

CROSSLINGUISTIC GENERALIZATION OF SEMANTIC TREATMENT IN APHASIA: EVIDENCE FROM THE INDIAN CONTEXT

Introduction

The last two decades witnessed several novel treatment approaches to aphasia therapy. Semantic feature-based therapy is one of such treatment approaches that gained considerable research attention (Boyle & Coelho, 1995). More importantly, this treatment approach has been found effective in bilingual persons with aphasia. For instance, Edmonds and Kiran (2006) administered semantic feature based therapy in Spanish-English bilingual persons with aphasia and reported of crosslinguistic generalization of treatment effect to untreated language. This promising research, however, needs to be replicated and extended to novel language pairs.

Research on crosslinguistic generalization of treatment effects is of paramount importance to multilingual countries like India. For instance, with several hundreds of languages and dialects spoken across India and with the pervasive use of English as second language, speech language pathologists (SLPs) in the country are often baffled on the selection of language for treatment in bilingual persons with aphasia. Empirical evidence from Indian languages would add confidence to the SLPs while selecting language for treatment in person with aphasia. In this context, the current study aimed to replicate and extend the earlier findings on crosslinguistic generalization of treatment effects in bilingual persons with aphasia to the Indian context.

Methods

This investigation was carried out in Karnataka, a southern state in India, where the primary spoken language is Kannada. We recruited three bilingual (Kannada-English) persons with aphasia for the current study. Their premorbid proficiency was calculated with a rating scale rated either by the participants or with the help of an intimate family member. While participant 1 (P1) was equally proficient in both languages, P2 and P3 were more proficient in Kannada. Table 1 provides the demographic data as well as language proficiency of the three participants. Prior to as well as following the administration of semantic feature-based treatment, the language skills of the participants were assessed with Western Aphasia Battery (Chengappa & Kumar, 2008), Bilingual Aphasia Test (Paradis & Rangamani, 1989), and Boston Naming Test (Shanthala, 1997) (see Table 2) in Kannada and English.

Table 1 about here

Table 2 about here

We employed the methods of Edmonds and Kiran (2006) for preparing treatment probes as well as administering treatment in our participants. From an initial set of 300 pictures that were administered on each participant, 50 unsuccessfully named pictures were selected for the training purpose. The names of these pictures were neither cognates nor had 50% or more phonetic similarity in both languages. The selected items for each participant varied from that of other participants as the final items ($n = 50$) were selected

based on the individual naming failures. All items belonged to various semantic categories like animals, fruits, household articles etc.

For each participant, six sets of stimuli were developed with 10 items in each set, except in control set, which had only 5 stimuli. The stimuli were categorized into: a) English Set 1 (e.g., *cat*: N = 10); b) Kannada set 1 (translation equivalent of English set 1: e.g., */bekku/*: N = 10); c) English set 2 (semantically related to items in set 1: e.g., *dog*: N = 10); d) Kannada set 2 (translation equivalent of English set 2: e.g., */na:ji/*: N = 10); e) English set 3 (control: semantically unrelated: e.g., *stone*: N = 5); f) Kannada set 3 (control: translation equivalent of English set 3: e.g., */kallu/*: N = 5).

For each participant, two sessions of therapy, each lasting for 2 hours, were provided on a weekly basis. Unlike in Edmonds and Kiran (2006), the participants were assessed only twice (i.e., before & after therapy) in the current study.

Results

Participant P1, equally proficient in both languages, was trained using English set 1. Performance improved on both English set 1 (from 0 - 90%; $X^2 = 9$; $df = 1$; $p = 0.0027$) as well as on English set 2 (from 0 - 80%; $X^2 = 8$; $df = 1$; $p = 0.0046$). Further, crosslinguistic generalization to both translation equivalents (i.e., to Kannada set 1: 0 - 70%; $X^2 = 7$; $df = 1$; $p = 0.0081$) and semantically related items (Kannada set 2: 0 - 60%; $X^2 = 6$; $df = 1$; $p = 0.01431$) was also noticed. The control sets, however, did not show any significant improvement following therapy.

Participant P2, who was more proficient in Kannada, received treatment in the same language using Kannada set 1. Both trained set (from 0 - 80%; $X^2 = 8$; $df = 1$; $p = 0.0046$) and semantically related untrained (i.e., Kannada set 2: 10 - 60%; $X^2 = 6$; $df = 1$; $p = 0.014$) showed significant improvement. However, neither English set 1 nor English set 2 showed improvement, indicating poor crosslinguistic generalization. Subsequently, the treatment was provided in English using English set 2. Though the trained set showed improvements (from 10 - 90%; $X^2 = 8$; $df = 1$; $p = 0.0046$), it failed to generalize to English set 1. However, interestingly, with treatment initiated in English, P2 showed crosslinguistic generalization to both translation equivalents (i.e., Kannada set2: 60 - 80%) as well as to the semantic related items (i.e., Kannada set 1: 80 - 100%). Neither Kannada (0%-20%; p - ns) nor English (0%-0%; p - ns) control sets showed any notable changes following the training.

Participant P3, who was more proficient in Kannada like P2, received treatment in English using English set 1 and crosslinguistic generalization was monitored for Kannada set 1 and set 2. Scores on the trained set improved from 0 to 80% ($X^2 = 8$; $df = 1$; $p = 0.0046$). Within language generalization was observed on semantically related untrained items (i.e., English set 2) as the scores improved from 0 to 40% ($X^2 = 4$; $df = 1$; $p = 0.045$) and there was crosslinguistic generalization to Kannada set1 (from 10 to 70%; $X^2 = 6$; $df = 1$; $p = 0.014$) and to Kannada set2 (from 0 to 60%; $X^2 = 6$; $df = 1$; $p = 0.014$). Both control sets (0 - 0%; p - ns) did not show any change after the provision of training.

Discussion

The results of this investigation are, in general, on par with earlier similar investigations (e.g., Edmonds & Kiran, 2006). In their study, these authors observed improvements in both languages subsequent to the provision of treatment in L2 in balanced (i.e., equally proficient) bilinguals. However, in dominant bilinguals, where there exists a difference in proficiency level between the languages, provision of treatment in weaker language resulted in crosslinguistic generalization and the results of this study

corroborated their findings. This in turn, supports the Revised Hierarchical Model (Kroll & Stewart, 1994) of bilingual language system. Additionally, it may be noted that the pre- and post-therapy evaluations revealed overall improvement in languages skills of all three participants in the current study. Though unexpected, this observation warrants further exploration of the generalized effects of strengthening the semantic system on the overall language skills.

Conclusion

The current study replicated and extended the previous evidence on crosslinguistic generalization of semantic therapy to the Indian context. The outcomes from the current study provide empirical evidence for selecting language of treatment in bilingual persons with aphasia in the pervasively bi-/multilingual Indian context.

Acknowledgments:

This study was funded by All India Institute of Speech and Hearing, Mysore, Karnataka, India.

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Table 1: Demographic and linguistic proficiency data of the participants

Participant	Gender	Age (years)	Education	Etiology	MPO	Self-ratings: Premorbid proficiency in English/Kannada (1-least proficient; 7-most proficient)	Bilingual proficiency rating
P1	Male	60	Graduate	CVA	15	Speech:7/7 Comp: 7/7 Reading:7/7 Writing:6/7	1.00
P2	Male	58	Graduate	CVA	11	Speech:5/7 Comp:7/7 Reading:6/7 Writing:5/7	1.16
P3	Male	24	Graduate	CVA	13	Speech:5/7 Comp:6/7 Reading:6/7 Writing:5/7	1.27

Table 2: Performance of participants on various test of language in Kannada and English

Western Aphasia Battery (Scores in %)	Participant 1				Participant 2				Participant 3			
	English		Kannada		English		Kannada		English		Kannada	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Spontaneous speech	70	80	65	70	60	75	55	60	30	45	35	55
Auditory comprehension	75	80	75	80	60	70	65	75	36.6	50	40	50
Repetition	68	76	73	81	64	73	60	80	30	47	34	46
Naming	65	75	60	70	45	60	40	55	26.6	45	28.3	48.3
Auditory word recognition	66.7	71.6	61.6	68.3	53.3	61.6	58.3	65	35	46.6	31.6	51.6
Sequential commands	72.5	78.75	55	62.5	55	63.7	55	66.2	31.2	42.5	28.7	48.7
Word fluency	40	50	40	55	35	50	40	55	25	40	30	45
Sentence completion	80	80	60	80	40	60	60	60	40	60	40	60
Responsive speech	80	80	80	80	40	60	40	50	50	60	40	60
Reading	70	80	75	80	37.5	52.5	45	60	30	45	37.5	52.5
Reading commands	60	65	70	75	50	70	55	70	30	45	35	50
Written word stimulus - object choice matching	100	100	83.3	100	66.6	66.6	66.6	83.3	66.6	83.3	66.6	66.6
Written word stimulus - picture choice matching	100	100	83.3	100	66.6	83.3	50	83.3	66.6	83.3	50	83.3
Picture stimulus written word choice matching	100	100	100	100	50	66.6	66.6	66.6	50	83.3	50	66.6
Spoken words written word choice matching	100	100	100	100	50	50	50	75	50	66.6	50	66.6
Spelled word recognition	66.6	66.6	83.3	83.3	83.3	100	83.3	83.3	50	66.6	66.6	83.3
Spelling	50	66.6	66.6	66.6	83.3	83.3	66.6	66.6	66.6	83.3	66.6	83.3
Bilingual Aphasia Test	English		Kannada		English		Kannada		English		Kannada	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Pointing	100	100	100	100	80	100	70	90	40	80	30	70
Semicomplex commands	90	100	80	90	60	70	60	80	30	50	30	60
Verbal auditory discrimination	72.2	77.7	77.7	83.3	72.2	83.3	66.6	72.2	27.7	44.4	33.3	55.5
Judgment of words/non words	86.6	93.3	76.6	90	63.3	70	73.3	80	33.3	56.6	23.3	53.3

Naming	70	80	65	70	60	75	65	75	20	55	15	45
Word repetition	100	100	96.6	100	70	86.6	80	86.6	63.3	76.6	66.6	80
Semantic categories	80	80	80	80	60	80	60	60	40	60	60	80
Semantic opposites	70	80	60	70	60	60	50	60	20	60	30	50
Semantic acceptability	80	90	100	100	70	80	70	90	60	70	50	70
Synonyms	60	80	80	80	40	60	60	80	40	80	40	80
Antonyms	60	80	80	100	40	40	40	60	40	60	20	60
Antonyms 2	80	80	40	60	60	80	60	60	20	40	40	60
Reading words	90	100	100	100	50	70	70	80	20	50	30	50
Reading sentences	60	70	80	80	40	50	50	50	20	40	20	50
Boston Naming Test	English		Kannada		English		Kannada		English		Kannada	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
	53.3	61	47	54.3	35	53.7	33.3	48	21.7	53	27.3	46.7