THE EQUIVALENCE OF SINGLE-ITEM SCALES OF PSYCHIC DISTANCE: A TEST IN BRAZIL

EQUIVALÊNCIA DE ESCALAS DE DISTÂNCIA PSÍQUICA DE ITEM ÚNICO: UM TESTE NO BRASIL

OTAVIO FIGUEIREDO
otavio@ufrj.br

ANGELA DA ROCHA
amc.darocha@gmail.com

JORGE FERREIRA DA SILVA
shopshop@iag.puc-rio.br

ABSTRACT

Despite the broad acceptance of the concept of psychic distance, problems related to measuring the construct have persisted in empirical studies. 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. The present study sought to evaluate several single-item scales to measure psychic distance as a summary construct. Four data collection instruments in the literature were identified, and applied to a final sample of 365 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 as to assess their equivalence and validity. The results enabled to compare features and showed that only two of the instruments 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 has the capacity to be used with a greater range of statistical tests and presented superior results in practically all of the tests carried out. It is the scale recommended to researchers wishing to utilize single-item measures of psychic distance.

Key words: psychic distance, measurement scales, summary construct, single-item scales.

RESUMO

Apesar da ampla aceitação do conceito de distância psíquica, ainda persistem problemas relativos à medição do construto. Embora os pesquisadores tenham desenvolvido e utilizado vários instrumentos, nenhum estudo, até o momento, preocupou-se em realizar uma avaliação comparativa com o propósito de verificar a equivalência das escalas. O presente estudo procurou contribuir para a avaliação de diversos instrumentos que utilizam escala única para medir a distância psíquica como construto-síntese. Quatro instrumentos de coleta de dados foram identificados na literatura e aplicados a uma amostra final de 365 universitários. Aproximadamente um quarto da amostra respondeu a cada questionário. Diversos testes estatísticos foram utilizados para identificar as características de cada instrumento assim como para avaliar sua equivalência e validade. Os resultados obtidos permitiram comparar as características, mostrando que apenas dois instrumentos produziram resultados equivalentes. Todas as escalas se mostraram fortemente correlacionadas, mas o desempenho das escalas nos testes mostrou variações. A escala de Stöttinger e Schlegelmilch (1998) pode ser utilizada em grande variedade de testes

estatísticos e apresentou resultados superiores em praticamente todos os testes realizados. Trata-se, portanto, da escala mais recomendada aos pesquisadores que desejarem utilizar uma medida de item único de distância psíquica.

Palavras–chave: distância psíquica, escalas de medida, construto-síntese, escalas de item único.

INTRODUCTION

Operating in foreign markets poses uncertainty and risk. The Uppsala model, an exponent of behavioral theories on firm internationalization, was built based on a particular vision of how uncertainty and risk impacts internationalization decisions (Johanson and Vahlne, 1977; Figueira-de-Lemos *et al.,* 2011). According to Clark and Pugh (2001), the model seeks to explain and predict two aspects of firm internationalization: (i) the incremental pattern of development in a determined foreign market, and (ii) 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 could be constrained by the phenomenon of psychic distance.

The phenomenon of psychic distance has attracted the attention of researchers in the area of International Business ever since Beckerman (1956) posited 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. 307-308) suggested that psychic distance could be understood as "factors preventing or disturbing the flow of information between firms and market." Hallén and Wiedersheim-Paul (1993) saw two components of the construct: different perceptions of needs and different perceptions of offers. Accordingly, they defined psychic distance as "a measure of the difficulty a seller has to perceive or estimate the needs of a buyer or the corresponding difficulty a buyer experiences in perceiving the seller's offer" (Hallén and Wiedersheim-Paul, 1993, p. 293). From a business perspective, Fletcher and Bohn (1998, p. 49) defined psychic distance as "this willingness (or lack thereof) to undertake business in specific overseas markets."

The logic of psychic distance is rooted in managers' perceptions of uncertainty and risk. Managers tend to be risk-averse; however, they still have to make decisions concerning entry into foreign markets, even though information may be incomplete (Björkman and Forsgren, 1997). As such, the greater the psychic distance to the foreign market, the greater would be managers' resistance in making the initial foray. For this reason, international operations would tend to be first implemented in markets perceived to be psychically closer (Johanson and Vahlne, 1992). Psychic distance would be gradually overcome by the acquisition of experiential knowledge, and the orga-

nization could 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 persisted in empirical studies. Several authors point to the difficulties involved in capturing the nature of the construct. For example, Dow (2000, p. 51) observes that "efforts to develop and test a valid and reliable instrument to measure psychic distance have been sporadic and flawed." Other authors have noted inconsistencies in terms of the conceptualization, operationalization, and explanatory power of the measures (Evans and Mavondo, 2002), as well as apparent contradictions (Stöttinger and Schlegelmilch, 1998, 2000) in the results of existing studies. Sousa and Bradley (2006) suggest that the construct is little understood, and Brewer (2007, p. 45) raises "serious questions about how the concept has been incorporated into research in recent years." Smith *et al.* (2011) have called for further research to gain a better understanding of the concept.

Authors are divided among those who regard psychic distance as a summary construct and those who view it as a sum of factors. The conception of psychic distance as a summary construct was originally formulated by Reid (1986) and gained several followers (e.g. Shoham *et al.,* 1995; Stöttinger and Schlegelmilch, 1998, 2000). It assumes that individuals perceive psychic distance as an indivisible construct. On the other hand, the notion of psychic distance as a sum of discrete factors has received more support in the literature (Smith *et al.,* 2011). 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.

We argue that these two different conceptualizations are essentially irreconcilable, and that they imply the use of different methods for measuring psychic distance. Each conceptualization depends on different assumptions as to how individuals perceive and make judgments about the world around them. The summary construct view is anchored on the belief that individuals perceive images of the world (and countries) that cannot be decomposed into discrete components. On the other hand, the sum of factors view assumes that each individual captures different attributes of a phenomenon, and then makes a judgment on the whole. The sum of factors view also assumes that the final judgment by each individual takes the full range of attributes into account. Among the proponents of scales to measure psychic distance as a sum of factors are

Klein and Roth (1990), Evans *et al.* (2000; Evans and Mavondo, 2002), Sousa and Bradley (2005, 2006), and Sousa and Lengler (2009). In addition, several proponents of the sum of factors stance have used objective measures of psychic distance (e.g. Brewer 2007; Dow and Karunaratna 2006). As a result of such differences, the summary construct view of psychic distance assumes the use of holistic measures; the sum of factors view, on the other hand, implies that measurement of psychic distance include such factors.

This paper does not intend to demonstrate the superiority of one approach over the other, but to consider the implications of a *Gestalt* view of psychic distance for the measurement of the construct, and to test several single-item scales to measure psychic distance as a summary construct. In fact, 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 lies in its assessment of different instruments designed to measure psychic distance as a summary construct.

REVIEW OF THE LITERATURE
PSYCHIC DISTANCES AS GESTALTEN

The concept of psychic distance as a summary construct relates to the principles of *Gestalt* psychology (Stöttinger and Schlegelmilch, 2000). Although *Gestalt* principles have seldom been used in international business research, recent works in the areas of strategic management (Rindova *et al.,* 2010) and marketing (Diamond *et al.,* 2009) reflect the interest in this approach to the understanding business phenomena.

Human beings may perceive certain phenomena as *Gestalten*; such phenomena are not sensed or experienced as a sum of their parts, but are perceived in their totality (Köhler, 1947). Consider, for example, Van Gogh's masterpiece, *The Starry Night* (Museum of Modern Art, New York City). The visitor's perception of the masterpiece can be described as holistic. The work is not comprehended as a discrete set of traits, dots, and colors, but rather as a single image. One of the key concepts in *Gestalt* psychology is exactly that of emergence, which means that a vision of the whole (the *Gestalt*) emerges at once and fully formed. Therefore, lists of attributes contradict the logic of emergence (Çakir, 2009).

Images of objects, people, or even countries, are integrated *Gestalten*. In the context of psychic distance, 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.

MEASUREMENTS OF PSYCHIC DISTANCE AS A SUMMARY CONSTRUCT

Stöttinger and Schlegelmilch (2000, p. 171) have pointed out to that "the summary character [of the psychic distance construct] is underlined by the research instrument employed." Several authors have relied on a single-item scale to measure psychic distance. For example, Vahlne and Nordström (1992) constructed an index of psychic distance by asking managers to assign a value, from 0 to 100, to 22 different countries; Dow (2000), using a ten-point scale, asked members of a government trade organization to rate the psychic distance between Australia and 25 other countries.

Another study, carried out by Boyacigiller (1990), interviewed 1015 professionals at 84 branches in 43 countries of a large U.S. bank. Although the author named this variable "cultural distance", he measured individual perceptions. The question posed in order to measure the construct aimed to evaluate the difficulty of adapting to work in different countries: "How difficult 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 way to tap this issue is to think about how long it takes an 'average American' to adapt to the business milieu. 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.

Shoham *et al.* (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 = not at all different.

Another type of scale was used in the work of Dichtl *et al.* (1984, 1990). These studies 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 *et al.* (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 translated the judgment

spectrum into the distance between the degree of longitude of 0° (Greenwich Meridian) and 180° (International Date Line). This geographical distance (of approximately 16,700 kilometers) was related to the interviewees' answers on the magnitude scale. The question was phrased: "In the following we would like to ask you to assess several countries. Assessment criterion must be their relative foreignness. Foreignness can be expressed in differences, for example with regard to language, culture, industrial development, or business practices."

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 *et al.* (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 (2002), the notion that a single item could fully capture the perceptions of executives 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) and gestalt theory.

An early study in Brazil (Leite *et al.*, 1988) also proposed the use of a single-item scale. The Brazilian scale was first used by Leite *et al.* (1988) and later by Silva *et al.* (2007). Leite *et al.* (1988) applied the scale to a sample of 171 top executives from exporting firms, while Silva *et al.* (2007) used the same questionnaire with a sample of 222 students of a Brazilian university. Respondents were asked to indicate how similar or different each of these countries seemed in relation to Brazil. Then, they were presented a set of 7-point scales with Brazil on one extreme of the scale and another country on the other. Using Spearman's rank order correlation, the results of both studies showed a correlation coefficient of 0.871 (p<0.001). These results suggest that despite substantial differences in terms of time and groups (executives versus students) used in each study, the perception of psychic distance from Brazil to other countries remained remarkably stable over time and consistent between the two groups.

Given the use of different single-item instruments to measure psychic distance in different studies, the present research has sought to answer the following question: *Do the instruments to measure psychic distance conceived of as a summary construct produce similar results?* Therefore, the hypothesis to be tested in the study was:

H₁: The main instruments utilized to measure psychic distance as a summary construct do not present significant differences in their measurements.

METHODOLOGY

Given the characteristics of the study, the survey method was adopted. The target population of the study comprised university students enrolled in undergraduate classes in Business Administration, Economics and Accounting. The high correlation found by Silva *et al.* (2007), when comparing the results of their study using university students with an earlier one by Leite *et al.* (1988) using executives from exporting firms, supports the use of students' samples in psychic distance studies. The university in question was located in Rio de Janeiro, Brazil, and the students sampled had completed at least two years of undergraduate study.

A non-probabilistic sample of 377 students was obtained. Around 62% of the respondents were male and 38% female; 94% had ages between 18 and 26; 37% were from Business, 25% from Accounting and 38% from Economics. As to their religion, the majority was Catholic, but one third of the sample declared not to profess any religion. Almost 60% had travelled to another country, but only 26% had actually lived in another country. After exclusions of outliers and cases with missing values, 365 questionnaires were deemed usable.

INSTRUMENTS AND COUNTRIES SELECTED

After a thorough review of the international literature on psychic distance, only three instruments for measuring psychic distance were identified which assumed that psychic distance was a summary construct measurable using a single-item scale. Multiple-item instruments were discarded since they did not serve the purpose of the study. In addition to the instruments used in the international literature by Stöttinger and Schlegelmilch (1998); Boyacigiller (1990) and Shoham *et al.* (1995), a single-item scale used in studies in Brazil was also tested. For purposes of ease 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 *et al.* (1988)
- Questionnaire C: the scale of Boyacigiller (1990)
- Questionnaire D: the scale of Shoham *et al.* (1995).

The instructions for each instrument included the following explanation:

A) "Foreignness can be expressed in terms of differences, for example with regard to language, culture, industrial development or business practices."

B) "... How similar or different does each of these countries seem to you in relation to Brazil."

C) "... How difficult is it to adapt to the following countries because of the difference in the location's culture in relation to that of Brazil?"

D) "... The degree of difference you perceive between Brazil and the countries below in terms of differences in culture, and economic climate, and legal barriers."

For purposes of comparison, a five-point scale was adopted for all of the instruments (except the original scale used by Stöttinger and Schlegelmilch, 1998), 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 *et al.*, 1988; Silva *et al.*, 2007) for two reasons: (i) it would permit to compare the results of this study with previous studies using Brazilian samples; and (ii) the countries selected provided a broad range of psychic distances from Brazil, which was useful to the purposes of the study.

DATA COLLECTION

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 to select the students to be interviewed. In each class, students received the questionnaires according to their location in the classroom. For example, student 1 received questionnaire A, student 2 (sitting behind student 1) received questionnaire B, and so on. The questionnaires were filled out by the respondents themselves in the classroom, with the acquiescence of the instructors, and in the presence of the interviewer. The interviewer explained the purpose of the study and asked the students for their assistance. Because the questionnaire required up to 10 minutes to be completed, less than 5% of the students did not cooperate.

ANALYTICAL TECHNIQUES

Preliminary analyses included the use of the following analytical techniques: chi-square tests, to check for significant differences between the groups, and the Little's Missing Value Test to check for missing data randomness. Then the Kolmogorov-Smirnov test was used to test for normality. To test the study's hypothesis two analyses were performed: (i) the Kruskal-Wallis test was used to verify whether there were differences between the instruments; and (ii) the Mann-Whitney (U) test was used for the comparison of two independent samples. Additional analyses were also performed using Spearman's rank order correlation, Friedman's non-parametric test for dependent samples, and ANOVA.

PRELIMINARY ANALYSES
TEST OF HOMOGENEITY

In order to ensure the comparability of the results obtained using each instrument, it is critical that the in-

dependent samples be homogeneous. This means that any differences between the groups are caused by the measuring instruments themselves and not by characteristics of the informants. An evaluation was made of the demographic variables of the four samples in order to discern possible differences between them.

The results of chi-square tests showed 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).

MISSING DATA AND OUTLIERS

Missing information is a frequent problem in surveys, and they can impact the generalizability of the study's results. 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. We used Little's Missing Value Test to check the randomness of the missing data. If the data are MCAR (Missing Completely at Random), then imputation methods can be used (Hair *et al.*, 2006). The missing data in questionnaires B, C, and D were MCAR; therefore, values were imputed using the EM (Expectation-Maximization) method (Hair *et al.*, 2006), an interactive process that estimate means, covariance and correlations. In relation to questionnaire A, where missing data did not occur at random, it was decided to remove the five cases with missing data.

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. The SPSS tool "Identify Unusual Cases" was used and 7 occurrences were detected, which were excluded from the sample. Having completed the procedures to handle missing data and outliers, the final sample was constituted as shown in Table 1.

TEST OF HYPOTHESIS

H₁: The main instruments utilized to measure psychic distance as a summary construct do not present significant differences in their measurements.

For each one of the 16 countries tested, there were confirmed differences in the psychic 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.

It can be seen from Table 2 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.

The Kolmogorov-Smirnov test was used to test for normality (Hair *et al.*, 2006). The null hypothesis for this test is: "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 (using 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 because of its non-parametric nature (Black, 2010).

KRUSKAL-WALLIS TEST

The test hypothesis is "whether there are differences between the instruments of psychic distance for a given coun-

try". It should be noted that the null hypothesis for this test is "All instruments are identical", and the alternative hypothesis is "at least one of the instruments is different" (Black, 2010, p. 694). Table 3 presents the results of the test.

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. 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. However, the results of the Kruskal-Wallis Test do not permit to know which instrument or instruments produced different results, therefore requiring the use of additional analyses (Black, 2010).

The analysis of averages and standard deviation (Table 2) 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 3, the last three 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. An additional test was necessary to find out which instrument(s) did not produce equivalent results.

A new test was carried out to evaluate differences between average psychic distances derived using instruments B and D. If B and D produced equivalent results, then A would have to be different. This was reasonable to expect, because instruments B and D were only slightly different. Table 4 presents the results of the Mann-Whitney (U) test, a non-parametric

Table 1 – *Sample distribution after elimination of missing data and outliers.*

Respondents	Instrument				
	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

Table 2 – *Means (M) and standard deviations (s) of psychic distance from Brazil to each country, for each questionnaire.*

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

M = mean; s = standard deviation; n=sample size

Table 3 – *Kruskal-Wallis Test.*

Country	All instruments		Instruments B, C and D		Instruments A, B and D	
	Chi-square[a]	*p-value*	Chi-square[b]	*p-value*	Chi-square[c]	*p-value*
Argentina	90.627	0.000	26.465	0.000	83.073	0.000
Canada	128.278	0.000	106.041	0.000	64.055	0.000
China	66.893	0.000	29.891	0.000	23.849	0.000
England	115.131	0.000	107.566	0.000	42.804	0.000
Germany	60.296	0.000	44.481	0.000	38.283	0.000
Greece	12.750	0.005	12.441	0.002	0.655	0.721
Hong Kong	8.060	0.045	1.360	0.507	4.927	0.085
India	55.336	0.000	33.591	0.000	9.908	0.007
Israel	5.879	0.118	0.191	0.909	5.371	0.068
Italy	82.532	0.000	75.418	0.000	29.013	0.000
Japan	30.157	0.000	11.314	0.003	26.803	0.000
Mexico	26.371	0.000	4.852	0.088	25.052	0.000
Portugal	100.539	0.000	84.126	0.000	48.614	0.000
Russia	7.623	0.054	2.985	0.225	5.364	0.068
South Africa	7.726	0.052	1.388	0.500	4.612	0.100
U.S.A.	123.745	0.000	110.364	0.000	54.596	0.000

Notes: (a) degrees of freedom (df) =3; (b) df=2; (c) df=2

Table 4 – *Mann-Whitney Test (U).*

Country	U	Z	p–value
Argentina	3306.5	-2.467	0.014
Canada	4003.0	-0.383	0.702
China	3622.0	-1.517	0.129
England	3940.5	-0.572	0.567
Germany	4059.0	-0.221	0.825
Greece	3868.0	-0.773	0.440
Hong Kong	3963.0	-0.499	0.618
India	3549.0	-1.683	0.092
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
South Africa	3937.0	-0.562	0.574
U.S.A.	3818.0	-0.913	0.361

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.

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; instruments B and D produced equivalent results.

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 were worded. Despite of the beginning of each question being quite similar, instrument C is the only one that asks the respondent to reflect not only on the differences, 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. 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 5.

Based on these results, the Spearman rank order correlation test was applied. Table 6 shows a matrix of the Spearman's correlation coefficients (r) and p-values. The p-value obtained for all the correlations was over 0.05, 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 (r=0.556, p<0.025) and instruments C and D (r=0.574, p<0.02), 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. Correlation coefficients of instrument A with B and D are all above 0.700 (p<0.001) and between B and D is 0.979 (p<0.001). These results strongly support the contention of equivalence and therefore, of convergent validity, between instruments A, B, and D.

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 7. For all instruments, at least one of the countries had a psychic distance different from the others. These results mean that distances between Brazil and one or another specific country may differ depending on the instrument used, although not enough to impact the overall results.

Given this result, a more detailed analysis was performed for each instrument in order to find homogeneous country

Table 5 – *Average rank of psychic distance.*

Country	Instrument			
	A	B	C	D
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
England	9.37	10.66	6.59	10.46
Germany	10.76	11.69	10.57	11.59
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
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
South Africa	7.48	5.92	8.01	5.65
USA	6.44	8.97	4.61	9.01
N	90	96	93	86

sub-groupings. In the case of significant differences between countries, we used Friedman's test for non parametric samples with a smaller number of countries in order to investigate possible differences and to establish the homogeneous subgroups. For the sake of comparison Friedman's test was used with the four instruments. In addition, a parametric test was also used with instrument A. The results of these tests showed 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 8 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. The parametric test was able to

Table 6 – *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
B	r		1	0.556	0.979
	p-value		–	0.025	0.000
C	r			1	0.574
	p-value			–	0.020
D	r				1
	p-value				–

Note: n=16.

Table 7 – *Friedman's test for dependent samples.*

Instrument	Statistics		
	n	Chi–square*	*p-value*
A - Stöttinger and Schlegelmilch (1998)	90	587.3	0.000
B – Leite *et al.* (1988)	96	620.5	0.000
C - Boyacigiller (1990)	93	965.0	0.000
D – Shoham *et al.* (1995)	86	518.1	0.000
	F statistic**		
A - Stöttinger and Schlegelmilch (1998)	90	68.994 (F)	0.000

Notes: *Chi-square tests; **Parametric test with F-distribution; for all tests, df = 15

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. One 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. Another interpretation could come from the fact that the study only measured distances from Brazil to a given country, but not between these other countries. Therefore, two countries could have almost the same distance from Brazil and yet not to be close to each other. In addition, countries that are close to Brazil tend to be also close to each other. Therefore, the closer the countries, the more homogeneous the subgroups would tend to be.

DISCUSSION

This study used several statistical tests to evaluate to what extent the four instruments used in the literature to test psychic distance produced equivalent results. The results supported the research hypothesis only partially: instruments B and D were determined to produce almost exactly the same results, but instrument A produced slightly different results, and instrument C seemed to be the most different. In general, the instruments presented several characteristics in the various tests that were carried out and are summarized in the next paragraphs.

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.

Instruments B (Leite et al., 1988) and D (Shoham et al., 1995) did not significantly differ from each other. Instrument B produced measures that were consistently intermediate relative to the other instruments. Instrument 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 thus producing equivalent results.

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 and makes special reference to cultural differences. Despite this, questionnaire C still correlates well with the others, although the correlations are weaker, particularly with respect to instruments B and D. It seems that questionnaire D only measures part of the construct, cultural differences, but not other differences that are included in the concept definition, such as

The tests showed there is convergent validity between the instruments, although only the scales of Leite et al. (1988) and of Shoham et al. (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 facet of psychic distance.

Such results suggest that the use of each instrument depends on the characteristics of the research project. Instrument A is more difficult to apply, but it presented superior results in practically all of the tests carried out. Moreover, since it does not violate assumptions of normality, instrument A has the capacity to be used with a greater range of statistical tests. The latter characteristic can be particularly important when other variables are included in the study and more complex statistical techniques are required, such as multiple regression analysis or structural equation modeling (Hair et al., 1996). This is a common design of studies that use psychic distance as an antecedent of market selection or marketing strategy. Instrument C, on the other hand, would be the instrument of choice when the researcher is interested in covering only one facet of psychic distance, perceived cultural differences between two countries. Although significantly correlating 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 question, which makes explicit reference only to culture.

FINAL CONSIDERATIONS

The study aimed to test whether four instruments that exist in the literature to measure psychic distance as a summary construct, based on a single-item scale, produced equivalent results. The results showed that only the instruments used by Leite et al. (1988) and Shoham et al. (1995) produced fully equivalent results; therefore the research hypothesis of the study was only partially supported. All of the scales correlated strongly; however, the performance of the scales in the tests did vary.

Researchers should be aware of what they can get from each scale. Each instrument has its own characteristics and is more appropriate to different types of study. The Stöttinger and Schlegelmilch (1998) instrument is the scale recommended to researchers wishing to utilize single-item measures of psychic distance, especially when psychic distance is to be

measured with other variables, as an antecedent, a mediator, or a moderator of a given dependent variable. The scales used by Leite *et al.* (1988) and by Shoham *et al.* (1995) are basically equivalent; either of them constitutes the second best option for researchers following a summary construct approach to measure psychic distance. Finally, the Boyacigiller (1990) scale produces results somewhat different from the others. In fact, the author saw it as a "cultural distance scale". It should be used when the researcher is interested in this specific facet of the psychic distance construct.

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 bias the results, since the perception of psychic distance would also be present in those who have still not exercised international activities. In order to maintain, in as much as possible, the comparability of a sample of students with a sample of executives, the questionnaires were applied to students in disciplines close to those of future executive work (administration, accounting and economics). Also, earlier studies in Brazil (Leite *et al.*, 1988; Silva *et al.*, 2007) showed a very high correlation between the results obtained from samples of executives of exporting firms and university students, with substantial time lag between the two fieldworks, suggesting that the phenomenon under study – psychic distance – is stable within the same country over time and with different groups of nationals. Nevertheless, further research to replicate the tests, using different sample groups and different countries, should be undertaken in order to verify whether the results obtained here can be generalized.

REFERENCES

BECKERMAN, W. 1956. Distance and the Pattern of Intra-European Trade. *Review of Economics and Statistics*, **28**:31–40. http://dx.doi.org/10.2307/1925556

BJÖRKMAN, I.; FORSGREN, M. 1997. *The Nature of the International Firm: Nordic contributions to international business research.* Copenhagen, Copenhagen Business School Press, 600 p.

BLACK, K. 2010. *Business Statistics for Contemporary Decision Making.* New York, Wiley, 864 p.

BOYACIGILLER, N. 1990. The Role of Expatriates in the Management of Independence, Complexity and Risk in Multinational Corporations. *Journal of International Business Studies*, **21**:357–381. http://dx.doi.org/10.1057/palgrave.jibs.8490825

BREWER, P. 2007. Operationalizing Psychic Distance: a Revised Approach. *Journal of International Marketing*, **15**(1):44–66. http://dx.doi.org/10.1509/jimk.15.1.044

ÇAKIR, A.E. 2009. Gestalt Ontology in International Relations: the Case of European Integration. *International Studies Perspectives*, **10**(3):321–340. http://dx.doi.org/10.1111/j.1528-3585.2009.00379.x

CLARK, T.; PUGH, D. S. 2001. Foreign Country Priorities in the Internationalization Process: a Measure and an Exploratory Test on British Firms. *International Business Review*, **10**:285–303.

http://dx.doi.org/10.1016/S0969-5931(01)00017-8

DIAMOND, N.; SHERRY, J.F.; MUÑIZ, A.M.; MCGRATH, M.A.; KOZINETS, K.V.; BORGHINI, S. 2009. American Girl and the Brand Gestalt: Closing the Loop on Sociocultural Branding Research. *Journal of Marketing*, **73**(3):118–134. http://dx.doi.org/10.1509/jmkg.73.3.118

DICHTL, E.; LEIBOLD, M.; KÖGLMAYR, H.G.; MÜLLER, S. 1984. The Export Decision of Small and Medium-Sized Firms: a Review. *Management International Review*, **24**(2):49–60.

DICHTL, E.; KÖGLMAYR, H.G.; MÜLLER, S. 1990. International Orientation as a Precondition for Export Success. *Journal of International Business Studies*, **21**(1):23–40. http://dx.doi.org/10.1057/palgrave.jibs.8490325

DOW, D. 2000. A Note on Psychological Distance and Export Market Selection. *Journal of International Marketing*, **1**:51–64. http://dx.doi.org/10.1509/jimk.8.1.51.19563

DOW, D.; KARUNARATNA, A. 2006. Developing a Multidimensional Instrument to Measure Psychic Distance Stimuli. *Journal of International Business Studies*, **37**:578–602.

EVANS, J.; MAVONDO, F. T. 2002. Psychic Distance and Organizational Performance: An Empirical Examination of International Retailing Operations. *Journal of International Business Studies*, **33**(3):515–532. http://dx.doi.org/10.1057/palgrave.jibs.8491029

EVANS, J.; TREADGOLD, A.; MAVONDO, F.T. 2000. Explaining Export Development through Psychic Distance. *Management International Review*, **17**(2):64–68.

FIGUEIRA-DE-LEMOS, F.; JOHANSON, J.; VAHLNE, J.E. 2011. Risk Management in the Internationalization Process of the Firm: a Note on the Uppsala Model. *Journal of World Business*, **46**(2):143–152. http://dx.doi.org/10.1016/j.jwb.2010.05.008

FLETCHER, R.; BOHN, J. 1998. The Impact of Psychic Distance on the Internationalization of the Australian Firm. *Journal of Global Marketing*, **12**(2):47–68. http://dx.doi.org/10.1300/J042v12n02_04

HALLÉN, L.; WIEDERSCHEIM-PAUL, F. 1993. Psychic Distance and Buyer-Seller Interaction. *In:* P.J. BUCKLEY; P. GHAURI (eds.), *The Internationalization of the Firm: a Reader.* London, Harcourt, p.291–302.

HAIR, J.F.; BLACK, W.C.; ANDERSON, R.E.; TATHAM, R.L. 2006. *Multivariate Data Analysis.* New Jersey, Upper Saddle River, Prentice Hall.

JOHANSON, J.; VAHLNE, J.E. 1977. The Internationalization Process of the Firm: a Model of Knowledge Development and Increasing Market Commitment. *Journal of International Business Studies*, **8**:23–32. http://dx.doi.org/10.1057/palgrave.jibs.8490676

JOHANSON, J.; VAHLNE, J.E. 1992. Management of Foreign Market Entry. *Scandinavian International Business Review*, **1**(3):9–27. http://dx.doi.org/10.1016/0962-9262(92)90008-T

JOHANSON, J.; WIEDERSHEIM-PAUL, F. 1975. The Internationalization of the Firm: Four Swedish Cases. *Journal of Management Studies*, **12**:305–322. http://dx.doi.org/10.1111/j.1467-6486.1975.tb00514.x

KLEIN, S.; ROTH, V.J. 1990. Determinants of Export Channel Structure: the Effects of Experience and Psychic Distance Reconsidered. *International Marketing Review*, **7**(5):27–38.

http://dx.doi.org/10.1108/EUM0000000001533

KÖHLER, W. 1947. *Gestalt Psychology*. New York, Liveright, 369 p.

LEITE, H.; DA ROCHA, A.M.C.; FIGUEIREDO, K.F. 1988. A Percepção Cultural e a Decisão de Exportar. *In:* A.M.C. da ROCHA (ed.), *Gerência de Exportação no Brasil.* São Paulo/Rio de Janeiro, Atlas/Editora da UFRJ, p. 61-72.

REID, S. 1986. Migration, Cultural Distance, and International Market Expansion. *In:* P.W. TURNBULL; S.J. PALIWODA (eds.), *Research in International Marketing.* London, Croom Helm, p. 22-34.

RINDOVA, V.; FERRIER, W.J.; WILTBANK, R. 2010. Value from Gestalt: How Sequences of Competitive Actions Create Advantages for Firms in Nascent Markets. *Strategic Management Journal*, **31**(3):1474-1497. http://dx.doi.org/10.1002/smj.892

SHOHAM, A.; ROSE, G.M.; ALBAUM, G.S. 1995. Export Motives, Psychological Distance, and the EPRG Framework. *Journal of Global Marketing*, **8**(3/4):9-37. http://dx.doi.org/10.1300/J042v08n03_02

SILVA, M.G.F.; ROCHA, A.M.C.; FIGUEIREDO, O. 2007. Medindo o construto da distância psíquica. *E & G. Economia e Gestão*, **14**:31-42.

SMITH, M.; DOWLING, P.J.; ROSE, E.L. 2011. Psychic Distance Revisited: a Proposed Conceptual Framework and Research Agenda. *Journal of Management & Organization*, **17**:123-143. http://dx.doi.org/10.5172/jmo.2011.17.1.123

SOUSA, C.M.P.; BRADLEY, F. 2005. Global markets: does psychic distance matter? *Journal of Strategic Marketing*, **13**:43-59.

http://dx.doi.org/10.1080/0965254042000328668

SOUSA, C.M.P.; BRADLEY, F. 2006. Cultural distance and psychic distance: two peas in a pod? *Journal of International Marketing*, **14**(1):49-70. http://dx.doi.org/10.1509/jimk.14.1.49

SOUSA, C.M.P.; LENGLER, J. 2009. Psychic Distance, Marketing Strategy and Performance in Export Ventures of Brazilian Firms. *Journal of Marketing Management*, **25**(5/6):591-610. http://dx.doi.org/10.1362/026725709X461876

STÖTTINGER, B.; SCHLEGELMILCH, B.B. 1998. Explaining Export Development through Psychic Distance: Enlightening or Elusive? *International Marketing Review*, **15**(5):357-372. http://dx.doi.org/10.1362/026725709X461876

STÖTTINGER, B.; SCHLEGELMILCH, B.B. 2000. Psychic Distance: a Concept Past its Due Date? *International Marketing Review*, **17**(2):169-173. http://dx.doi.org/10.1108/02651330010322723

VAHLNE, J.E.; NORDSTRÖM, K.A. 1992. *Is the globe shrinking? Psychic distance and the establishment of Swedish sales subsidiaries during the last 100 years.* Stockholm, Institute of International Business at the Stockholm School of Economics, Research Paper 92/3.

OTAVIO FIGUEIREDO
Universidade Federal do Rio de Janeiro
Instituto Coppead de Administração
Rua Pascoal Lemme, 355, Ilha do Fundão
21941-918, Rio de Janeiro, RJ, Brasil

ANGELA DA ROCHA
Pontifícia Universidade Católica do Rio de Janeiro
IAG Escola de Negócios
Rua Marques de São Vicente, 225, Gávea
22451-900, Rio de Janeiro, RJ, Brasil

JORGE FERREIRA DA SILVA
Pontifícia Universidade Católica do Rio de Janeiro
IAG Escola de Negócios
Rua Marques de São Vicente, 225, Gávea
22451-900, Rio de Janeiro, RJ, Brasil