that most strongly correlated with social approval. At the same time, due to the relatively strong relationship of the IPPQ v. 1 scales with social approval, we decided to introduce a control scale to the

questionnaire, measuring the intensity of the need for social approval. The introduction of such a scale provides the opportunity to better control attitudes towards testing adopted by the subjects.

Additionally, within each subscale of the IPPQ v. 1, the reliability analysis was repeated, analysing the contribution of each item to the incremental reliability of the given subscale.

The content of some of the items has been modified and nine new items have been added, in particular to the subscales with the lowest reliability coefficients. As a result, the number of items was reduced to 55. The resulting version of the questionnaire was named IPPQ v. 2 and subjected to Pilot Study III.

Pilot Study III

The primary goal of this study was to develop a social approval subscale that would serve as a control scale in the IPPQ. To this end, 170 people participated in the study (93 women, 77 men; $M_{\text{age}} = 28,48$, $SD = 11,21$). In order to construct the internal IPPQ control scale measuring social approval, parts of the Social Approval Questionnaire were used. Therefore, five items were selected which were correlated the highest with the overall result of the IPPQ. Subsequently, these items were included in the IPPQ as a control scale.

An analysis of the reliability of the IPPQ v. 2 subscales was carried out. In the course of this analysis, the items contributing the least to the reliability of a given subscale were eliminated from some of the subscales. Three items were eliminated, leaving six items in each scale. In this way, the final version of the questionnaire was obtained, covering a total of 49 items, comprised of 42 items measuring IPP traits and seven items from the control scale measuring social approval. At the same time, a new order-alignment of the items was introduced.

Validation Study

The validation study was conducted on a sample of 727 participants from the general population. This sample included people aged between 16 and 81 years. About 63% of the sample were women, and about 36% were men.

Among the respondents, the most numerous group was comprised of people with a secondary education (about 34%) and a master's degree (about 32%). The largest subgroup of respondents (about 38%) lived in large cities (over 100000 residents), the least numerous consisted of people living in the countryside (about 18%).

Reliability of the Immune Power Personality Questionnaire

For individual subscales of the final version of the IPPQ, a reliability analysis (internal compliance) was carried out using the Cronbach's α coefficient. The obtained reliability ratios for the eight subscales and the global score are shown in Table 2. The test-retest reliability was expressed as Pearson's r correlation coefficients between the two measurements carried out on the same sample four weeks apart. This estimate of reliability was made on a separate sample. The sample consisted of 44 people, 34 women and 10 men. The average age in this sample was 26.32 ($SD = 8.83$). The values obtained are shown in Table 2.

Table 2
Internal Compliance Coefficients and Constancy for Individual Scales of the Immune Power Personality Questionnaire

IPPQ scales	Reliability (Cronbach's α)	Reliability (test-retest)
Attend, connect, and express	0.62	0.72
Capacity to confide	0.87	0.75
Hardiness	0.81	0.67
Assertiveness	0.84	0.85
Affiliative trust	0.8	0.73
Healthy helping	0.85	0.84
Self-complexity	0.84	0.82
Global score	0.92	0.87
Social approval	0.65	0.85

The reliability of the IPPQ was satisfactory. The obtained reliability coefficients estimated by internal compliance (Cronbach's α) for most of the subscales were high (above .80). The highest possible reliability was achieved by the global score and the subscales of the capacity to confide and assertiveness. Relatively lower

reliability coefficients were obtained in the ACE factor and the social approval scale. Satisfactory and high values of Cronbach's α reliability coefficients indicate the internal conformity of the tool and prove that the measurement can be treated as reliable.

The stability ratios were generally similar or slightly lower than the internal compliance rates for most of the scales. For the ACE factor and the social approval subscale, the stability ratios were higher than the internal compliance ratios. The lowest stability rate (0.67) was obtained for the subscale of hardiness. For other subscales, these indices were in the satisfactory (above 0.70) or high (above 0.80) value ranges. The highest value of the stability index was obtained for the global score (0.87). These values generally indicate satisfactory or high stability of the IPPQ results over time and prove that the questionnaire can be treated as reliable also in this aspect.

Factor Analysis of the Immune Power Personality Questionnaire

In order to determine the relevance of the factors in the IPPQ, an exploratory factor analysis was carried out. The main component method with varimax orthogonal rotation and the Keizer correction was used. Eigenvalues greater than 1.0 were assumed as the criterion for the identification of the factors (Table 3).

A 10-factor structure was obtained. Six of the obtained factors were unequivocally equivalent to six predetermined scales of the IPP traits. Two of the obtained factors were created by items belonging to the ACE scale and two factors were created by items belonging to the social approval scale.

The ACE scale did not obtain confirmation as a separate factor in the factor analysis: Items 9 and 25 formed one factor, Item 1 created an independent factor, Items 41 and 33 obtained the highest factor loads in the factor of the capacity to confide, and Item 17 obtained the highest factor load on the scale of affiliative trust. However, positions that joined the scales of the capacity to confide and affiliative trust had factor loads lower than the items originally forming these scales.

The items that created the social approval scale a priori have also been split. Items 40, 49, and 32 formed an independent factor, Items 16 and 8 also formed an independent factor. Item 48, which is part of

Table 3

**Factor Charge Matrix of the Immune Power Personality
Questionnaire test items**

Scale	Item	1	2	3	4	5	6	7	8	9	10
CTC	10	0.81									
CTC	18	0.78									
CTC	2	0.78									
CTC	34	0.78									
CTC	42	0.71									
CTC	26	0.65									
ACE	41*	0.64								-0.20	0.05
ACE	33*	0.41								-0.07	-0.24
AT	29		0.77								
AT	13		0.7								
AT	5		0.63								
AT	37		0.63								
AT	45		0.57								
AT	21		0.45								
ACE	17*		0.45							0.08	0.08
SA	48*		0.38					0.30	0.18		
HH	30			0.83							
HH	14			0.8							
HH	46			0.71							
HH	6			0.7							
HH	38			0.68							
HH	22			0.58							
HH	24*			0.51				0.26	-0.04		
AS	20				0.80						
AS	4				0.77						
AS	36				0.70						
AS	44				0.66						
AS	28				0.66						
AS	12				0.65						
SC	31					0.77					
SC	15					0.73					
SC	7					0.73					
SC	23					0.72					
SC	39					0.63					
SC	47					0.52					
HA	27						0.7				
HA	11						0.65				
HA	19						0.63				
HA	3						0.61				
HA	43						0.58				
HA	35						0.49				
SA	40							0.68			
SA	49							0.61	0.29		
SA	32							0.55	0.13		
SA	16							0.17	0.72		
SA	8							0.09	0.71		
ACE	1*									0.65	-0.04
ACE	9									-0.03	0.52
ACE	25									0.03	0.49

Note. ACE = attend, connect, and express; AS = Assertiveness; AT = Affiliative trust; CTC = capacity to confide; HA = Hardiness; HH = healthy helping; SA = social approval; SC = self-complexity* = Items that received the highest factor load not in their factor.

the social approval scale joined the affiliative trust scale and Item 24 joined the healthy helping scale. The items that created the social approval scale a priori have also been split. Items 40, 49, and 32 formed an independent factor, Items 16 and 8 also formed an independent factor. Item 48, which is part of the social approval scale, joined the affiliative trust scale and Item 24 joined the healthy helping scale. The last two items of the social approval scale obtained relatively lower charges in these factors than the items originally forming them.

Ten isolated factors explained a combined 59% of the variance in the test (see Table 4).

Table 4

Variance in the Immune Power Personality Questionnaire explained by factors distinguished in the factor analysis			
Factor	Sum of squares of loads after rotation		
	Together	% variance	% cumulated
1	4.66	9.5	9.5
2	4.2	8.56	18.06
3	3.97	8.09	26.16
4	3.61	7.36	33.51
5	3.51	7.17	40.68
6	3.07	6.27	46.95
7	1.74	3.54	50.5
8	1.71	3.48	53.98
9	1.39	2.83	56.81
10	1.14	2.33	59.14

Although no eight-factor structure was obtained, six out of seven scales measuring the IPP traits achieved an almost perfect mapping, consistent with the assumptions. This confirms the validity of the items in the subscales constructed a priori and the legitimacy of distinguishing these scales as measuring relatively independent constructs.

Conclusions

In sum, the results of the factor analysis did not confirm the validity of the ACE and social approval as separate scales. This may indicate a common range of variance between both ACE, social approval, and other IPP traits. It should also be emphasized that the ACE factor, by its definition, is heterogeneous—it includes the ability to recognize

own internal states, the ability to associate them with the stimuli that cause them, and the ability to adequately respond to them.

Analyses showed that for six out of the seven scales measuring IPP traits, it was possible to fully confirm the legitimacy of separating these subscales in the exploratory factor analysis. The results obtained on the IPPQ can be treated as personality correlates of various aspects of physical health. Further research should focus on verifying the validity of the IPPQ. In particular, it should focus on the comparison of the IPPQ results between clinical groups of people suffering from various diseases and healthy individuals. In addition, further research should aim to verify hypotheses about the relationship between IPPQ results and parameters of the immune system.

The application of the questionnaire may include not only scientific research, but also the assessment of IPP among healthy people as well as patients, allowing for determination of the strength of individual traits. In practice, the analysis of an individual profile of IPP traits can help to identify those characteristics that can contribute to an increase or decrease in physiological immunity and thus affect health. It seems that the intraprofile analysis in particular may be a valuable source of information orientating therapeutic or prophylactic activities for a specific person (e.g., an individually developed training program).

Summary

In his book, Henry Dreher (1996) described research on seven personality characteristics which had been found to be linked to the functioning of the immune system. His literature review concluded that the IPP encompasses such dimensions as the ACE factor, the capacity to confide, hardiness, assertiveness, affiliative trust, healthy helping, and self-complexity. So far, however, no tool has been developed that would allow for a simultaneous measurement of these traits. This chapter presents the summary of Dreher's research on IPP and results of the studies on the development and psychometric validation of the IPPQ. The results provide data confirming the reliability and validity of this new tool. The IPPQ can be used in the future in both scientific research and in clinical practice to enhance the diagnosis and therapeutic process.

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