



## Spoken Discourse Characteristics of Bengali Speakers with Alzheimer's Disease: a Comparison of Picture Description and Story Narrative Tasks

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# Spoken discourse characteristics of Bengali Speakers with Alzheimer's Disease: A comparison of picture description and story narrative tasks

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## Introduction

Deficits in spoken discourse have been documented in individuals with Alzheimer's Disease (AD, Duong et al., 2003; Fleming & Harris, 2008); majority of the studies are from English speaking participants (Slegers et al., 2018). Consequently, our understanding of discourse impairments in languages that are different than English remains limited. Bengali is a pro-drop highly inflected language from the Indo-Aryan language family (Dash, 2015). It is the seventh most spoken language in the world, yet, to date, no studies have investigated spoken discourse characteristics of Bengali individuals with AD. The current study aimed to compare and identify differences in spoken discourse performances elicited using two discourse tasks in Bengali AD and matched healthy controls (HC).

## Methods

Six individuals with AD (mean = 66.83, SD = 11.28) and six age-education- and gender-matched HC (mean = 70.33, SD = 4.22) participated. All participants described the Western Aphasia Battery (WAB) picnic scene and retold the Frog story. Language samples were analyzed in terms of productivity, lexical, semantic, and morphosyntactic aspects using the Quantitative Production Analysis and Correct Information Unit (CIU) analyses. Performances were compared between groups using non-parametric statistics.

## Results and Discussion

Table 1 provides the descriptive statistics and the results of statistical tests. Our results demonstrate that compared to picture description, the Frog story task was more sensitive in precipitating linguistic differences between both groups. Specifically, in line with prior AD research in English (e.g., Ash et al., 2007; Sajjadi et al., 2012), Frog story showed significant group differences across all domain measures (i.e., reduced productivity, simplified syntactic complexity, and impoverished semantic content). Interestingly, in contrast to studies documenting overuse of pronouns and inflectional errors in AD (e.g., Ahmed et al., 2012; Fraser et al., 2015), the Bengali individuals with AD demonstrated a smaller proportion of pronouns than HC and no noun or verb inflectional impairments. In comparison, picture description differences were observed for the proportion of well-formed sentences and CIU measures; most participants mainly listed the picture elements (Garrard & Forsyth, 2010). Importantly, the most common domain of impairment between the two tasks was the semantics characterized by reduced semantic content and efficiency.

Therefore, picture description tasks can be a valuable tool to assess semantic impairments in AD (Mueller et al., 2018; Sajjadi et al., 2012) whereas narrative tasks elicit richer language, thus can be

useful in comprehensively documenting the linguistic impairments in languages which has yet not been explored in depth with neurological impairments.

## Conclusions

This study represents the first of its kind to characterize spoken discourse productions of Bengali AD participants revealing similarities with the English-speaking patients, but also demonstrates differences in language specific patterns. Further, our findings indicate that narrative tasks are more sensitive in revealing linguistic differences between AD and HC at the lexical, morphosyntactic, and semantic levels. Thus, relying solely on picture description tasks may not be sufficient for assessing spoken discourse of individuals who speak languages that are structurally different than English.

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**Table 1.** Spoken discourse performance comparisons between AD and HC groups for the Frog story narrative and the WAB picture description tasks.

Variable	Frog Story			WAB Picnic		
	AD (n=6) Mean (SD)	HC (n=6) Mean (SD)	<i>p</i> -value	AD (n=6) Mean (SD)	HC (n=6) Mean (SD)	<i>p</i> -value
<b><i>Productivity</i></b>						
Total words	322.0 (133.43)	494.0 (243.11)	.180	103.0 (42.21)	97.67 (41.75)	.937
Words per minute	60.07 (29.52)	139.2 (36.85)	<b>.004*</b>	77.26 (24.94)	77.35 (4.90)	.699
<b><i>Morphosyntactic measures</i></b>						
Mean sentence length	4.23 (0.63)	7.69 (0.95)	<b>.002*</b>	4.76 (0.70)	5.31 (0.47)	.394
Proportion of well-formed sentences	0.79 (0.12)	0.93 (0.06)	<b>.015*</b>	0.59 (0.18)	0.88 (0.17)	<b>.026*</b>
Embedding index	0.03 (0.05)	0.58 (0.25)	<b>.002*</b>	0.09 (0.07)	0.10 (0.03)	.589
Noun inflection index	0.98 (0.03)	1 (0)	.394	0.98 (0.03)	1 (0)	.394
Verb inflection index	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1.00
<b><i>Lexical measures</i></b>						
Proportion of nouns	0.33 (0.04)	0.33 (0.02)	.699	0.35 (0.06)	0.35 (0.03)	.818
Proportion of pronouns	0.05 (0.03)	0.11 (0.03)	<b>.026*</b>	0.06 (0.07)	0.07 (0.04)	.589
Proportion of verbs	0.27 (0.02)	0.22 (0.04)	.065	0.23 (0.04)	0.20 (0.04)	.485
<b><i>Semantic measures</i></b>						
Number of CIUs	135.67 (29.65)	162.17 (6.15)	<b>.015*</b>	65.83 (21.98)	79.0 (26.98)	.485
CIU% (idea density)	62.48 (12.44)	93.22 (3.58)	<b>.002*</b>	67.44 (13.58)	83.57 (8.59)	<b>.026*</b>
CIUs/minute (idea efficiency)	41.23 (12.34)	102.41 (16.42)	<b>.002*</b>	49.86 (9.48)	64.54 (6.90)	<b>.026*</b>

*Note.* AD = Bengali-speaking individuals with Alzheimer's Disease; HC = Healthy Control; SD = Standard Deviation; WAB = Western Aphasia Battery; CIU = Correct Information Unit; F = Frog story; W = WAB Picture description; \* =  $p < 0.05$ ; ~ = no significant difference