

A manifestation of the bilingual disadvantage in college-level writing

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While bilingual ability can add richness to one's life, bilingualism has been demonstrated to hamper lexical access, verbal fluency and vocabulary size of the targeted language. Although in higher education the quality of one's writing is a great indicator of success, little research has explored how bilingual disadvantages translate into written expression. The current study utilized the written portion of the Peabody Individual Achievement Test (PIAT) to compare performance between monolingual and bilingual college students, with the Raven Progressive Matrices providing baseline nonverbal intelligence and Linguistic Inquiry and Word Count software providing an objective analysis of the written samples. Bilingual students wrote fewer words and tended to receive a lower score on the PIAT than monolingual students, while showing a similar level of competency in other measures of quality of writing. Results suggest that bilinguals may be at a disadvantage on English writing tasks that are time constrained.

Keywords: Bilingualism; Written Expression; Language Education; Language Assessment; Writing Skill; Lexical Access

1. Introduction

With the rapid shift toward globalization, the world is finding itself with an ever-growing population of individuals who can speak more than one language. In the United States, alone, between 1980 and 2007 there was a 140.4% increase in the number of people who speak a language other than English in their home, according to the US Census Bureau (2010). This trend has led researchers to investigate the implications of a bilingual brain, and how it differs from that of a monolingual.

While there are many positive outcomes related to speaking more than one language, previous research also indicates that such an ability may be at fault for deficits in vocabulary and slowed lexical access in bilinguals (Bialystok, Craik & Luk, 2008; Bialystok, Luk, Peets & Yang, 2010). However, little

research has been published on differences in written expression capabilities between monolinguals and bilinguals. General measures of vocabulary have correlated with various measures of academic achievement (Rhode & Thompson, 2007), and academic assessment is often based on one's written work in the form of exams, papers and problem sets. In light of the evidence indicating a smaller lexicon and decreased verbal fluency, the authors of the current study hypothesized that bilingual college students would also be at a disadvantage on measures of written expression, when compared with their monolingual peers.

2. Background

Aside from the obvious gains in the ability to communicate with a larger subset of the population, bilingualism is thought to enhance one's capacity for task switching, outside of a linguistic setting. This means that the constant presence of multiple competing language circuits in the bilingual brain makes it more apt to shift focus and adapt to a new situation more quickly than one might expect a monolingual to adapt (Prior & Macwhinney, 2010).

The ability to speak a second language promotes other cognitive processes that fall under the general heading of executive functioning, including inhibitory control, which is to say that bilingualism better enables individuals to ignore task-irrelevant information (Bialstock, Craik, Klein & Viswanathan, 2004). There has been some dissent, however, on whether this effect is present in all age groups, but merely enhanced in people 60 years and older who are bilingual, compared with the monolingual cohort of the same age, as suggested by Bialstock et al. (2004), or whether it is only significant in the elderly (Salvatierra & Rosselli, 2010). Perhaps a more significant advantage of the aging bilingual comes in the form of increased cognitive reserve, which is a theory stemming from the observation that, in many dementia patients, the level of dysfunction is not as severe as the extent of brain pathology might suggest. Bialystok, Craik and Freedman (2007) found that the age of onset of dementia in bilinguals was, on average, four years later than in their monolingual counterparts, suggesting that the ability to speak more than one language may provide a greater degree of neuroprotection.

The benefits of bilingualism, however, come with well-documented costs. One disadvantage of bilingualism that is pertinent to the current study is the apparent smaller receptive and expressive vocabulary size (Bialystok et al., 2010; Bialystok & Luk 2012; Oller, Pearson & Cobo-Lewis, 2007; Portocarrero, Burright & Donovick, 2007), as articulated in oral communication. Even more crucial to this study's purposes, however, are the experimental data that show the speed at which an appropriate word is selected in speech, known as lexical access, is consistently slower in bilinguals

than in monolinguals (Bialystok et al., 2008). Ivanova and Costa (2008) further demonstrated that this hindering of lexical access is evident, not only in the second language of the individual, but also in their native tongue.

The most compelling argument for why this occurs is the notion that the individual's multiple language systems within the brain are always active, creating competition between the appropriate target words in the two languages (Costa, Colomé, Gómez & Gallés, 2003). Within the competing language systems, an appropriate word must be selected from the language that is currently in use, and this process is thought to take extra time. A frequency of use explanation, however, is also commonly cited (Gollan, Montoya & Werner, 2002; Oller et al., 2007), and refers to the likelihood that the regularity with which an individual uses a word within his or her vocabulary will affect the ease of retrieval for use. That bilinguals must constantly 'choose' between language circuits, however, may enhance their inhibitory control ability (Emmorey, Luk, Pyers & Bialystok, 2008), one of the advantages of bilingualism discussed above.

At the same time, the lexical access effect may play into the apparent bilingual verbal fluency deficit. Multiple studies have reported that bilinguals perform worse on measures of verbal fluency, or the ability of an individual to produce a high number of appropriate words within a given time limit (Gollan et al., 2002; Portocarrero et al., 2007; Sandoval, Gollan, Ferreira & Salmon, 2010). Verbal fluency can be either phonemic, in which case all words must begin with the same letter (phoneme), or semantic, where all words must be categorically related based on their meaning (e.g., tools), and it appears that a bilingual disadvantage in verbal fluency may be specifically semantic (Portocarrero et al., 2007; Kormi-Nouri, A. Moradi, S. Moradi, Akbari-Zardkhaneh & Zahedian, 2012).

The literature seems to indicate that the processes involved in oral and written language production (for example, lexical access and semantic priming) are similar (Bonin, Fayol & Gambrel, 1998; Cleland & Pickering, 2006; Hadikin, 2012). It follows, then, that writing has also been used as a modality in measuring semantic fluency (Baddeley, Lewis, Eldridge & Thomson, 1984). It is certainly plausible to expect that the verbal fluency deficit in bilinguals could be present across modalities.

3. Method

3.1. Participants

Binghamton University undergraduate students, enrolled in introductory psychology and psychological statistics courses, participated in the study. Of the 104 participants ($N=104$), 53 were female, and 51 were male; 27 men and

26 women were monolingual ($n=53$), and 24 men and 27 women were bilingual ($n=51$). All participants completed a demographic survey, which included questions about ethnicity, length of time the individual had lived in the US, the language that had been spoken in their childhood home, and how long they had studied English. Each student labeled him/herself as monolingual, bilingual or multilingual. Individuals were placed in the bilingual group if they considered themselves fluent in a language other than English, and at home either spoke a language other than English, or spoke English and the other language. Criteria for participation in the study were self-reports of strong mastery of the English language and the ability to write fluently in English.

Table 1 reports participants' self identified ethnicities. The variety of languages spoken by participants in the bilingual group, other than English, included Spanish, French, Cantonese, Korean, Russian and Tagalog, among others. The mean time spent in the US for bilinguals was 14.1 years. Those bilinguals who reported how many years they had studied English (33/51, 64.7%) had, on average, studied English 11.8 years. The average age of participants in the current study was 19.2 years.

Table 1.

Participants' Self-Reported Ethnicities

	Caucasian	Asian	Hispanic	Other
Monolingual ($n=53$)	43 (81.1%)	0 (0.0%)	5 (9.9%)	5 (9.9%)
Bilingual ($n=51$)	9 (17.6%)	22 (43.1%)	11 (21.6%)	9 (17.6)

3.2. Measures

The current study was approved by Binghamton University's IRB. Following informed consent and the collection of demographic data, an untimed measure of nonverbal intelligence, the Raven Progressive Matrices (Carpenter, Just & Shell, 1990), was administered. The PIAT-R/NU administration was in keeping with the manual, thus the participant was then shown picture prompt A (Figure 1 below) of the written expression portion of the Peabody Individual Achievement Test (PIAT-R/NU); They were told that they had twenty minutes to write a story about the picture. This written expression task was chosen because it did not require any specific or technical knowledge of the participant (Markwardt, 1998). Also, there were no specific guidelines for content of the story, but the product allowed for a normed scoring technique.

The participant was told that they should focus on the people and objects in the picture, and use their imagination. They were instructed that the story should be grammatically correct, with appropriate use of punctuation. The

test administrator left the room, to avoid making the participants feel that the investigator was scrutinizing their writing. A stopwatch was left in the room so that the participant would be aware of how much time remained. A small number of participants exited the room before the full twenty minutes had expired, stating that they had completed their stories, but the vast majority were asked to stop writing at the 20 minute marker, regardless of where they were in the story.



Figure 1. Picture prompt A, PIAT-R/NU written expression. (Markwardt, 1998)

3.3. Data analysis

Two test administrators, who were unaware of whether the writer belonged to the monolingual or bilingual group, independently scored each written story, based on the 48 point criteria provided by the PIAT-R/Nu manual (Markwardt, 1998). The investigators of the current study were wary of the subjective component inherent in the scoring of essays, and did their best to circumvent the confounding nature of this problem. Whereas research suggests that individual scorers may be inattentive to scoring guidelines, and interpret them differently (Rezaee & Kermani, 2011), the PIAT-R/Nu provided examples of essays with corresponding appropriate scores, as determined by expert scorers. Each scorer of the present study had extensively studied the samples provided in the manual until the scores they assigned were congruent with those of professional scorers. On the few (<1%

of the items scored) occasions when there was a discrepancy in the scoring of a participant's written sample, both scorers reviewed each item again until agreement was reached on the participant's performance on the criterion in question.

The written stories were then transcribed into Microsoft Word documents, and analyzed via Linguistic Inquiry and Word Count (LIWC) software, which provided output on the percentage of words that fell within a particular lexical category. The LIWC dictionary included both function words, like the impersonal pronoun "it", and content words, like the present-tense verb "jumps" (Tausczik & Pennebaker, 2010). Other data provided by the software included word count, average words per sentence and percent of words that exceeded six letters.

Differences in nonverbal intelligence between groups were assessed using an ANOVA of Raven scores. Relationships between language ability and: PIAT score, percent of function words, average words per sentence, percent of prepositions and percent of words six letters or greater, were analyzed using ANCOVAs, which co-varied for score on the Raven. The authors of the current study also ran a Pearson correlation between word count and performance on the PIAT.

4. Results

4.1. Nonverbal intelligence

Analyses indicated that regardless of language group ($p=0.80$) and gender ($p=1.00$), the average score on the Raven Progressive Matrices was 46.7 ($SD=6.59$), which places the participants of this study between the 25th and 30th percentiles of first year university students as reported by Burke (1985).

4.2. Written expression

Scoring of the PIAT writing samples, according to the criteria given in the manual, revealed a trend of bilinguals to perform more poorly than monolinguals, but this did not reach statistical significance ($p=0.10$; monolingual mean = 44.33, $SD = 1.93$; bilingual mean = 43.59, $SD = 2.46$). It should be noted that a difference in score of one point on the PIAT written expression task typically places the sample in a different stanine (Markwardt, 1998), however, we were unable to locate normed scores for the written sample alone, beyond grade 12. There was no sex difference in PIAT scores ($p=0.95$).

As shown in Figure 2, bilinguals wrote fewer words per story, according to the output of the LIWC software, than monolinguals (monolingual mean = 294.79, $SD = 94.09$; bilingual mean = 248.82, $SD = 95.71$; $p=0.01$).

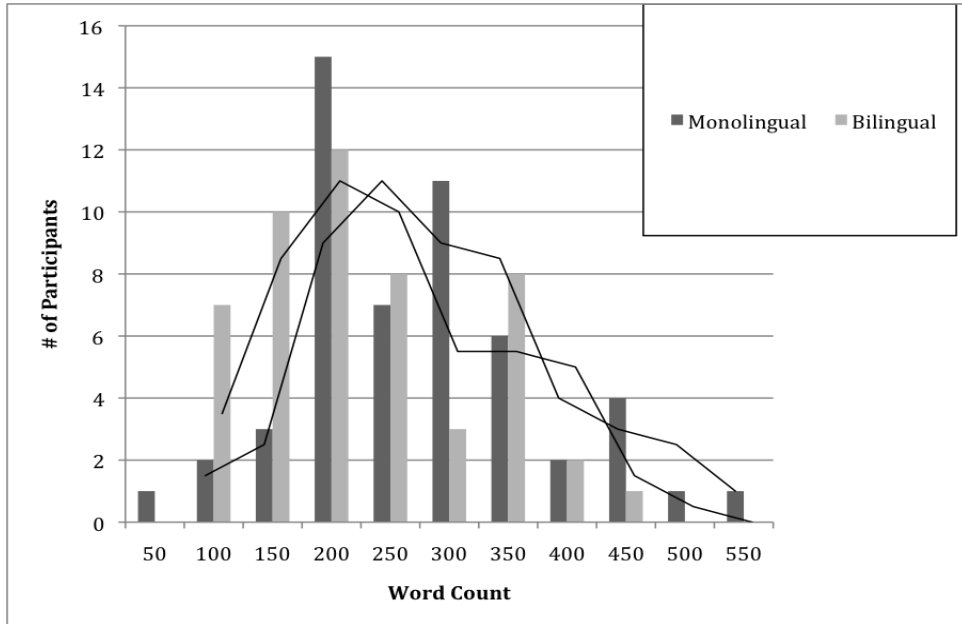


Figure 2. Length of written sample by language ability.

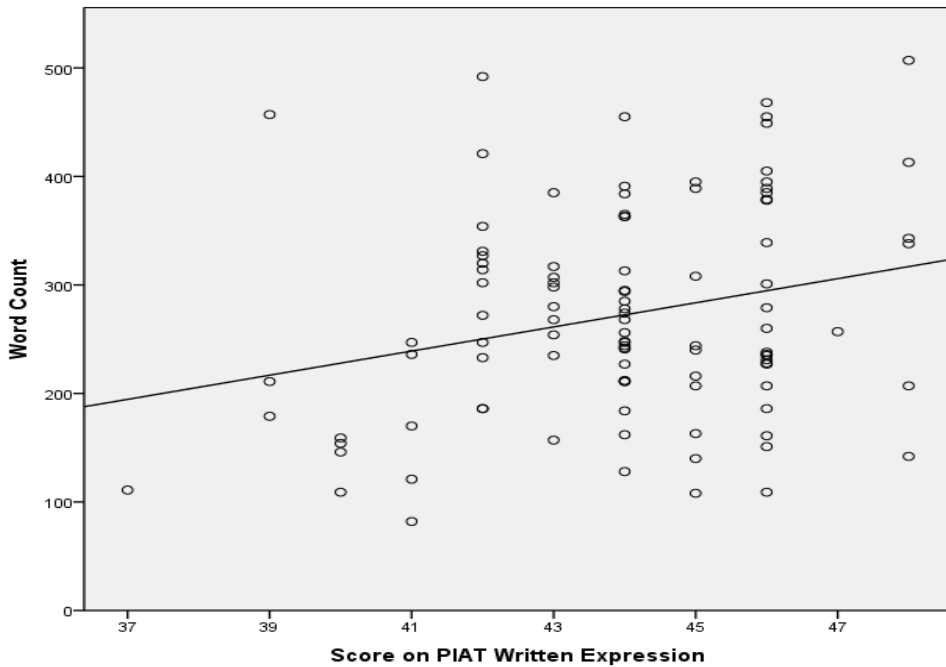


Figure 3. Relationship between written sample score and length of sample.

There was a significant correlation between word count and performance on the PIAT ($r=0.225$, $p=0.01$) (Figure 3). LIWC analysis also revealed that bilinguals wrote a significantly smaller percent of function words than monolinguals (monolingual mean = 56.57, $SD = 3.99$; bilingual mean = 54.60, $SD = 3.70$; $p=0.01$). The two groups performed similarly on the average number of words per sentence ($p=0.546$), percent of prepositions ($p=0.18$) or percent of words six letters or greater ($p=0.78$).

5. Discussion

This study was designed to investigate the performance differences between monolinguals and bilinguals on a written expression measure. The results of the current study showed that bilinguals wrote significantly shorter stories than their monolingual peers during the time allotted for a written expression task, resulting in a tendency to score lower on the PIAT-R/Nu written expression subtest. The difference in word count demonstrated between the two groups is in keeping with prior findings, in which the length of written samples correlated with verbal fluency (Tausczik & Pennebaker, 2010), on measures of which bilinguals historically tend to perform worse (Gollan et al., 2002). The current study provides evidence that the verbal fluency effect (Portocarrero et al., 2007) translates into written expression, at least when there is a time constraint on the task.

As noted, the nonverbal intelligence of the two groups was very similar, thus differences in performance should not be attributed to intelligence differences between groups. The present study did not determine if a bilingual disadvantage in the context of written expression is inherent to bilingualism, as with the advantages and disadvantages discussed in section 2 of this paper. If this is not the case, the disadvantage may be a function of the manner in which English as a second language (ESL) students are instructed in English writing skills. ESL students report that English writing exercises employed in their classroom are frustrating, and learning to write in English is difficult (Luchini, 2010).

Since English was the second language for most of the bilingual participants in the current study, researchers should implement a similar written expression task in the first language of a population of bilinguals, and compare the results to monolinguals writing in that same language. This would give a better indication of the nature of the disadvantage identified here. Future studies should also investigate differences between monolinguals and bilinguals in the use of function words, as bilinguals used fewer per written sample, on average, than monolinguals. It has been indicated that function words are more difficult for early language users to learn because they are not meaningful on their own, but rather require a

contextual understanding (Ehri & Wilce, 1980), but how this effect is manifested in college students, both monolingual and bilingual, remains to be investigated.

Interestingly, the two groups performed similarly on three other correlates of the level of mastery of the language: words per sentence, number of prepositions used, and frequency of words containing six or more letters (Tausczik & Pennebaker, 2010). As the quality of writing of monolinguals and bilinguals did not differ according to those measures, but overall performance and word count suffered in bilinguals (two measures which were highly correlated), we suggest that it may take bilingual individuals longer than monolinguals to produce a writing sample of equal quality. This would make sense when we consider the delay in lexical access that is quite evident in bilinguals (Bialystok et al., 2008; Ivanova & Costa, 2008).

The implications for such data on the success of bilinguals at a university level, and beyond, may be significant. That is to say, many exams include a written sample that must be completed within a restricted amount of time. A broader manifestation of the lexical access and verbal fluency delays in bilinguals could put them at an inherent disadvantage compared to monolingual individuals. The current study did not collect any information from its participants about their performance on standard measures of success at a university level, such as GPA. A comparison between monolinguals and bilinguals on such a measure would be interesting, however, as performance at the university level (and beyond) greatly depends on one's ability to communicate through writing.

6. Conclusion

Bilingual college students wrote shorter stories for an English written expression task, when held to a time limit, compared with their monolingual peers of similar nonverbal intelligence. The scores of bilinguals on the writing task tended to be lower than those of monolinguals, and score on this task was highly correlated with the length of the sample. Bilinguals wrote fewer function words, but performed similarly to monolinguals in other categories that suggest a mastery of writing. These results indicate that bilinguals are at a disadvantage when asked to produce an English writing sample in a restricted amount of time, and may indicate a manifestation of the verbal fluency and lexical access disadvantages for bilinguals in writing at a college level.

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