

STUDY ON THE ADAPTATION OF THE PROBLEM SOLVING INVENTORY (P.S.I.) TO THE ROMANIAN POPULATION

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Abstract: Consecrated studies in scientific literature support the estimation of problem solving as important to teachers, psychologists or researchers. Assessing problem solving is connected to a series of behavioural, cognitive and affective activities in relation to personal approach on problem solving.

In view of using the Problem Solving Inventory; P.S.I.; Heppner and Peterson, 1982, studies are necessary to clarify the issue of diversity pertaining to environment, age, gender, psycholinguistic aspects, cultural factors, school environment etc.

Within the study implemented in Romania we analyse the P.S.I. experimentally, keeping into account the cultural specifics of a postcommunist country. There in are presented: the methodology, psychometric data for the scale and the results of the Confirmatory Factor Analysis.

The results support the reliability of the P.S.I. in the case of Romanian participants.

Keywords: problem solving, Confirmatory Factor Analysis (C.F.A)

Starting with 1982, The Problem Solving Inventory (P.S.I.) (Heppner And Peterson, 1982) has been used in about 130 studies even though its validity has not always been supported. Analysing the studies in the field and the abstracts published so far in the most prestigious international data bases, we can observe that this scale has not received a due interest in Europe and especially in eastern Europe.

The appreciation of the ability of solving problems has been related in the last thirty years to a great number of variables characteristic of the clinical psychology including distress, depression or behavioural coping. Furthermore, psychological or educational counselling have benefited of the new directions in research sustained also by the using of the P.S.I. (DeJoung and Berg, 1998; Heppner, 2000; Corcoran and Fischer, 2007).

The appreciation of problem solving has been related to a series of behaviour, cognitive and emotional activities with a personal approach (Heppner and Peterson, 1982; Heppner, Baumgardner, Larson and Petty, 1988). The studies in the field sustain that the problem solving issue is of utmost importance for psychologists, pedagogues and researches. Heppner and Baker (1997) state that the problem solving is an issue of paramount importance for practitioner psychologists who work towards increasing the efficiency with people of all ages.

Lucas (2004) insists on the necessity of studies which should clarify the problem of diversity (race, ethnic group, gender, class). Having all these considerations in mind, in the study applied in Romania, we analysed in an experimental way the P.S.I. having in view the cultural specific of a post-communist country. Moreover, Salami and Aremu (2006, page 142) emphasise that age, gender, environment, congenital factors, psycholinguistic problems, physical or cultural factors and the educational environment are significant variables which influence the development of the adolescents in their personal life environment.

In this study we will determine the measure in which the P.S.I. presents internal consistency for the population in the west of Romania. Secondly, the structure of the P.S.I. factors (confidence in the ability of solving problems, self-control and the approach-avoidance style) in the case of a sample of teenagers and adults will be analysed by means of the Confirmatory Factor Analysis (C.F.A.). We estimate that the results will prove the applicability of the P.S.I. on the Romanian sample.

The P.S.I. is an instrument with 35 items directed to measure the way in which individuals generally react to every day personal problems (Heppner, 200, page 591). The term 'problem' refers to personal aspects such as choosing a career path, feelings or the decision of

separating from someone important in life. The P.S.I. does not measure the current abilities of solving problems, but has in view the personal style of solving problems.

Administration

The P.S.I. can be used in the case of both teenagers and adults and can be filled in individually or collectively (Corcoran and Fischer, 2007, pp. 579-582).

The instructions require the respondents to appreciate what they believe it is true in the case of every item. In the next stage the respondents are required to self-assess themselves on a Likert scale (between 1 as strongly agreeing and 6 as strongly disagreeing) and to choose the value that corresponds to the degree in which they agree or disagree. The P.S.I. and its scales are anchored in such a way that the lowest scores should reflect the highest perception of their ability to solve the problems.

The evaluation of the answers

The P.S.I. consists of three subscales: confidence in the ability of solving the problems (items: 5, 10, 11, 12, 19, 23, 24, 27, 33, 34, 35), the approach-avoidance style (items: 1, 2, 4, 6, 7, 8, 13, 15, 16, 17, 18, 20, 21, 28, 30, 31) and the self-control (items: 3, 14, 25, 26, 32). The items 9, 19 and 22 are filter items and do not count. Also, the global score is considered as a general index of the awareness of problem solving ability.

The P.S.I. can be scored by the patient/client, by the practitioner or by the researcher. The following items will have reverse scores: 11, 34, 1, 2, 4, 13, 15, 17 and 21. In the next stage, the scores for each factor will be totalised. The scores of the three totalised factors will represent the total score. The low scores show a greatest perception of personal abilities.

Practical application

The P.S.I. is used especially in counselling but as research instrument, as well. Heppner and Baker (1997), Heppner, Witty and Dixon (2004) and Beccaria and Machin (2010) also

support the idea that the P.S.I. is not affected by the social desirability and is sensible to clinical changes (DeJoung and Berg, 1998).

The aim of the study

1. The validation of the P.S.I. and the establishment of the norms for the population;
2. Empirical examination of the relationship between the P.S.I. and other relevant variables.

Research method

Participants

In our study we included in the first stage of the research a number of 280 persons from the rural area (129; 46.1%) and from the urban area (151; 53.9%) being heterogeneous from the point of view of their educational level. The initial panel consisted of teenagers (N=130), students (N=129) and persons with university degrees or secondary schooling education (N=21). The respondents were aged between 16 and 45 years of age, the age average being of 21.49, and the standard deviation of 6.28. We would like to mention that the panel was made up of 146 men (52.1%; the age average being of 19.86; the standard deviation being of 5.51) and 134 women (47.9%; the age average being of 23.26; the standard deviation being of 6.61). From the point of view of marital status, the panel consisted of 35 married persons (12.5%) (8 married men; 5.5%; 27 married women; 20.1%) and 245 single persons (87.5%) (138 single men; 94.5%; 107 single women; 79.9%).

In the second stage of the study, the panel was formed of 147 persons (79 teenagers, 54 students and 14 adults). This panel was used for the establishing of the P.S.I. results. The respondents who did not complete the scales which were part of the study were eliminated. They were aged between 16 and 45 with an average age of 21.06 and standard deviation of 6.28. The panel consisted of 57 men (38.8%; average=20.66; standard deviation 5.60; single=51; married=6) and 90 women (61.2%; average=21.31; standard deviation=6.70; single=75; married=15).

Procedure

The participants filled in the P.S.I. form as well as other social-cognitive orientation instruments in two testing sessions (T1 and T2). The second session was implemented two weeks later (according to Heppner's, Corcoran's and Fischer's prescriptions).

In order to establish the internal consistency and to confirm the factors, we analysed the results of the whole panel (N=280). For the establishing of the confidence coefficient (test-retest) and for the validation of the P.S.I., we took into consideration the results of the participants during the two sessions. We did not assess the participants who did not present creditability to the examiner or those who were not present in the second session.

The participants were examined individually or in small groups, their anonymity being preserved. No time limit was imposed.

RESULTS

Technical Aspects

The preliminary analysis did not present significant differences between genders. In consequence, the Confirmatory Factorial Analysis data are presented for the entire panel (N=280).

In Table nr.1 we present the averages and the standard deviations for the subscale and the total score of the P.S.I. As we can notice from the table, the values are comparable to those obtained by the authors of the scale (Heppner and Peterson, 1982) even after adapting the items to the Romanian socio-cultural environment. We can also notice the adolescents panel and the general panel do not present significant average and standard deviations. The accuracy of the research can be sustained by the Confirmatory Factorial Analysis which proves to what extent the P.S.I. is valid in Romania as well.

TABLE 1. Items, means and standard deviations of P.S.I.

Scale	Teenagers	Total
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	(N=130)	panel(N=280)				
	Boys	Girls				
	M	SD	SD	M	SD	
Confidence in the ability of solving the problems		28,20	6,28	30,53	6,92	27,88
Approach - avoidance style		47,03	8,53	48,76	10,45	46,55
Personal control		17,95	4,78	18,53	4,45	17,98
General Index for awareness of the ability of solving the problems		93,19	16,83	97,84	19,47	92,41

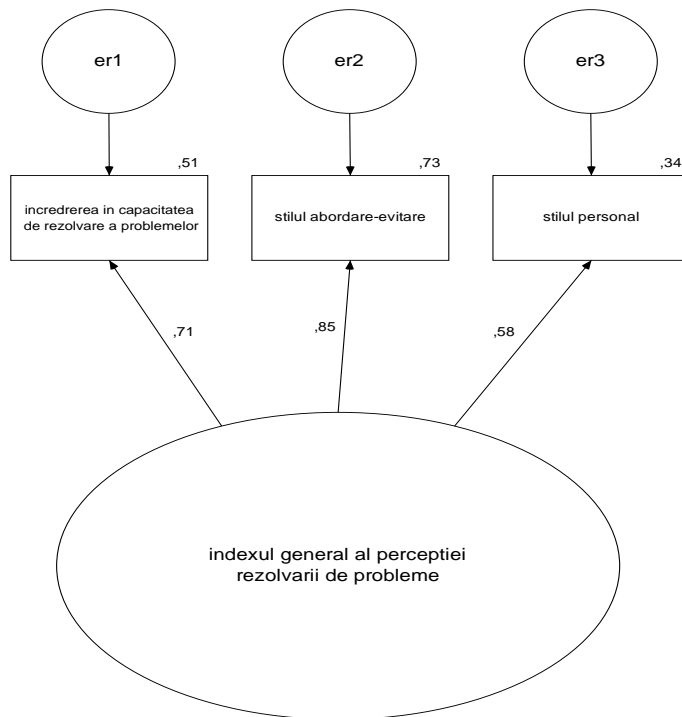
The preliminary analysis of the correlative matrix proves that all the P.S.I. items are positively intercorrelated and the Barlett sphericity test is significantly stable χ^2 (N=280) = 3607,431, $p < .0001$, which confirms the usefulness of the Factorial Analysis. The testing of the degree of suitability of the panel has been done by means of the Kaiser-Meyer-Olkin (KMO) method, and we obtained a value of .82, which demonstrates that the panel fulfils the basic conditions for the use of the Exploratory Factorial Analysis (EFA).

The 32 items (the 32 analysed items, exclude the 3 filter items) which compose the P.S.I. have been submitted again to the Confirmatory Factorial Analysis (CFA). With the help of the 280 respondents panel we were able to establish the CFA in order to test the degree of suitability of the solution with 32 items in the case of the Problem Solving Inventory (P.S.I.). Thus, we can ascertain that the factorial model proposed by us for the P.S.I. (Table 2) is appropriate and the data found correspond the theoretical suppositions (χ^2 normalised < 3; RMR < .80; GFI > .80; RMSEA < .08). The results obtained demonstrate that, in the case of the analysed panel, the model proposed (Chart 1) for the composition of the P.S.I. subscales suits our aim.

TABLE 2. The values of the main absolute and comparison indices for the factorial model of the P.S.I.

Indicators	χ^2 normalized (CMIN/D F)	RMR	RMSEA	GFI	AGFI	NFI	RF I	IFI	CFI
	2,753	.79	.08	.89	.87	.82	.79	.89	.89

CHART 1. The diagram with the stages for the P.S.I. factorial model



In TABLE 3, we can notice that the items proposed by us present a significant relationship with the latent factor (the general Index of the awareness of the ability to solve the problems), which determines the three manifest variables presented in Chart1. Consequently, we can draw the

conclusion that the variant we have proposed for the P.S.I. is solid and convergent according to Garson's specifications (2006, 2007).

TABLE 3. The saturation of the items upon the P.S.I. factors (the prevalence of the regression in the structural model established according to the CFA)

	Estimation	S.E.	C.R.	P		
Confidence in the ability of solving the problems	<---		General Index for awareness of the ability of solving the problems	1,000		
Approach - avoidance style	<---		General Index for awareness of the ability of solving the problems	1,664	,157	10,572
Personal style	<---		General Index for awareness of the ability of solving the problems	,584	,056	10,487

The Confirmatory Factorial Analysis underlines the fact that the P.S.I. presents discriminative validity as well (Table 4), the correlation coefficients of the three factors (confidence in the ability to solve problems, the approach-avoidance style and the personal style) being not very high (below .90).

TABLE 4. Standardised Estimation of the P.S.I. regression

	Estimation	
Confidence in the ability of	<---	General Index for awareness of the ability of

solving the problems		solving the problems
Approach - avoidance style	<---	General Index for awareness of the ability of solving the problems
Personal control	<---	General Index for awareness of the ability of solving the problems

Internal Consistency

Heppner and Peterson (1982) and Heppner (2000) reported fidelity of the P.S.I. between .72 and .85 for the subscales and an alpha coefficient of .90 for the general index of the awareness of the ability of problem solving.

In our study, after adapting the P.S.I. items, we can notice that the subscales present a similar fidelity to the previously mentioned studies. The correlation between the items and the total score of the P.S.I. (between .73 and .97) is significant for the threshold $t < .01$, which demonstrates the necessity of preserving the items within the instrument of the awareness of the ability of problem solving. The data presented in Table 5 are close to those reported by Heppner and Peterson (1982).

TABLE 5. Self – confidence coefficient of the Problem Solving Inventory (P.S.I.)

Scales	Internal consistency	Self-confidence coefficient		
	N	α Cronbach	N	r
Confidence in the ability of solving the problems		280	.75	147
Approach - avoidance style		280	.74	147

Personal control	280	.77	147
General Index for awareness of the ability of solving the problems	280	.86	147

Significant correlation at $**p < .01$

The fidelity of the P.S. inventory has been assessed by means of the alpha Cronbach coefficient. For the global index of the P.S.I., we obtained a coefficient of .86 (32 items), which indicates a very good internal consistency. In Table 5 we present the internal consistency of the three P.S.I. subscales as well. The values range between .74 (the approach-avoidance style) and .77 (personal control). The results obtained are greatly due to the participants' ability to discriminate between the three subcategories of their own awareness of problem solving ability.

TABLE 6: The inter-correlation matrix of the P.S.I. scales

Dimensions	1	2	3	4
1. Confidence in the ability of solving the problems	-			
2. Approach - avoidance style	.61**	-		
3. Personal control	.43**	.50**	-	
4. General Index for awareness of the ability of solving the problems	.82**	.90**	.71**	-

Significant correlation at $**p < .01$

In Table 6 we can notice that, in the case of the three subscales composing the P.S.I., the inter-correlations are at the same level with the fidelity coefficients showing that there is no clear demarcation between them.

The test-retest confidence coefficient

In our study (Table 5), the results of the evaluation during the test (T1) and retest (T2) stages present a consistent stability of the P.S.I. subscales, the registered value being significant at a threshold of $t < .01$. The evaluation of the correlation coefficient between the two stages (T1 and T2) shows a value between .25 and .67, which indicates the consistency of the results. The t test for pair samples shows that there are no significant differences from the statistical point of view between the two examinations.

Validity

Throughout this study we want to sustain the validity of the P.S.I. and we consider it to be an efficient instrument in detecting changes both in the conduct of the teenagers suffering from behavioural disorders and in that of their families (the change in the teenagers's conduct will automatically attract a change in the family's conduct) all along the counselling process.

The P.S.I. is an instrument differentiating between the clinical and the non-clinical panels (Corcoran and Fischer, 2007). Thus, its validity will be presented (just like of other instruments used throughout this study) in subsequent studies, where we will analyse the "problem solving" construct in association with other relevant concept for adolescents suffering from behavioural disorders.

The first information about discriminative validity was presented by Heppner and Peterson (1982, pp.71-72), who reported correlations between the P.S.I. factors and the measurements of the verbal intelligence by means of SCAT.

Huang and Flores (2001) showed that the P.S.I. demonstrates an internal consistency acceptable in the case of the American students of Mexican origin (Huang and Flores, 2011). The greatest number of studies have been implemented on American students, but the validity studies has been presented in the case of Afro-American students, African students (South

Africa) (Salami and Aremu, 2006), students in Turkey, adults speaking French in Canada or adolescents in China, as well. On the other hand, Heppner, Pretorius, Wei, Lee and Wang (2002) consider that the P.S.I. has a good internal consistency irrespective of the culture of the people in which the instrument was translated and used.

Huand and Flores (2011), when using the AFC, supported the initial model proposed by Heppner and Peterson (1982). The results obtained prove the cultural validity of the P.S.I. scores with Americans of Mexican origin, suggesting the possibility of generalizing the results in other cultures as well.

As previously presented, there are several studies sustaining the validity of the P.S.I. (such as Huang and Flores, 2011; Salami and Aremu, 2006; Rath, Langenbahn, Simon, Sherr, Fletcher and Diller, 2004; Heppner and Peterson, 1982) and, above all, the construct validity of the three factors and of the total score of the P.S.I.

Beccaria and Machin (2010) studied the structural validity of the P.S.I. (by means of the CFA) and the relationship between the P.S.I. and the subscales of positive and negative emotions, of depression and of anxiety. The data found greatly replicated the results previously reported by Heppner and coll. (2004) without affecting the original structure. The results presented by Beccaria and Machin (2010) show a good predictive and structural validity of the P.S.I.

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