The Equivalence of Single-Item Scales of Psychic Distance

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Abstract

Beckerman (1956) originally proposed the phenomenon of psychic distance, which was subsequently incorporated into the Uppsala model, in order to explain why organizations move from markets that are psychically closer towards markets that are psychically distant, as they gain knowledge and increase their commitment to international activities. However, despite the concept's importance and general acceptance, there is still much debate regarding how the phenomenon ought to be measured, with several instruments having been developed for such purpose. The present study sought to evaluate different instruments for measuring psychic distance as a summary construct. Four data collection instruments in the relevant literature were identified, and applied to a sample of 377 university students. Approximately one fourth of the sample answered each questionnaire. A range of statistical tests were carried out in order to identify the features of the respective instruments as well to assess their equivalence and convergent and discriminant validity. The results enabled features to be compared and recommendations to be made regarding which instruments appear to produce the best results.

Introduction

Operating in foreign markets poses increased risks due to increased uncertainty and complexity. Risk is, therefore, a key variable for understanding the process of the internationalization of the firm. The Uppsala model, an exponent of behavioral theories on firm internationalization, was built based on a particular vision of how the perception of risk impacts internationalization decisions (Johanson and Vahlne, 1977).

According to Clark and Pugh (2001), the model seeks to explain and predict two aspects of firm internationalization: (1) the incremental pattern of development in a determined foreign market, and (2) the gradual expansion by organizations from countries that are psychically closer to those that are psychically more distant. The second aspect of the model proposes that the sequence of penetrating external markets is constrained by the phenomenon of psychic distance.

The logic of psychic distance is rooted in perceptions of risk. Managers tend to be risk-averse and make decisions concerning entry into foreign markets based on incomplete information (Björkman and Forsgren, 1997). As such, the greater the psychic distance of the foreign market, the greater the resistance by managers in making the initial foray. For this reason, international operations tend to start in markets perceived to be psychically closer (Johanson and Vahlne, 1992). Psychic distance is gradually overcome by the acquisition of experiential knowledge; the organization can then gradually penetrate markets at a greater psychic distance.

Despite the broad acceptance of the concept of psychic distance, problems related to measuring the construct have been persistent in the empirical studies. For example, Dow (2000, p. 51) observed that "efforts to develop and test a valid and reliable instrument to measure psychic distance have been sporadic and flawed". Others authors pointed out inconsistencies in terms of the conceptualization, operationalization, and explanatory power of the measure (Evans and Mavondo, 2002a), as well as in the contradictory appearance of some of the results (Stöttinger and Schlegelmilch, 1998) in the existing studies. Sousa and Bradley (2006), in turn, suggested that the construct was little understood and Brewer (2007, p. 45) raised "serious questions about how the [psychic distance] concept has been incorporated into research in recent years".

The sheer variety of measurement instruments that have been proposed underlines the lack of consensus regarding the best way to measure the construct. Moreover, although researchers have developed and used a variety of instruments, no study has, thus far, concerned itself with making a comparative evaluation for the purpose of assessing their equivalence.

This being the case, the theoretical contribution of this study pertains to the investigation of psychic distance as a summary construct and the assessment of different instruments designed to measure psychic distance. The study is organized as follows: a review of the pertinent literature is followed by an explanation of the methodology adopted in the study. The analysis is then presented. Finally, conclusions are presented as well as suggestions for further research.

Review of the Literature

The phenomenon of psychic distance has attracted the attention of researchers in the area of International Business ever since Beckerman (1956) proposed the existence of a behavioral factor related to the way in which relations between international suppliers and buyers were established and maintained, a concept he referred to as 'psychic distance'. Johanson and Wiedersheim-Paul (1975, p. 307) suggested that psychic distance could be understood as "factors preventing or disturbing the flow of information between firms and market". More recently, Baack and Baack (2006, p. 229) re-conceived the construct as "the aggregate of national distance and business distance being processed through individual experience".

Authors are divided between those who regard psychic distance as a summary construct and those who view it as a sum of factors. In this context, the notion of summary construct

means that, upon noticing the difference between the country of origin and another, the individual does not assess the discrete factors responsible for the difference and make a judgment based on such an assessment, but, rather, experiences the difference holistically, with a foreign country's differences being perceived as greater or smaller relative to the country of origin. This conception is rooted in the psychological concept of *gestalt*, that interprets discrepancies not as an erroneous reproduction of reality, but as an expression of individual cognition. This vision, originally formulated by Reid (1986), has many followers. On the other hand, the notion of psychic distance as a set of discrete factors implies that measurement thereof include such factors. For followers of this approach, psychic distance would be defined as an aggregate measure of the difference factors between the country of origin and the foreign country.

The present work revolves around the treatment of the concept of psychic distance as a mere summary construct.

Measurement of Psychic Distance as a Summary Construct

A good many authors that use the summary construct approach (following Reid, 1986) have relied on measuring psychic distance by means of a single-item scale.

Leite, Da Rocha and Figueiredo (1988) used the summary construct approach to measure psychic distance, starting out from the assumption that the cultural affinity felt by an exporter in relation to a given country affects their decision to export to such country. Cultural affinity was measured based on the perception of national differences and similarities. The authors based their research on a study of 171 top executives at 153 private Brazilian exporters of manufactured goods. Respondents were asked to ascertain the degree of similarity or difference between the country of origin (Brazil) and a range of

exporting countries, using a seven-points scale (from 1 = very similar to 7 = very different).

Boyacigiller (1990) carried out a research study at large U.S. banking institution, interviewing 1015 professionals at 84 branches. The question posed in order to measure psychic distance aimed to evaluate the difficulty of adapting to work in different countries: "How difficult it is it to do business in the following countries because of the difference in the location's culture from that of the U.S.? Another route is to consider how much time the 'average American' takes to adapt to the business environment. Are some countries in the same region easier to adapt to than others?" The author used a five-point scale from 1 = very easy, to 5 = very difficult to adapt/very different from the United States (and including the option 'Don't know').

Shoham, Rose and Albaum (1995) studied Danish manufacturing companies involved in international activities. The authors asked respondents to evaluate psychic distance by means of the following question: "Describe the general nature of geographical diversity your company faces in its most important products in terms of differences in culture, economic climate and legal barriers". The perceptions were measured on a five-point scale, ranging from 1 = very different, to 5 = no difference.

Dichtl, Leibold, Köglmayr and Müller (1984) and Dichtl, Köglmayr and Müller (1990) made use of principles of cognitive mapping, starting out from the premise that people might develop mental maps of space and distance that might not necessarily correspond to reality. The authors carried out their research with executives from Japan, Finland and Germany. In order to measure psychic distance, the interviewees were asked to position certain countries in a space with 14 concentric circles such that the distance to the center (country of origin) represented the subjective export experience in relation to those

countries. The countries perceived as psychically more distant would be put in the outer circles; those perceived as being psychically less distant would be placed near the center. The distance of each country from the center was used to measure psychic distance.

With the objective of improving the psychic distance measuring instrument used by Dichtl, Leibold, Köglmayr and Muller (1984), Stöttinger and Schlegelmilch (1998) adopted a free scale, i.e., without any reference stimulus, in order to capture individual differences of judgment. The authors used a sample of U.S. companies in the manufacturing sector. In order to relate the psychic distance perceived by the managers to actual geographic distance, Stöttinger and Schlegelmilch (1998) translated the judgment spectrum into the distance between the degree of longitude of 0° (Greenwich Meridian) and 180º (International Date Line). This geographical distance (of approximately 16,700 kilometers) was related to the interviewees' answers on the magnitude scale.

According to Stöttinger and Schlegelmilch (2000), the utilization of a single-item scale based in the idea of a summary construct has been simultaneously defended and criticized. Evans, Treadgold and Mavondo (2000), for example, have criticized the work of Stöttinger and Schlegelmilch (1998) suggesting that the single-item measure proposed by the authors failed to incorporate the factors that, if combined, would create the perception of distance (including factors related to business or the competitive/legal milieu.) For Evans and Mavondo (2002a, 2002b), the notion that a single item could fully capture the perceptions of exetutives regarding the construct's various dimensions would be questionable. However, Stöttinger and Schlegelmilch (2000) have defended their methodological choice, claiming it to be a measure based on the principles of cognitive mapping (which assumes that people develop subjective maps of space and distance that do not necessarily correspond to reality).

Methodology

The present study has sought to answer the following question: *Do the instruments to measure psychic distance conceived of as a summary construct produce similar results?* Given the characteristics of the study, the survey method was adopted. The target population of the study comprised Brazilian university students enrolled in undergraduate classes in Business Administration, Economics and Accounting. The university in question was located in Rio de Janeiro and the students sampled had completed at least two years of undergraduate study. A non-probabilistic sample of 377 students was obtained.

Based on the literature, four instruments for measuring psychic distance were selected and, in each case, psychic distance was assumed to be a summary construct measurable using a single-item scale. The instruments used were Stöttinger and Schlegelmilch (1998); Leite, Da Rocha and Figueiredo (1988); Boyacigiller (1990); and Shoham, Rose and Albaum (1990).

For purposes of comparison, a five-point scale was adopted for all of the instruments, regardless of whether the number of intervals in the original work was five or seven. A total of 16 countries were used: South Africa, Germany, Argentina, Canada, China, U.S.A., Greece, Hong Kong, India, England, Israel, Italy, Japan, Mexico, Portugal and Russia. The selection of the 16 countries paralleled the list of countries utilized in previous studies in Brazil (Leite, Da Rocha and Figueiredo, 1988; Silva, Da Rocha and Figueiredo, 2007).

Each of the four questionnaires was applied to approximately one fourth of the sample. The decision to divide the student sample into four was a result of the inadvisability of applying four very similar questionnaires to the same respondent: doing so might have

resulted in bias from tiredness, irritation, or some other negative reaction. In order to ensure comparability of the instruments, a systematic random sample procedure was used.

The questionnaires were filled out by the respondents themselves, with the aid of the interviewers. The data were collected from September to December of 2008. The questionnaires were filled out inside the classroom, either before or after class.

Preliminary Analyses

<u>Test of Homogeneity</u>

In order to ensure the comparability of the results obtained using each instrument, it is critical that the independent samples be homogeneous. This means that any differences between the groups are caused by the measuring instruments themselves and not by the informants. An evaluation was made of the demographic variables of the four samples in order to discern possible differences between them. For purposes of ease of identification, the questionnaires were named A, B, C and D, as follows:

- questionnaire A: the scale of Stöttinger and Schlegelmilch (1998)

- questionnaire B: the scale of Leite, Da Rocha and Figueiredo (1988)

- questionnaire C: the scale of Boyacigiller (1990)

- questionnaire D: the scale of Shoham, Rose and Albaum (1990).

The comparison of the samples was carried out, variable by variable, using the chi-square test, in order to ascertain the existence of a significant relationship between the variable and the samples relative to the instruments A, B, C and D (assumed to be independent) utilized in the analyses. The results obtained indicated that the samples did not present significant differences in terms of gender (chi-square = 4.179; p-value = 0.243); age (chi-

square = 14.966; p-value = 0.454); student distribution by course (chi-square = 1.687; p-value = 0.946); distribution by university seniority (chi-square = 7.993; p-value = 0.979); religion (chi-square = 14.154; p-value = 0.514); travel abroad (chi-square = 1.541; p-value = 0.673) and lived abroad (chi-square = 3.254; p-value = 0.354). In general, a typical student was male (62%), aged between 21 and 23 (57% and 22.3 years, on average), second-semester junior (26%), Catholic (44%), had travelled abroad (59%), and had never lived abroad (74%).

Missing Data and Outliers

Missing information is a frequent problem in surveys. According to Hair et al (2006), the task of the researcher, in the face of missing data, is to attempt to identify problems that could prevent the possibility of making generalizations from the results. If necessary, data must be imputed, i.e., missing data is replaced with plausible values. One advantage of imputation is that, after the procedure, the researcher can continue to use traditional statistical analysis techniques for the complete data. In order to evaluate the possibility of imputing missing values or discarding the case, it must be ascertained whether the missing values are MCAR (missing completely at random). In fact, the missing data were MCAR, indicated by the fact they were distributed reasonably randomly among the observations, i.e., there is no bias in the pattern of missing data. Cases of missing data in the sample were few: of the total of 377 cases and 16 variables, only 19 cases (5%) presented at least one missing datum. The following table presents the missing data identified, the results of the Little's MCAR test, and the how the missing data was handled.

Table 1 – Identification of missing data

Questionnaire	Number of Cases	Cases with missing data	MCAR Test Results			Handling
			Chi-square	d.f.	*p-value*	
A	96	5	111.577	75	0.004	5 cases with missing data removed.
B	97	2	15.996	15	0.382	EM method of data imputation.
C	95	1	9.134	15	0.870	EM method of data imputation.
D	89	3	19.185	30	0.936	EM method of data imputation.

The following step was to verify the occurrence of outliers. Outliers do not constitute an intrinsic problem, unless their presence significantly impacts the relationships between variables. However, it can be a challenge to identify those cases with the potential to significantly impact the relationships being studied. This being the case, only the most extreme cases (identified using the SPSS tool "identify unusual cases") were excluded. Having completed the procedures to handle missing data and outliers, the sample was constituted as shown in table 2, below.

Table 2 – Sample distribution after elimination of missing data and outliers

Respondents	Type of Questionnaire				
	A	B	C	D	Total
Initial sample	96	97	95	89	377
Cases discarded due to missing data	5	0	0	0	5
Cases discarded due to outliers	1	1	2	3	7
Final sample	90	96	93	86	365

Test of Hypothesis

H_1: The main instruments utilized to measure psychic distance as a summary construct do not present significant differences in their measurements.

Hypothesis H_1 was then tested. For each one of the 16 countries tested, there were confirmed differences in the psychological distances measured by instruments A, B, C and D. The hypothesis was tested by means of the following steps: (a) Exploratory data analysis and normality tests; and (b) Kruskal-Wallis test.

Exploratory data analysis and normality tests

Initially, it was necessary to make certain adjustments to the scales in order to enable their comparison:

- Unlike the B, C and D, which used a five-point scale, questionnaire A featured a scale from 0 to 15. This being the case, questionnaire A was modified as follows: 1 – from 0 to 2.99; 2 – from 3 to 5.99; 3 – from 6 to 8.99; 4 – from 9 to 11.99; and 5 – from 12 to 15.

- The scales of questionnaires A, B and C were shown fixed on the left side (smallest value on scale = 1), with the expressions "closest", "very similar" and "very easy". However, questionnaire D was fixed on the right side (smallest value on scale = 1), with the terms "very different". As such, in order the make the comparative analyses, it was necessary to invert the scale of questionnaire D.

Table 3 – Means (M) and Standard Deviations (s) of Psychic Distance from Brazil to each Country, for each Questionnaire

Country	Questionnaire												Compiled		
	A			B			C			D					
	n	M	s	n	M	s	n	M	s	n	M	s	n	M	s
South Africa	90	2.7	1.24	96	3.0	1.02	93	3.1	0.92	86	3.1	0.97	365	3.0	1.05
Germany	90	3.6	1.13	96	4.4	0.79	93	3.8	0.81	86	4.5	0.61	365	4.1	0.93
Argentina	90	1.4	0.63	96	2.3	0.88	93	1.9	0.75	86	2.6	0.97	365	2.0	0.93
Canada	90	3.2	1.07	96	4.2	0.83	93	2.9	0.88	86	4.3	0.80	365	3.6	1.10
China	90	3.2	1.37	96	4.0	1.07	93	4.7	0.50	86	4.2	0.91	365	4.0	1.13
U.S.A.	90	2.6	1.32	96	3.8	1.03	93	2.2	0.82	86	3.9	1.00	365	3.1	1.29
Greece	90	3.8	1.03	96	3.8	0.91	93	3.5	0.84	86	3.9	0.92	365	3.7	0.94
Hong Kong	90	3.8	1.17	96	4.2	0.90	93	4.3	0.84	86	4.2	0.80	365	4.1	0.95
India	90	3.1	1.28	96	3.4	1.28	93	4.4	0.77	86	3.7	1.19	365	3.7	1.24
England	90	3.2	1.21	96	4.2	0.86	93	2.8	0.78	86	4.2	0.93	365	3.6	1.14
Israel	90	3.9	1.00	96	4.2	0.91	93	4.3	0.70	86	4.2	0.87	365	4.2	0.88
Italy	90	2.7	0.98	96	3.3	1.07	93	2.2	0.71	86	3.6	1.06	365	2.9	1.09
Japan	90	3.7	1.31	96	4.5	0.74	93	4.2	0.87	86	4.5	0.63	365	4.2	0.98
Mexico	90	1.7	0.76	96	2.2	0.79	93	2.0	0.72	86	2.3	0.92	365	2.1	0.83
Portugal	90	1.8	0.95	96	2.6	1.00	93	1.5	0.65	86	2.8	1.00	365	2.2	1.05
Russia	90	3.8	1.07	96	4.1	1.08	93	4.2	0.75	86	3.9	1.02	365	4.0	0.99
n = sample size; M = mean; s = standard deviation															

It can be seen that questionnaire C is the instrument that most clearly presents extreme measures (smallest and biggest); questionnaire A shows the lowest averages and

questionnaire D shows the highest averages. Questionnaire B, for all countries, occupied an intermediate position.

Then, tests were carried out to discover whether, for each country, psychic distance from Brazil had a normal distribution. In order to do so, the Kolmogorov-Smirnov test was applied to each one of the variables. This test assumes normality (H_0: Psychic distance measured by instrument i from Brazil to country j has a normal distribution, where i = A, B, C or D and j = one of the 16 countries investigated). For all of the instruments, evaluated for all of the countries, with the exception of instrument A (and compared to the original scale), the assumption of normal distribution was rejected at the 0.05 level. However, when instrument A, with a modified scale (1 to 5) was tested, the assumption of normality was also rejected for all of the countries investigated. Given this outcome, the use of the Kruskal-Wallis test for independent samples was considered the most adequate.

Kruskal-Wallis Test

The test hypothesis is to discover "whether there are differences between the instruments of psychic distance for a given country". Table 4 presents the results of the test.

Table 4 –Kruskal-Wallis Test

Country	All instruments			Instruments B, C and D			Instruments A, B and D		
	$\chi 2$	df	p-value	$\chi 2$	df	p-value	$\chi 2$	df	p-value
South Africa	7.726	3	0.052	1.388	2	0.500	4.612	2	0.100
Germany	60.296	3	0.000	44.481	2	0.000	38.283	2	0.000
Argentina	90.627	3	0.000	26.465	2	0.000	83.073	2	0.000
Canada	128.278	3	0.000	106.041	2	0.000	64.055	2	0.000
China	66.893	3	0.000	29.891	2	0.000	23.849	2	0.000
U.S.A.	123.745	3	0.000	110.364	2	0.000	54.596	2	0.000

Greece	12.75	3	0.005	12.441	2	0.002	0.655	2	0.721
Hong Kong	8.06	3	0.045	1.360	2	0.507	4.927	2	0.085
India	55.336	3	0.000	33.591	2	0.000	9.908	2	0.007
England	115.131	3	0.000	107.566	2	0.000	42.804	2	0.000
Israel	5.879	3	0.118	0.191	2	0.909	5.371	2	0.068
Italy	82.532	3	0.000	75.418	2	0.000	29.013	2	0.000
Japan	30.157	3	0.000	11.314	2	0.003	26.803	2	0.000
Mexico	26.371	3	0.000	4.852	2	0.088	25.052	2	0.000
Portugal	100.539	3	0.000	84.126	2	0.000	48.614	2	0.000
Russia	7.623	3	0.054	2.985	2	0.225	5.364	2	0.068

It can be seen that in the "all instruments" test, only for South Africa, Israel and Russia was the hypothesis of equality of instruments A, B, C and D at the 0.05 level not rejected. This is tantamount to saying that for the other countries, at least one of the instruments tested produced results significantly different from the rest. Continuing with the analysis, with instrument A (which originally used a different scale and had been adapted for the purpose of facilitating the comparison) having been withdrawn, the test was carried out for instruments B, C and D. As can be seen in Table 4 (three middle columns), there is practically no change in the results. Only for South Africa, Hong Kong, Israel, Mexico and Russia was the hypothesis of equality of instruments B, C and D, at the 0.05 level not rejected. Again, the results have shown that for the other countries at least one of the measurement instruments analyzed produced distinct results.

The analysis of averages and standard deviation (Table 3) showed that instrument C presented extreme averages for the majority of countries, suggesting that this instrument might be responsible for the differences. It was, therefore, decided to exclude instrument C from the analysis and to compare instruments A, B and D (Table 4, three last columns). As can be seen, there is practically no change in the results. Only for South Africa, Greece,

Hong Kong, Israel, and Russia was the hypothesis of equality of instruments A, B, and D, at the 0.05 level not rejected. Again, the results have shown that for the other countries at least one of the measurement instruments analyzed produced distinct results.

A new test then was carried out to evaluate differences between average psychic distances derived using instruments B and D. Table 5 presents the results of the Mann-Whitney (U) test, a non-parametric test for the comparison of two independent samples. For all countries except Argentina, was the hypothesis of equality of instruments B and D at the 0.05 level not rejected. This indicates that instruments B and D produce equivalent results.

Table 5 – Mann-Whitney Test (U)

Country	U	Z	*p-value*
South Africa	3937.0	-0.562	0.574
Germany	4059.0	-0.221	0.825
Argentina	3306.5	-2.467	0.014
Canada	4003.0	-0.383	0.702
China	3622.0	-1.517	0.129
U.S.A.	3818.0	-0.913	0.361
Greece	3868.0	-0.773	0.440
Hong Kong	3963.0	-0.499	0.618
India	3549.0	-1.683	0.092
England	3940.5	-0.572	0.567
Israel	4065.5	-0.19	0.849
Italy	3567.0	-1.635	0.102
Japan	4107.0	-0.068	0.946
Mexico	4006.0	-0.389	0.697
Portugal	3575.5	-1.637	0.102
Russia	3607.0	-1.555	0.120

Based on the results of the tests carried out, hypothesis H_1, relative to the instruments used for measuring psychic distance as a summary construct, was partially rejected. Instruments A and C produce results somewhat distinct from the other instruments.

In case of the instrument A, the scale might be the cause of this effect. With respect to instrument C, on the other hand, an explanation for the differences might lie in how the questions regarding psychic distance were worded:

> A – "Distance can be expressed in terms of differences, e.g., with respect to language, culture, industrial development or trade practices."
>
> B – "... how similar or different does each of these countries seem to you in relation to Brazil."
>
> C – "... difficulty in adapting to the following countries due to differences in the local culture in relation to Brazilian culture?"
>
> D – "... the degree of difference you perceive between Brazil and the countries below in terms of differences in culture, and economic, social, and legal climate."

Despite of the initial questions being quite similar, instrument C is the only one that asks the respondent to reflect not only on the differences or distance, but also on the difficulty of adaptation, making explicit reference only to culture.

Additional Results

Spearman rank order correlation test

The differences discerned between the instruments might be a question of degree, rather than power to discriminate. This would be a reasonable assumption if the countries had maintained the same ranking (or close to the same ranking) in the four instruments, i.e., if a psychically close (or distant) country in instrument A behaved similarly when instruments

B, C or D were applied. To test this assumption, it was decided to see if there was any correlation between the results obtained using the four instruments.

Because the assumption of normality had been rejected and, further, the differences in the scales are significant, it was decided to analyze the rankings, i.e., the order obtained for the countries depending on their psychic distance. The scores of each respondent were transformed into a ranking: the country with the smallest psychic distance from Brazil ranked first; the second smallest ranked second; and so forth. This technique was used for each respondent and for each of the instruments being tested; the resulting averages of the rankings were used in the analysis. For questionnaire A, the original scale (0 to 15) was used. Average ranks are presented in Table 6.

Table 6 – Average rank of psychic distance

Country	Instrument			
	A	B	C	D
South Africa	7.48	5.92	8.01	5.65
Germany	10.76	11.69	10.57	11.59
Argentina	2.09	3.60	3.77	4.07
Canada	8.80	10.81	7.01	10.72
China	9.48	9.68	13.91	10.49
United states	6.44	8.97	4.61	9.01
Greece	11.08	8.89	9.36	8.88
Hong Kong	12.02	10.66	12.31	10.16
India	8.57	7.53	12.69	8.53
England	9.37	10.66	6.59	10.46
Israel	11.96	10.84	12.24	10.56
Italy	7.48	7.04	4.69	7.47
Japan	11.22	11.91	11.75	11.74

Mexico	3.85	3.13	4.07	2.85
Portugal	3.73	4.36	2.54	4.62
Russia	11.66	10.32	11.90	9.21
N	90	96	93	86

Based on these results, the Spearman rank order correlation test was applied. Table 7 shows a matrix of the Spearman's correlation coefficients (r) and p-values. The value obtained for all the correlation was over 0.5, confirming strong positive correlations, as expected.

For all correlation pairs, the hypothesis of zero correlation is, therefore, rejected. The weakest correlations were between instruments B and C and instruments C and D, thereby confirming the results previously obtained with the test of hypothesis. In other words, there is evidence that instrument C provides the results that diverge the most from those obtained using the other instruments. The results of Spearman's correlation test support the view that there is convergent validity between instruments A, B and D. (Convergent validity is the degree to which several independent measures of the same construct are found to be strongly correlated).

Table 7 – Spearman's rank order correlation matrix

Instruments		A	B	C	D
A	r	1	0.787	0.782	0.729
	p-value	-	0.000	0.000	0.001
	n	16	16	16	16
B	r		1	0.556	0.979
	p-value		-	0.025	0.000
	n		16	16	16
C	r			1	0.574
	p-value			-	0.020

					16	16
	r					1
D	p-value					-
	n					16

Additional tests for Sub-Groups of Countries

The positive correlation between the instruments suggests that countries evaluated as near (or far) in terms of psychic distance in relation to Brazil in one instrument are also considered near (or far) in another. This outcome is desirable in distinct instruments that are designed to measure the same phenomenon. With this in mind, we decided to test the capacity of the instruments to discriminate between sub groups of countries with similar psychic distance in relation to Brazil. The samples were considered to be dependent since, for each instrument, the same informant evaluated the 16 countries in relation to Brazil in a single round of questions. For the sake of comparability, for all of the instruments, Friedman's non-parametric test for dependent samples was used. To complement this analysis, a modified ANOVA test was also applied to instrument A. Test results are presented in Table 8. For all instruments, the hypothesis of equality was rejected, i.e., at least one of the countries had a psychic distance different from the others.

Table 8 – Friedman's test for dependent samples

Instrument	Statistics			
	n	χ^2	df	p-value
A - Stöttinger and Schlegelmilch (1998)	90	587.3	15	0.000
B - Leite, Rocha and Figueiredo (1988)	96	620.5	15	0.000
C - Boyacigiller (1990)	93	965.0	15	0.000
D - Shoham, Rose and Albaum (1990)	86	518.1	15	0.000
A - Stöttinger and Schlegelmilch (1998)[*]	90	68.994 (F)	15	0.000

Given this result, a more detailed analysis was performed for each instrument in order to find homogeneous country sub-groupings. In the case of significant differences between countries, we used Friedman's test with a smaller number of countries in order to investigate possible differences and to establish the homogeneous subgroups. This analysis is summarized in Tables 9–13, respectively for A, B, C and D (non-parametric test) and A (parametric test).

Table 9 – Summary table of the differences of the average ranks of psychic distance between Brazil and each country using instrument A – Stöttinger and Schlegelmilch (1998)

Country	Average Rank	1	2	3	4	5	6	7	8
Argentina	2.1								
Portugal	3.7								
Mexico	3.9								
U.S.A.	6.4								
South Africa	7.5								
Italy	7.5								
India	8.6								
Canada	8.8								
England	9.4								
China	9.5								
Germany	10.8								
Greece	11.1								
Japan	11.2								
Russia	11.7								
Israel	12.0								
Hong Kong	12.0								
p-value		1	0.913	0.699	0.066	0.528	0.207	0.096	0.207

Table 10 – Summary table of the differences of the average ranks of psychic distance between Brazil and each country using instrument B – Leite, Rocha and Figueiredo (1988)

Country	Average Rank	1	2	3	4	5	6	7	8
Mexico	3.1								
Argentina	3.6								
Portugal	4.4								
South Africa	5.9								
Italy	7.0								
India	7.5								
Greece	8.9								
U.S.A.	9.0								
China	9.7								
Russia	10.3								
Hong Kong	10.7								
England	10.7								
Canada	10.8								
Israel	10.8								
Germany	11.7								
Japan	11.9								
p-value		0.777	0.102	1	0.564	0.396	0.296	0.057	0.746

Table 11 – Summary table of the differences of the average ranks of psychic distance between Brazil and each country using instrument C – Boyacigiller (1990)

Country	Average Rank	1	2	3	4	5	6	7	8	9	10
Portugal	2.5										
Argentina	3.8										
Mexico	4.1										
U.S.A.	4.6										

Country	Average Rank	1	2	3	4	5	6	7	8	9	10
Italy	4.7										
England	6.6										
Canada	7.0										
South Africa	8.0										
Greece	9.4										
Germany	10.6										
Japan	11.8										
Russia	11.9										
Israel	12.2										
Hong Kong	12.3										
India	12.7										
China	13.9										
p-value		1	0.150	0.058	0.370	0.052	1	1	0.243	0.192	1

Table 12 – Summary table of the differences of the average ranks of psychic distance between Brazil and each country using instrument D – Shoham, Rose and Albaum (1990)

Country	Average Rank	1	2	3	4	5	6	7	8
Mexico	2.9								
Argentina	4.1								
Portugal	4.6								
South Africa	5.7								
Italy	7.5								
India	8.5								
Greece	8.9								
U.S.A.	9.0								
Russia	9.2								
Hong Kong	10.2								
England	10.5								
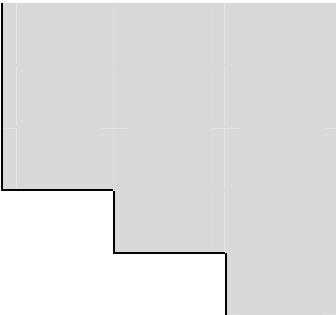
Country	Average								
China	10.5								
Israel	10.6								
Canada	10.7								
Germany	11.6								
Japan	11.7								
p-value		1	1	0.055	0.153	0.061	0.083	0.227	0.092

Table 13 – Summary table of the average differences of psychic distance between Brazil and each country using instrument A – Stöttinger and Schlegelmilch (1998)

Country	Average	1	2	3	4	5
Argentina	2.4					
Portugal	3.5					
Mexico	3.7					
U.S.A.	6.1					
South Africa	6.5					
Italy	6.6					
India	7.6					
Canada	8.0					
England	8.2					
China	8.3					
Germany	9.4					
Greece	9.6					
Japan	9.7					
Russia	10.0					
Israel	10.2					
Hong Kong	10.3					
p-value		1	0.753	0.255	0.142	0.084

Summarizing, it was observed that:

- Instrument A, when a non-parametric test was applied, presented 8 subgroups and 9 countries in at least two distinct groups; this same instrument, when used with a parametric test, presented only 5 groups and intersections were absent.

- Instrument B presented eight subgroups; 8 countries pattern in two distinct groups.

- Instrument C presented 10 subgroups; 4 countries pattern in two distinct groups.

- Instrument D presented 8 subgroups; 9 countries pattern in two or three distinct groups.

Especially interesting were the results of the non-parametric and parametric tests used to compare countries using instrument A. The fact of having a normal distribution of psychic distance to the countries enabled greater accuracy in the parametric test results. As Table 13 shows, the parametric test was able to distinguish the difference between country subgroups with more precision.

It is also apparent that the smaller the psychic distance, the easier the formation of country subgroups without intersections. On the other hand, as psychic distance increases, so do the country subgroup intersections. Apparently then, the instruments' power to discriminate is greater for countries that are psychically closer. A possible interpretation for these results bears on the respondents' capacity to discriminate. Countries that are psychically closer exhibit better defined curves on the respondents' cognitive maps: respondents tend to regard the countries they know best as being the closest. On the other hand, countries that are psychically more distant are less well defined, since the respondents tend to know less about them.

Evaluation of the instruments by gender and course

In order to enhance still more the comparative evaluation of the scales, it was decided to analyze the performance of the instruments in terms of gender and academic course (i.e.,

administration, accounting and economics), once again using the Mann-Whitney (U) test. In principle, none of the instruments should present significant differences. However, there were some significant differences in the results obtained with the four instruments with respect to gender and course:

- for instrument A, gender and course did not impact the evaluation of psychic distance;

- for instrument B, course barely impacted the evaluation of psychic distance; however, gender did impact the results of the measurement.

- for instrument C, course made little impact on the evaluation of psychic distance; gender affected the results of the measurement only somewhat;

- Instrument D, in turn, did not present differences for gender; however, academic course altered significantly the measurements for certain countries.

Conclusions

The intent of the study was to test whether the various instruments that exist in the literature to measure psychic distance as a summary construct, based on a single-item scale, produced the same results. In general, the instruments presented the following characteristics in the various tests that were carried out:

- Instrument A (Stöttinger and Schlegelmilch, 1998) is the only instrument that conforms with the requirements of normality, with its original scale. The measurements obtained with this questionnaire are, on average, lower than those obtained with the other questionnaires. However, the instrument A average results are different from those in questionnaires B, C and D for almost all countries and in B and D for 11 of the countries evaluated. The results obtained using instrument A correlate strongly, but not

completely, with those obtained using instruments B, C and D. There are no significant differences as a function of gender and course.

- Instruments B (Leite, Rocha and Figueiredo, 1988) and D (Shoham, Rose and Albaum, 1995) did not significantly differ from each other. Instrument B produced measures that were consistently intermediate relative to the other instruments. Questionnaire D, on the other hand, produced measures that were consistently higher than the others. The results obtained with the use of questionnaires B and D are highly correlated. However, there are significant differences with respect to gender for the two questionnaires, and in relation to course, with respect to questionnaire D.

- Instrument C (Boyacigiller, 1990) yields more extreme measures and its results are statistically distinct from those obtained using the other questionnaires. It is possible that the differences are caused by the wording of the questions, which differ substantially from those used in the other instruments. Despite this, questionnaire C correlates well with the others, although the correlations are weaker, particularly with respect to instruments B and D. Questionnaire C yields significant differences with respect to gender, although not with respect to course.

The hypothesis test results confirm that only the instruments used by Leite, Da Rocha and Figueiredo (1988) and Shoham, Rose and Albaum (1995) produced equivalent results. All of the scales correlated strongly; however, the performance of the scales in the tests did vary:

- The Stöttinger and Schlegelmilch (1998) scale had the capacity to be used with a greater range of statistical tests (being able to generate results with normal distribution) and presented superior results in practically all of the tests carried out. Additionally, it is not affected by differences in the demographic characteristics of the sample. It is the

scale recommended to researchers wishing to utilize single-item measures of psychic distance.

- The scale of Leite, Da Rocha and Figueiredo (1988) and of Shoham, Rose and Albaum (1990) are basically equivalent: either of them constitute the second best option for researchers following a summary construct approach.

- The scale of Boyacigiller (1990) produces results somewhat different from the others. Although correlating well with the other scales tested, it tends to produce more extreme measures and for certain countries, it produces distinct results. This probably arises from the wording of the questions, which make explicit reference only to culture. As such, it is believed that this measure is more closely linked to cultural distance, a construct encompassed by that of psychic distance.

The tests carried out showed there is convergent validity between the instruments, although only the scales of Leite, Da Rocha and Figueiredo (1988) and of Shoham, Rose and Albaum (1990) can be considered to be fully equivalent in terms of the results they provide. Also in a consistent manner, the instrument of Boyacigiller (1990) provided partial evidence of discriminant validity, since it appeared to measure cultural distance, a sub-construct of psychic distance. However, it provided somewhat weaker correlations with the other instruments.

The study has certain limitations. Most important was the use of undergraduate students to respond to the questions rather than executives involved in international activities. On the other hand, it was judged that the use of students would not prejudice the results, since the perception of psychic distance – for the most part a product of the culture in which the individual is inserted – would also be present in those who have still not exercised international activities as executives. In order to maintain, in as much as possible, the

comparability of a sample of students with a sample of executives, the questions were posed to students studying disciplines close to those of future executive work (administration, accounting and economics).

Further research to replicate the tests, using different sample groups and different countries, might profitably be undertaken in order to verify whether the results obtained here can be generalized or whether they are a function of specific aspects of the Brazilian sample.

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