Dysfluencies in Persons With Aphasia Showing Improvement: AphasiaBank Transcripts

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INTRODUCTION

- ***Fluency*** is the forward flow of communication
- ***Dysfluency*** is any abnormal self-interruption to fluency, or Stutter-Like Disfluencies (SLD):
  - Whole-word repetitions [W] *(and and)*
  - Sound-syllable repetitions [S] *(a-a-a-and)*
  - Prolongations: Inaudible: *-----and;* Audible [A]: *aaaand)*
- ***Disfluencies*** are self-interruptions other than SLDs, presumed more normal in type:
  - Phrase repetitions [P] (*He is g- he is going; He is going- he is going*)
  - Revisions [R] *(He- She is going)*
  - Interjections [I] *(Uh Um)*

PURPOSE & RATIONALE

From a speech fluency perspective:
(1) What is so-called neurogenic or acquired stuttering? Is it best termed **"non-developmental stuttering" (NDS)** (Logan, 2015)?
(2) How does NDS manifest in **persons with aphasia (PWA)** over time? PWA account for 37% - 50% of the neurogenic stuttering cases (e.g., Market et al., 1990; Theys et al., 2008, as cited in Logan, 2015)
(3) Where to access transcripts of PWA so we can learn about NDS?

AphasiaBank: A Resource for Clinicians

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ABSTRACT

AphasiaBank is a shared, multimedia database containing videos and transcriptions of ~180 aphasic individuals and 140 non-aphasic controls performing a uniform set of discourse tasks. The language in the videos is transcribed in Codes for the Human Analysis of Transcripts (CHAT) format and coded for analysis with Computerized Language ANalysis (CLAN) programs, which can perform a wide variety of language analyses. The database and the CLAN programs are freely available to aphasia researchers and clinicians for educational, clinical, and scholarly uses. This article describes the database, suggests some ways in which clinicians and clinician researchers might find these materials useful, and introduces a new language analysis program, EVAL, designed to streamline the transcription and coding processes, while still producing an extensive and useful language profile.

KEYWORDS: Aphasia, discourse, CHAT, CLAN, Computerized Language ANalysis

Learning Outcomes: As a result of this activity, the reader will be able to (1) describe the general contents and uses of the AphasiaBank data, and (2) describe the functionality of the EVAL program.

AphasiaBank was designed to provide researchers and researcher-clinicians with a large shared multimedia database of uniform discourse samples from individuals with and without aphasia for the purpose of studying their communication. However, this database and the associated Computerized Language ANalysis (CLAN) programs can also serve as valuable resources for speech-language pathologists (SLPs) whose major responsibilities are clinical. A new CLAN program, EVAL, has been designed for busy clinicians who wish to have an overview of their patients' language strengths and weaknesses and who need data to document the initial language status and the language changes of their patients.

This article will focus on: (1) describing the parts of the AphasiaBank database likely to be

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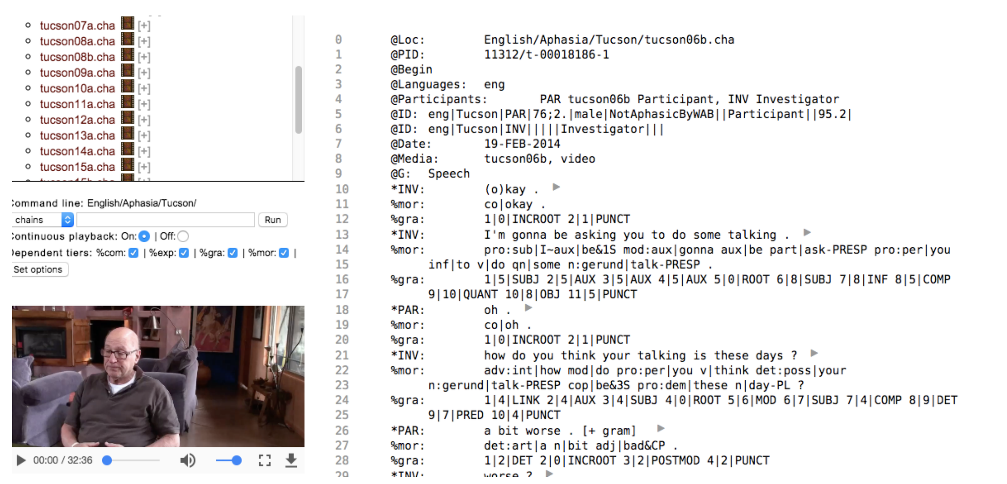
Perhaps NDS is not due to brain infarct loci as much as it is simply a speech motor disorder (Ludlow et al., 1987; cf. Basilakos et al., 2014). Thus, looking at PWA's responses to speech tasks would be promising research for developing norms.

Purpose: To use longitudinal data from AphasiaBank as a means to investigate dysfluencies and disfluencies in the speech samples of persons with aphasia (PWA) and who have shown aphasia improvement over time.

Rationale: If we knew more about disfluency frequency and types in a sample of this population, disfluencies could serve as a linguistic marker, taken with other symptomatology, of aphasia improvement.

METHODS

- Eleven participants from www.aphasia.talkbank.org "AphasiaBank", were selected based on Holland, Fromm, Forbes & MacWhinney (2016) showing that these individuals showed significant improvement on the Western Aphasia Battery-Revised (WAB-R; Kertesz, 2006; i.e., AQ>SEM) and on various discourse measures between their first and last visit.
- Dysfluencies or Stuttering-Like Disfluencies (SLDs; i.e., [W],[S],[A]) were coded using CLAN transcripts. Inaudible sound prolongations [B] were excluded due to low prevalence and validity and reliability concerns.
- Each instance of an *Um/Uh* was counted within the word counts for Interjections [I]. The other two non-SLD Disfluencies, Phrase Repetitions [P] and Revisions [R] were coded as per many available guidelines (e.g., Logan, 2015).
- Interjudge and intrajudge reliability was 92% and 95% respectively, collected on 20% of the data (i.e., 1100 words x 22 pt samples; 220 randomly selected words per pt).
- Descriptive data and nonparametric statistical analysis were used to test the hypothesis that fluency would improve between Time1 and Time2.



AphasiaBank Protocol List Discourse Tasks:

1. Free Speech (FS) Samples
   - Stroke Story and Coping
   - Important Event
2. Picture Description (see AphasiaBank for copyright)
   - Broken Window
   - Refused Umbrella
3. Story Narrative: Cinderella
4. Procedural Discourse (Expository): Peanut Butter and Jelly Sandwich or other simple sandwich

RESULTS

- Seven of the 11 participants decreased the frequency of the SLDs they produced between Time1 (a) and Time2 (b): A significant (W=44; n=11; z=1.93; p=0.03) difference between Time1(a) (M=5.5; 0-17) and Time2(b) (M=4.4; 0-12). No differences (p>0.03) between Time1-2 for Disfluencies and Total Disfluencies were found.

Table 1: From AphasiaBank, for Patient ID# e=elman (elman01 from Holland et al., 2016); s=scale; t=tucson; w=williamson). "a" designates Time1; "b" at Time2. Means (*M*) and ranges; percent increase/decreases from Time1 (a) are reported.

Pt ID#	Age	Sex	Aphasia Type(s)	Number of Wds	M SLD/ 100 wds	M Disfl/ 100 wds	M Tot.D/ 100 wds	SLD % Change	Disfl. % Change	Tot.D% Change
e01a	55;7	M	Conduction	1085	4.3	10.9	15.2	+6.9%	-13.8%	-7.9%
					(1-9)	(8-18)	(9-20)			
e01b	61;1			913	4.6	9.4	14			
					(1-11)	(7-14)	(7-20)			
e11a	52;1	M	Broca	675	13.4	20.2	33.6	-20.9%	+41.6%	+16.7%
					(10-17)	(8-31)	(28-45)			
e11b	57;7		→ Conduction	900	10.6	28.6	39.2			
					(4-12)	(25-39)	(34-44)			
s2a	57;5	M	Anomia	824	7.5	36.3	43.8	-41.3%	-13.8%	-18.5%
					(4-11)	(22-55)	(31-64)			
s2b	58;1			1300	4.4	31.3	35.7			
					(0-12)	(17-45)	(21-57)			
s5a	63;8	M	Transmotor	598	7.2	20.7	27.9	-23.6%	+22.2%	+10.4%
					(5-9)	(17-25)	(25-34)			
s5b	64;8		→Anomia	596	5.5	25.3	30.8			
					(2-10)	(18-32)	(31-35)			
s6a	41;2	M	Conduction	1201	2.6	17.3	19.9	+26.9% NCS	-1.7%	-5.0%
					(0-6)	(5-22)	(8-28)			
s6b	42;2			1023	3.3	17.6	20.9			
					(1-7)	(14-22)	(16-25)			
s12a	57;7	F	Transensory	504	5.4	11.2	16.6	-31.5%	+13.4%	-1.2%
					(3-8)	(8-15)	(11-23)			
S12b	61;7			642	3.7	12.7	16.4			
					(1-6)	(7-16)	(11-22)			
s18a	49;7	F	Broca's	443	4.8	6	10.8	-22.9%	+88.3%	+38.9%
					(2-7)	(4-18)	(7-24)			
s18b	50;7			384	3.7	11.3	15			
					(2-6)	(6-17)	9-19)			
t6a	71;1	M	Anomia	1057	3.7	41.1	44.8	-70.3%	-74.7%	-74.3%
					(1-9)	(33-47)	(35-53)			
t6b	76;2			832	1.1	10.4	11.5			
					(0-3)	(7-14)	(7-15)			
t8a	56;7	F	Conduction	573	3.6	19.6	23.2	-30.6%	-24.0%	-25.0%
					(1-7)	(19-25)	(20-31)			
t8b	61;7			993	2.5	14.9	17.4			
					(1-6)	(7-26)	(8-27)			
t15a	74;1	M	Wernicke's	980	3	5.7	8.7	+36.7%	+33.3%	+34.5%
					(1-4)	(3-16)	(6-20)			
t15b	79;1			766	4.1	7.6	11.7			
					(1-9)	(2-15)	(3-19)			
w12a	42;9	M	Broca's	445	5	36.3	41.3	+6.0%	-4.1%	-2.9%
					(4-7)	(29-47)	(34-51)			
w12b	45;1			429	5.3	34.8	40.1			
					(3-7)	(28-42)	(35-49)			

- Regarding Aphasia Diagnosis at Time1 or by Time2 when diagnosis changed, of the 11 participants, 4 Conduction, 3 Anomia, 2 Broca's, 1 TransSensory (TS), and 1 Wernicke's aphasia cases were represented in the present data.
- As can be seen in Table 1, in 3/3 pts with Anomia, in 2/4 pts with Conduction aphasia, 1/2 pts with Broca's and 1/1 TS Aphasia, a substantial (>20%) percent reduction from baseline occurred in SLDs, Disfluencies, and/or Total Disfluencies (See yellow highlights).
- However, 1/1 Wernicke's, 1/2 Broca's, 1/3 Anomia, and 1/4 Conduction, showed a substantial increase (see blue highlights) in Disfluencies ([I,P,R]), and the individual with Wernicke's was the only Pt to increase both Dys/disfluencies and total disfluencies.
- Next, the speech sample tasks were important to analyze. Because mean length of utterance (MLU), propositional aspects of speaking, and speech errors are related to increased dysfluencies (e.g., Eisenson, 1959; Bloodstein & Bernstein Ratner, 2008), those changes in discourse measures are taken from Holland et al. (2016) and shown in Table 2:

Table 2: Six of the 11 Participants showed 2/3 Percent Change from Time1 (a) as > 20%. Decreases highlighted in yellow; Increases in blue. The accompanying discourse measure changes reported by from Holland et al. (2016) are listed.

Pt ID# Aphasia Type	Discourse measure changes	SLD % Change	Disfl. % Change	Tot.D% Change
e11a/b Broca→ Conduction	↑ MLU in Pics	-20.9%	+41.6%	+16.7%
s5a/b Transmotor→ Anomia	↓ MLU in Pics ↓ Prop. Density in FS	-23.6%	+22.2%	+10.4%
s18a/b Broca's	↑ Prop. Density in FS ↓ Errors in pics/Cinderella	-22.9%	+88.3%	+38.9%
t6a/b Anomia→ NotAphByWAB	↑ MLU in Cinderella	-70.3%	-74.7%	-74.3%
t8a/b Conduction	↑ MLU in FS, Pics, & Cinder. ↓ Errors in FS	-30.6%	-24.0%	-25.0%
t15a/b Wernicke's	↓ Errors in FS	+36.7%	+33.3%	+34.5%

DISCUSSION

- This preliminary investigation into both overall disfluencies and dysfluencies in persons with aphasia who show improvement over time has **provided support for using dys/**disfluency frequency-type analysis as one measure that could serve as a linguistic marker or "struggle" with increased MLU, increased awareness of errors that require repair (e.g., Levelt, 1989) and thus can be used as a partial picture of aphasia improvement.
- Fluency experts mine data for dys/disfluencies, type, loci, etc; Aphasia experts mine data for language measures and changes. Fluency and Aphasia experts should collaborate more often than has commonly been the case.
- Future directions include: (a) Work with an aphasia expert in English and Spanish samples provided on AphasiaBank; (b) Investigating SLDs: W,S,A and possibly B types in specific; (c) Investigating Disfluencies: P, R, I types in specific; (d) separating out the samples, as it appears, as would be expected that Cinderella Narrative is the most dysfluent task; (e) investigating discourse markers (e.g., Haylett & LaSalle, 2006).

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