Identifying reliable discourse measures for second language speakers of English
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Introduction

About one-fifth of households in the U. S. speak a language other than English at home (U.S. Census, 2010). Thus, bilingual non-native English speakers are likely to constitute a, significant proportion of most Speech Language Pathologist’s (SLP) clinical caseload. Extensive research has documented the poorer performance of bilingual speakers on language measures of word retrieval and sentence structure (e.g., Gollan et al., 2011; Ivanova & Costa, 2008). The lower language scores are not due a disorder per se, but are attributed to less frequent use of each language (Gollan et al., 2011). This poses unique challenges in accurate diagnosis of language disorders and highlights the need to identify measures that are less likely to be negatively impacted by bilingualism. There is some preliminary evidence that the so-called “bilingual language disadvantage” may not be ubiquitous. For example, bilinguals and monolinguals perform similarly on phonemic fluency (FAS, Portocarrero et al., 2007, but see Sandoval et al., 2010) and action naming (Klassert et al., 2014). However, the findings thus far are equivocal and yet to be thoroughly examined.

Given that most (mid-to-high proficiency) bilinguals are conversationally competent, it is possible that measures of language use and informativeness, rather than vocabulary and language structure, are more representative of bilingual language competence. However, there is limited research on informativeness of discourse in bilinguals. One study compared correct information units (CIU) in the first versus second language of Spanish-English bilinguals (Edmonds, 2013).

The concept of CIUs was proposed to capture meaningfulness of discourse irrespective of syntactic errors or word retrieval difficulties (Nicholas and Brookshire, 1993). CIUs are words that are intelligible, informative and meaningful for the discourse context in which they are being used. Another potential measure of extracting informational content is idea density (ID, Turner and Greene, 1977). It is calculated as the number of ideas (represented as propositions) expressed per ten words in a language sample. An algorithm for automatic ID calculation (Brown et al., 2008) is available in the speech analysis software CLAN (MacWhinney, 2000). To our knowledge, CIU and ID have not been compared across bilingual and monolingual speakers as measures of informativeness.

The present study had three main goals. First we sought to report and compare performance of monolingual and bilingual (L2 English) speakers on a variety of lexical, syntactic and informational measures of discourse. Second, we aimed to identify discourse measure(s), particularly those related to informativeness and use, that are less likely to show an L2 English disadvantage. Third, we examined if particular demographic (e.g., education, age of English language acquisition and proficiency self-rating) and language (results on standardized tests) variables influenced performance on these measures.

Methods
All participants were neurologically healthy independent community dwelling adults with no current or prior history of language, learning, or neurological impairment. We used the age-wise incidence of cerebrovascular accidents in the US population (Mozaffarian et al., 2015) to recruit the numbers of participant in different age groups (range of 18-95 years). Participants were 43 monolingual English speakers (age range 23-95 years, mean education of 16.25 years) and 32 bilingual speakers, who all spoke English as their L2 (Spanish-English speakers N = 16; Asian Indian-English speakers N = 16; age range 18-82 years, mean education of 17.11 years). Asian Indian first languages included Hindi, Urdu, Tamil, Kannada, and Marathi. Bilingual speakers had a minimum of intermediate level proficiency (ACTFL standards) in both languages and reported speaking both languages regularly (as per the Bilingual Language Profile, Birdsong et al., 2012). For bilingual speakers, self-reported age of English acquisition ranged from 3 to 20+ years, and English language proficiency rating averaged 5 (SD=1.3) on a 6 point scale.

Discourse samples were elicited by adapting the AphasiaBank protocol (MacWhinney et al., 2011) and included a free speech sample, picture description, story retelling, and procedural discourse. In addition, a battery of standard language and cognitive neuropsychological tests (e.g., Western Aphasia Battery, Ravens Colored Progressive Matrices) was administered. Discourse samples were transcribed using the Codes for the Human Analysis of Transcripts (CHAT) format, and transcription reliability was obtained for 20% of monolingual and 50% of bilingual samples. Transcripts were analyzed in Computerized Language Analysis (CLAN) program using the EVAL and KIDEVAL utilities (MacWhinney, 2000). Additionally, CIU analysis was conducted using the procedure outlined by Nicholas and Brookshire (1993). Data analysis of the Spanish-English bilingual group is ongoing and scheduled to be completed in May 2016. Thus the Results below report statistical comparisons between Asian-Indian-English bilinguals (N=16) and their matched monolingual speakers (N =22).

### Results and Discussion

Overall, bilingual and monolingual speakers did not differ in sample length (measured as total number of utterances, total number of words and Mean Length of Utterance, all \( t(36)<1.2, p\text{-values}>.05 \)). Consistent with previous research, bilingual speakers scored significantly on morphosyntactic measures such as proportions of grammatical utterances and morphological errors (both \( t(36)>2.4, p\text{-values}<.02 \)). In contrast, the two groups did not differ in lexical diversity such as, type-token-ratio and vocabulary-diversity (VOC-D, Richards & Malvern, 1997) and one syntactic measure, the Developmental Sentence Score (DSS, Lee, 1974) was comparable (all \( t(36)=1.1, p\text{-values}>.05 \)). Consistent with our predictions for the informational content measures, there was no difference between groups for the number of CIUs (\( t(36)=1.1, p>.05 \)), and bilinguals scored better than monolinguals on idea density (\( t(36)=2.6, p<.02 \)).

To summarize, unlike measures of word retrieval, such as the Boston Naming Test (Gollan et al., 2008), bilinguals’ performance on most discourse measures, particularly measures of lexical diversity and information content, was comparable to that of monolingual speakers. Possible explanations include 1) a stylistic difference, where bilinguals tend to be more on task and produce fewer off-topic remarks, and 2) cognitive differences between monolinguals and bilinguals, given that idea density is known to be a reliable measure of cognitive abilities (Riley et al., 2010; Snowdon et al., 2000). As for syntactic measures, we found DSS to be a more unbiased measures. To conclude, identifying language measures that are less impacted by bilingual
status not only informs current understanding of language processing, but also reduces assessment bias in clinical contexts.

References


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