

SEMANTIC INDEPENDENCE AND DEGREE OF BILINGUALISM IN TWO PUERTO RICAN COMMUNITIES¹

TOMI D. BERNEY, ROBERT L. COOPER AND JOSHUA A. FISHMAN
Yeshiva University
New York, U.S.A.

Psychologists interested in bilingual functioning have devised a number of relatively quick and inexpensive measures of degree of bilingualism such as the number of words named in each language within equal time periods (Johnson, 1953; Macnamara, 1967), the speed of response to directions given in each language (Lambert, 1955), and the speed with which pictures are named in each language (Ervin, 1961). The present report describes a measure of semantic independence which can be derived from verbal fluency measures of degree of bilingualism.

METHOD

Two bilingual fluency techniques, word meaning and continuous word association, were administered to 38 and 31 respondents respectively as part of an intensive study of bilingualism conducted within a four-block Puerto Rican neighborhood in the "downtown" section Jersey City (Fishman, Cooper, Ma, *et al.*, 1968). Each of these techniques elicited a series of discrete words, in English and in Spanish separately, for each of five semantic contexts representing the institutional domains of family, neighborhood, religion, education, and work. These techniques were administered primarily to obtain an estimate of relative bilingual fluency in each domain, by comparing the number of words produced in each language. It was also possible, however, to subject the responses to another analysis in terms of the proportion of translation equivalent responses which were observed. This proportion could serve as an index of the degree of semantic independence exhibited in each domain by respondents in their two languages.

A Puerto Rican Spanish-English bilingual translated all Spanish responses into English. For any domain, a translation equivalent pair was counted for a respondent when an English response was

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identical to the English translation of one of his Spanish responses. The number of translation equivalent pairs in each domain was counted for each respondent and expressed as a ratio to the total number of words observed in the weaker language for that domain. For example, if for a given domain a respondent produced 20 words of Spanish and 15 words in English, and if 5 of his English responses had equivalent responses in Spanish, his translation equivalent ratio for that domain would be $5/15 = .33$.

To provide a contrast to the responses of the Jersey City group, the word naming and word association tasks were administered to 41 residents of Yauco, a small town a few miles away from Ponce, Puerto Rico. These responses were also analyzed in terms of translation equivalent ratios. The translation equivalent ratios of both groups were then compared via two analyses of variance, one for the word naming task and one for the word association task.

RESULTS

Tables 1 and 2 summarize the analyses of variance of the word naming and word association translation equivalent ratios respectively. Each analysis showed significant main effects for group ($p < .05$) and for domain (word naming, $p < .01$; word association, $p < .05$), but no significant interaction between the two. That is to say, one group, the Yauco respondents, gave significantly larger translation equivalent ratios on the average than did the other, and some domains exhibited significantly greater average ratios than did others, but no difference was observed between the two groups' patterns of domain differences.

TABLE 1

ANALYSIS OF VARIANCE OF WORD NAMING TRANSLATION
EQUIVALENT RATIOS

Source	df	MS	F
Between subjects	78		
Group (B)	1	36.75	4.21*
Error (b)	77	8.73	
Within subjects	285		
Domain (A)	4	19.54	4.79**
A × B	4	7.53	1.85
Error (w)	277	4.08	
Total	359		

* $p < .05$

** $p < .01$

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TABLE 2

ANALYSIS OF VARIANCE OF WORD ASSOCIATION TRANSLATION
EQUIVALENT RATIOS

Source	df	MS	F
Between subjects	71		
Group (B)	1	34.60	4.02*
Error (b)	70	8.87	
Within subjects	270		
Domain (A)	4	10.12	2.44*
A × B	4	1.90	.46
Error (w)	262	4.14	
Total	341		

On the word naming task, when the responses of both groups were pooled, the domains with the smallest ratios of translation equivalent responses (or conversely the domains with the greatest semantic independence) were those of family and neighborhood, and the domains with the largest ratios were those of religion and education. A Newman-Keuls multiple range test of these word naming differences indicated that the differences between the ratios for religion and neighborhood, religion and family, and education and neighborhood were statistically significant ($p < .01, .05, .05$, respectively). On the word association task, only one difference between domains, with both groups' responses pooled, approached significance ($p < .06$), when assessed by the Newman-Keuls multiple range test, this being the difference between the domains of family and education, the former domain exhibiting the smallest ratio and the latter the largest. On both tasks the domains of family and neighborhood showed the two lowest translation equivalent ratios and the domain of education showed either the highest or the second highest. Thus, it might be argued that the least public domains, those upon which it is plausible that English is likely to impinge the least, were the ones which exhibited the greatest semantic independence. Table 3 presents the translation equivalent ratios of both groups for each domain on each task.

With respect to the relationship between semantic independence and relative proficiency, it did not appear that the former was a function of the latter. When the difference between the average number of Spanish and English words produced by all respondents for a given domain was expressed as a ratio to the number of words produced in the weaker language, it was found that on both tasks the domains of family and religion exhibited the greatest ratios (Table 4). However, it can be seen that while the domain of religion exhibited the great-

TABLE 3

MEAN TRANSLATION EQUIVALENT RATIOS¹ ON TWO BILINGUAL FLUENCY TESTS

Group	Domain				Work	Total
	Family	Neigh- borhood	Religion	Educa- tion		
	Word Naming					
Jersey City	.46	.41	.60	.51	.52	.50
Yauco, P.R.	.53	.53	.60	.65	.56	.57
Total	.50	.47	.60	.58	.54	.54
	Word Association					
Jersey City	.37	.45	.49	.49	.49	.46
Yauco, P.R.	.47	.54	.50	.55	.53	.52
Total	.42	.50	.50	.52	.51	.49

¹Ratio of translation equivalent pairs to the number of words produced in the weaker language.

est translation equivalent ratio on the word naming task, the domain of family showed the second lowest. Similarly, on the word association task, the lowest translation equivalent ratio was observed for the domain of family, while the highest was observed for the domain of education. Thus, it is likely that semantic independence and relative proficiency are at least partially independent dimensions.

TABLE 4

MEAN RELATIVE PROFICIENCY RATIOS¹ ON TWO BILINGUAL FLUENCY TESTS

Group	Domain				Work	Total
	Family	Neigh- borhood	Religion	Educa- tion		
	Word Naming					
Jersey City	.05	-.03	.12	-.07	.11	.04
Yauco, P.R.	.48	.24	.38	.27	.26	.33
Total	.27	.11	.24	.10	.19	.19
	Word Association					
Jersey City	.14	-.11	.14	.00	-.04	.03
Yauco, P.R.	.32	.23	.44	.13	.31	.29
Total	.24	.09	.30	.08	.16	.18

¹The number of Spanish words minus the number of English words divided by the larger number of words.

The greater average total translation equivalent ratio obtained by the Yauco group can be explained not in terms of their greater

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Spanish dominance (since the difference between their proficiency ratios and those of the Jersey City respondents was much greater than the difference between the two sets of translation equivalent ratios) but rather in terms of the compound-coordinate distinction (Ervin and Osgood, 1954). The bilingualism of the Yauco group was more likely to have been school-based (and hence compound) than that of the Jersey City group. Thus, the finding of greater semantic interdependence in the former groups is not surprising. Such an interpretation is consistent with the finding of greater semantic independence in those domains, the family and the neighborhood, in which the compound use or compound acquisition of English would be least likely.

SUMMARY

The Spanish and English word naming and word association responses of two groups of Puerto Rican respondents, one living on the Island and the other on the mainland, were analyzed in terms of the proportions of translation equivalent pairs to the number of words produced in the weaker language for each of the five domains. The respondents living on the Island gave significantly higher translation equivalent ratios than did those living on the mainland. The domains of family and neighborhood exhibited the smallest translation equivalent ratios and the domain of education either the second largest or the largest. It was concluded that semantic independence and relative proficiency are probably largely independent dimensions and that the former may reflect the coordinateness of the bilingual's language systems.

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ABSTRACT

The Spanish and English word naming and word association responses of two groups of Puerto Rican respondents, one living on the Island the other on the mainland, were analyzed in terms of the proportions of translation equivalent pairs to the number of words

produced in the weaker language for each of five societal domains. The respondents living on the Island gave significantly higher translation equivalent ratios than did those living on the mainland. The domains of family and neighborhood exhibited the smallest translation equivalent ratios and the domains of education and religion the largest. Semantic independence and relative bilingual proficiency were found to be largely independent dimensions (since each predominated in different domains) with the former reflecting the coordinateness of the bilingual's language system.

RESUMEN

Las respuestas de nombramiento y de asociación de palabras de dos grupos de sujetos puertorriqueños, uno residente en Puerto Rico y el otro en los Estados Unidos, fueron analizadas en términos de las proporciones de pares equivalentes de palabras traducidas al número de palabras producidas en la lengua más débil para cada uno de cinco dominios sociales. Los sujetos residentes en Puerto Rico proporcionaron respuestas equivalentes traducidas en proporción significativamente más alta que las de los Estados Unidos. Los dominios de familia y barrios demostraron la menor frecuencia de palabras traducidas y los dominios de educación y de religión la mayor. Se encontró que la independencia semántica y la habilidad bilingüe relativa eran principalmente dimensiones independientes (puesto que cada una predominó en diferentes dominios), con la primera de éstas reflejando un carácter de coordinación del sistema lingüístico de la persona bilingüe.

RESUMO

As respostas de nomeação e associação de palavras de dois grupos de sujeitos portorriquenhos, um grupo em Pôrto Rico, o outro nos Estados Unidos, foram analisadas em termos das proporções de pares equivalentes de palavras traduzidas ao número de palavras produzidas na língua mais fraca para cada um de cinco domínios sociais. Os sujeitos residentes em Pôrto Rico deram respostas equivalentes traduzidas em proporção significativamente mais alta que os dos Estados Unidos. Os domínios de família e bairro demonstraram a menor frequência de palavras traduzidas e os domínios de educação e religião, a maior. Independência semântica e habilidade bilingue relativa mostraram ser dimensões geralmente independentes (dado que cada uma predominou em domínios diferentes), a primeira refletindo um caráter de coordenação do sistema lingüístico do indivíduo bilingue.