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Space and Motion Discomfort in Brazilian versus American Patients with Anxiety Disorders

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Abstract — Space and motion discomfort (SMD) was studied in 38 Brazilian and 50 U.S. patients belonging to one of three diagnostic groups: (a) panic disorder with agoraphobia, (b) panic disorder without agoraphobia, and (3) other nonpanic anxiety disorders. A group of 30 U.S. normal controls was also included. SMD was assessed by the Situational Characteristics Questionnaire (SitQ), which includes two scales for SMD — the Smd1 and the Smd2, and one scale for non-space-related agoraphobic discomfort, the Ag1. The score in the Smd2 is based on the sum of Likert style items, while the scores of the Smd1 and Ag1 are based on differences between contrasting subitems. A significant diagnosis effect was observed in all scales, with the highest scores in the agoraphobia group. A country effect was found only in the Smd2. A country effect was also observed when all subitems of the Smd1 and Ag1 were added rather than subtracted, suggesting that this country bias is related to a tendency of Brazilian patients to endorse symptoms. Implications of these findings to the trans-cultural validation of rating scales are discussed. © 1997 Elsevier Science Ltd

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INTRODUCTION

A high prevalence of vestibular or balance dysfunction has been reported in patients with panic disorder, particularly those with agoraphobia (Jacob, Furman, Durrant, & Turner, 1996; Jacob, Moller, Turner, & Wall, 1985; Yardley, Britton, Lear, Bird, & Luxon, 1995; Yardley, Luxon, Lear, Britton, & Bird, 1994). Psychiatric complications, especially anxiety symptoms and anxiety disorders, have also been reported in patients with vestibular dysfunction (Clark, Hirsch, Smith, Furman, & Jacob, 1995; Eagger, Luxon, Davies, Coelho, & Ron, 1991; Stein, Asmundson, Ireland, & Walker, 1994; Sullivan, Clark, Katon, Fischl, Russo, Dobie, & Voorhees, 1993). The importance of the relationship between agoraphobia and balance abnormalities is reinforced by the report of "pseudoagoraphobic" syndromes such as "street neurosis" (Levy & O'Leary, 1947), "supermarket syndrome" (McCabe, 1975; Rudge & Chambers, 1982), "motorist vestibular disorientation syndrome" (Page & Gresty, 1985), and "space phobia" (Marks & Bebbington, 1976). Patients with such complaints report discomfort in situations characterized by vestibular stimulation or paucity of non-vestibular spatial cues (Jacob, Furman, & Balaban, 1996). Such discomfort can evoke avoidant behavior and trigger panic attacks in a pattern very similar to that seen in panic disorder and agoraphobia.

In an attempt to further elucidate the nature of the correlation between agoraphobic avoidance and vestibular dysfunction, Jacob et al. (1993) coined the term *space and motion discomfort* (SMD) to describe a condition in which anxiety and stress are elicited by situations where adequate visual or kinesthetic information for normal spatial orientation is not available. The authors suggested that individuals with SMD have some degree of vestibular impairment and therefore are more dependent on visual or kinesthetic inputs for spatial orientation than other individuals. Identification and measurement of SMD can be reliably carried out by the Situational Characteristics Questionnaire (SitQ) (Jacob et al., 1993).

Recently, Ramos, Formigoni, Soares, Demetrio, Oliveira, and Gentil (in press) investigated the occurrence of vestibular dysfunction in 32 Brazilian patients with panic disorder and agoraphobia. Abnormalities in the caloric test were found in 31% of them. To further examine the role of space and motion discomfort in the relationship between panic/agoraphobia and balance disorders in the Brazilian population, there is a need for a Portuguese measure of SMD. Therefore, the present study reports our initial experiences with the translated Portuguese version of SitQ, as applied to Brazilian patients with uncomplicated panic disorder, panic disorder with agoraphobia, or non-panic anxiety disorders. Based on the results of Jacob et al. (1993) and Jacob et al. (1996), we predicted that Brazilian and American agoraphobics would have higher levels of SMD than those with panic disorder and other anxiety disorders. We were also interested in whether there would be a systematic difference in SMD scores between countries.

METHOD

Design

The Portuguese version of the SitQ was administered to 38 consecutive outpatients in an anxiety disorder research clinic in the Institute of Psychiatry of the University of São Paulo ("Brazilian sample") with diagnoses of panic disorder, panic disorder with agoraphobia, and other anxiety disorders. These SitQ scores were compared with those of 50 patients with similar diagnoses from Western Psychiatric Institute and Clinic, and 30 American normal comparison subjects ("U.S. sample"). We hypothesized that the agoraphobic groups would show the highest scores in both countries. We also examined the possibility of systematic differences between the countries.

The Portuguese Version of SitQ

The Situational Characteristics Questionnaire (SitQ) consists of two parts (Jacob et al., 1993). Part I contains information on the degree of discomfort associated with contrasting aspects of a situation, such as riding in a car, bus, or elevator. For example, for the situation of "riding in a car," one item elicits the difference between subitems of "sitting in the back seat" compared with "sitting in the front seat." Part I has two subscales, the Smd1 and Ag1, thought to reflect discomfort related to space and motion and "other" agoraphobic avoidance, respectively. Part II of the SitQ provides scores for a second space and motion discomfort scale, the Smd2, that includes items such as "looking up at tall buildings," "closing eyes in shower," and "aerobic exercise." The Smd2 consists of traditional Likert-type items scored from 0 to 3.

The SitQ was first translated into Portuguese independently by two psychiatrists (one being the senior author). After reconciliation, the translation was checked by a Brazilian English teacher who had previously resided in the United States for more than 2 years. The Portuguese version was back-translated to English by a Brazilian psychiatrist currently receiving residency training in the U.S. A native American speaker revised this translation to idiomatic English. The original and back translation were similar in all essential aspects except for Item #9 of the Smd1, which was changed in the translation from "standing in a bus" to "standing at a bus stop." In Item #12 of the Smd1 a change in the order of the subitems was found which required a trivial correction in the scoring.

Before analyzing the data, we examined the degree to which Item #9 of the Smd1 affected the total score by determining the correlation between the total Smd1 with an alternative scoring procedure that excluded Item #9. The Pearson product moment correlation was $r = .989$.

TABLE 1
AGE AND SEX DISTRIBUTION (A) BY GROUP: PANIC DISORDER WITHOUT AGORAPHOBIA (PD WITHOUT AG), PANIC DISORDER WITH AGORAPHOBIA (PD WITH AG), NONPANIC ANXIETY DISORDERS (NPA), AND NORMAL CONTROLS; AND (B) BY COUNTRY: BRAZIL AND UNITED STATES (U.S.)

		PD without AGPD		PD with AG		NPA		Normal Controls	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
N	Brazil	9		15		14		0	
	U.S.	14		21		15		30	
Age	Brazil	30.5	5.6	34.8	6.4	30.8	7.7		
	U.S.	35.3	8.5	31.9	8.4	33.6	10.7	33.3	8.3
Percent Females	Brazil	55.5		73.3		62.3			
	U.S.	50.0		71.4		66.7		60	

Participants

The patients of the "Brazilian sample" were evaluated by a resident and an experienced staff psychiatrist using a structured interview based on the DSM IV diagnostic criteria. For the "U.S. sample," diagnosis was based on the Anxiety Disorders Interview Schedule for *DSM III-R* (ADIS-R; DiNardo & Barlow, 1988). For both countries, the exclusion criteria were the previous or current evidence of medical or neurological disorders, alcohol or drug abuse, psychosis, organic brain syndrome, schizophrenia, or affective disorder.

According to their diagnoses, the patients were grouped as follows: patients with panic disorder without agoraphobia (PD without AG); patients with panic disorder with agoraphobia (PD with AG); and patients with other anxiety disorders except panic or agoraphobia (NPA).

In the Brazilian sample, the NPA group consisted of four patients with generalized anxiety disorder, seven with social phobia, and three with obsessive compulsive disorder. In the U.S. sample, the NPA group consisted of nine patients with social phobia and six with generalized anxiety disorder.

Statistical Analysis

The data were examined for an effect of Diagnosis as well as Country of origin using a 3 × 2 (Diagnosis × Country) analysis of variance. Post hoc testing employing the Tukey procedure to follow up significant F values was performed. Effect sizes of group or country effect were calculated as a "proportion of variance explained" measure using the η^2 statistics (Cohen, 1988).

TABLE 2
MEAN SCORES AND STANDARD ERROR OF THE SPACE AND MOTION DISCOMFORT (SMD1, SMD2) AND AGORAPHOBIA (AG1) SCALES (A) BY GROUP: PANIC DISORDER WITHOUT AGORAPHOBIA (PD WITHOUT AG), PANIC DISORDER WITH AGORAPHOBIA (PD WITH AG), NONPANIC ANXIETY DISORDERS (NPA), AND NORMAL CONTROLS; AND (B) BY COUNTRY: BRAZIL AND UNITED STATES (U.S.)

		PD without AG		PD with AG		NPA		Normal Controls		ANOVA (p values)		
		M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*	Country	Diagnosis	Country × Diagnosis
Ag1	Brazil	4.45	1.61	10.4	1.16	7.31	1.07			.1810	.0002	.1421
	U.S.	5.77	1.2	8.82	1.24	3.49	0.731	1.62	0.458			
Smd1	Brazil	1.3	0.768	4.79	0.616	2.79	0.621			.6116	.0022	.3263
	U.S.	3.04	1.03	4.48	0.657	2.34	0.654	1.38	0.213			
Smd2	Brazil	12.1	2.32	11.9	1.36	8.57	1.33			.0013	.0014	.1456
	U.S.	5.44	1.43	11.1	1.68	3.48	0.549	1.22	0.293			

RESULTS

The Brazilian and the U.S. samples had similar age distribution across all the diagnostic groups. In both countries the sex distribution was similar and included a higher proportion of females in the PD with AG group (Table 1).

Table 2 shows the scores on the Smd1, Smd2, and Ag1 scales by diagnostic group and by country. The PD with AG group had the highest score on all scales except for the Smd2 in the Brazilian sample. The Smd2 showed consistently higher scores in the Brazilian patients compared with U.S. patients.

The analysis of variance showed significant Diagnosis effects on all 3 scales: Smd1 [$F(2, 82) = 6.610$, $p = .0022$], Ag1 [$F(2, 82) = 9.421$, $p = .0002$], and Smd2 [$F(2, 82) = 7.167$, $p = .0014$].

A Country effect was found for the Smd2 [$F(1, 82) = 11.083$, $p = .0013$] but not for the Smd1 [$F(1, 82) = 0.268$, $p = .6116$] and Ag1 [$F(1, 82) = 1.821$, $p = .1810$]. There was no significant Country × Diagnosis interaction on the Smd1, Smd2, and Ag1.

Because the Diagnosis × Country interactions were not significant, the effect sizes for the diagnosis and country effects were calculated in an ANOVA model that did not include such an interaction. The country effect in the Smd2 amounted to $\eta^2 = .10$, that is, 10% of the variance. The effects sizes for diagnosis were $\eta^2 = .07$, .10, and .09, respectively, for the Smd1, Ag1, and Smd2.

Complementary Analysis

The presence of a country effect on only the Smd2 raised the possibility of differences in the tendencies to endorse symptoms between the countries.

Because the scores in the Smd1 and Ag1 were based on differences between subitems, such overall tendencies should be canceled out for these scales. On the other hand, if the subitems were added rather than subtracted, the differences in response bias between the countries should persist. Therefore, we created a new scale using the average of all subitems in Part I. Analysis of variance of this scale revealed a significant country effect [$F(2, 84) = 14.300$, $p = .0003$] and a significant diagnosis effect [$F(2, 84) = 19.327$, $p < .0001$]. The effect size for country was $\eta^2 = .19$, that is, representing close to 20% of the variance.

DISCUSSION

Consistent with previous reports (Jacob et al., 1993; Jacob et al., 1996), we found that space and motion discomfort, as measured by the Smd1, occurs at higher levels in agoraphobia than in uncomplicated panic disorder or non-panic anxiety disorders groups. These results suggest that the U.S. and Brazilian versions of the Smd1 can validly identify SMD in both countries. Further investigation of the construct validity of the Smd1 in Brazilian patients might include an examination of the relationship between test scores and actual measures of vestibular function, as was performed by Jacob, Furman, Durrant & Turner (1996) in a different sample of U.S. patients.

The unexpected finding of a significant country effect for the Smd2, but not the Smd1 or Ag1, led to a complementary analysis in which we examined whether the country effect might be related to the item structure of the Smd2. The Smd2 items are in standard Likert format, whereas the Smd1 and Ag1 items involve differences between pairs of subitems that each are of Likert format. We had earlier hypothesized (Jacob et al., 1993) that the item format of the Smd2 would make it more vulnerable to an acquiescence response bias than the Smd1 or Ag1 because the subtraction of one subitem from the other cancels out this kind of bias in the latter two scales.

To test our hypothesis that this country effect might be related to differences in response styles, we created an alternative scale from the subitems of Part I by averaging the subitem pairs rather than calculating the difference. Because taking the average of two Likert style subitems would not cancel out response bias, we hypothesized that there would be a significant country effect in this new "average subitems scale." The fact that a significant country effect was found for this new scale supports a contention that the country effect found for the Smd2 was related to differences in acquiescence response style in Brazilian versus U.S. patients. We consider the findings of this country effect preliminary and in need of replication, because the study was not a priori designed to investigate cross-cultural differences. Nevertheless, this effect deserves further comments.

Our finding of a country effect is consistent with the results of many studies indicating that patients from non-Western cultures differ from those in Western

cultures with respect to what symptoms are endorsed. Specifically, individuals in non-Western cultures tend to "somatize" their emotions whereas those from Western cultures tend to "psychologize" them (Goldberg & Bridges, 1988; Katon, Kleinman, & Rosen, 1982; Mumford, 1993). There are several reports of a high rate of somatic presentation of psychiatric disorders in countries such as China (Tseng, 1975), India (Janakiramaiah & Subbakrisna, 1980; Srinivasan, Srivasa Murthy, & Janakiramaiah, 1986; Saxena, Nepal, & Mohan, 1988), Iraq (Bazzoui, 1970), Saudi Arabia (Racy, 1980), Nigeria (Binitie, 1975), and Ethiopia (Keegstra, 1986). Latin Americans may have a similar tendency, as shown by Mezzich and Raab (1980), who administered a scale for depressive symptoms to Peruvian and U.S. samples. Although a commonality of core depressive symptoms was found in both the samples, Peruvian subjects had more complaints and higher scores on somatic symptoms, whereas U.S. subjects had higher scores on suicidal manifestations. Our findings are also broadly consistent with those of recent studies demonstrating cross-cultural differences in response styles on personality questionnaires (e.g., Chen, Lee, & Stevenson, 1995).

The implication of these findings is that, unless culture or country-specific normative data are available, results of studies using assessment instruments that are translations of Likert style items might not be generalizable across countries. For example, if the scores on such instruments are used to include or exclude subjects from a study, the country effect could introduce a differential inclusion bias between the countries. This potential problem may explain the results of Lucchesi, Fernades, Silva Junior, Yazigi, Ansseau, and Timsit-Berthier (1994), who found a lower rate of non-suppression in the dexamethasone suppression test (DST) in Brazilian female depressive patients compared with a sample of Belgian patients with the same diagnosis. In this study, a common cut-off of 24 on the Hamilton depression scale was adopted for both samples. If the same response bias found on the Smd2 was present in that study, the Brazilian individuals could have a less severe depression than their Belgian peers, and the results of the DST would not be comparable across countries.

Furthermore, this response bias can affect results of clinical trials involving Brazilian patients with anxiety disorders. Some treatment trials in Brazil include those patients whose score on an anxiety measure exceeds a specific "cut-off" value, and often this cut-off value is modeled after similar trials already conducted in the U.S. If the response bias found for the Smd2 also is present in the anxiety measure used to select patients, relatively milder patients, including patients with subclinical disorders, might be included in the Brazilian studies. Further research is needed to examine the effect of acquiescence response bias in Brazilian patients on questionnaire or interview measures. In addition, further research is needed to distinguish acquiescence from a tendency to endorse more extreme response options (Chen et al., 1995). Because the items on the SitQ are worded in the positive direction, the present findings do not permit us to distinguish which of these response tendencies might have been operative in this case.

Our results provide some reassurance about the generalizability of measures based on differences between scores. By taking the difference within individuals, the response bias is cancelled out (assuming, of course, that the person's acquiesence tendency has not changed between the two occasions). Thus, although response bias may affect which patients are included in a study, it would have less effect on the outcome measure, if this measure is based on comparing patients' post-treatment scores, either with (a) their own baseline levels of symptomatology, or (b) other individuals in the study from the same cultural context. The item structure of the Smd1 and Ag1, in which the difference is calculated between contrasting subitems, may be useful for overcoming this bias. Ag1, for instance, distinguished among the diagnostic groups in both samples with no significant country effect and may thus be a candidate for a "culturally robust" measure of agoraphobia.

Cross-cultural differences, therefore, do not impede country comparisons but must be carefully considered. Finally, the concept of space and motion discomfort, as measured by the Smd1, seems to be cross-culturally robust and can contribute for a better understanding of the relationship between anxiety and balance disorders.

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