Peanut Butter and Princesses: Analyzing Discourse in People with Right Hemisphere Brain Damage (RHD)

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Purpose

To compare procedural discourse (PB&J) and a narrative discourse (Cinderella Story) in participants with RHD to healthy controls via:
a. Assessment of **global coherence (GC)**
b. **Main concept analyses (MCA)**
c. Correlations across measures

Background

- Individuals with right hemisphere brain damage (RHD) often:
  - exhibit cognitive-communication deficits,[1] including impairments in discourse.[2]
  - have difficulty maintaining vocational or avocational pursuits, or have disrupted social relationships.[1]
- SLPs may not be able to reliably rate discourse of people with RHD. [3]
- GC of discourse is the degree to which utterances relate to the main topic. [4]
- MCA measures a speaker's ability to provide the essential elements of a story. [5]

TABLE 1 – PARTICIPANT CHARACTERISTICS

	RHD (n=19)	Control (n=19)
Age Range (Mean)	31.1 - 81.7 (58.29)*	20.3 – 64.8 (47.1)*
Gender	7 F, 12 M	14 F, 5 M
Education Range (Mean)	13 – 30 (18.53)	13 – 21 (16.74)
Race/Ethnicity	4 AA, 14 WH, 1 OTH	6 AA, 13 WH
Note: *p<0.05		

Methods

- **Discourse elicitation:**
  - Samples obtained from RHDBank (http://rhd.talkbank.org/).
  - Samples elicited with standardized prompts
  - Transcribed in CHAT format[6]
  - Analyzed with CLAN[7] and IBM SPSS software
- **Global coherence:**
  - Two independent raters used 4-Point Global Coherence Rating Scale. [4]
  - Discrepancies resolved through discussion and consensus.
- **Preliminary main concept analysis:**
  - Samples compared to main concept (MC) list from Richardson & Dalton. [6]
  - Transcripts scored using formula (see Table 2) [6]:
    $MC = (3 \times AC) + (2 \times AI) + (2 \times IC) + (1 \times II) + (0 \times AB)$

TABLE 2- GLOBAL COHERENCE

Code	Definition	Examples from PB&J sample
G1	Entirely unrelated to the stimulus or contained tangential information.	"I would go back to visit my friends in Rhode Island"
G2	Remotely related to the stimulus and may include egocentric or tangential information.	"My favorite peanut butter comes from Whole Foods"
G3	Related to the stimulus but not essential.	(pat it down) "So there's nothing go dribbling out when I eat it"
G4	Contained main details and were overtly related to the stimulus	"So first the peanut butter (gestures spreading) then the jam then another slice of bread"

TABLE 3– MAIN CONCEPT ANALYSIS

Code	Definition	Examples from Cinderella Narratives
AC	Accurate, complete	"They called her Cinderella because they had her cleaning the cinders out of the fireplace and sweeping the hearth"
AI	Accurate, incomplete	"She became a princess and all that stuff"
IC	Inaccurate, complete	"She and the prince get together"
II	Inaccurate, incomplete	"Everything just falls apart"
AB	Absent	

Results

TABLE 4 – GLOBAL COHERENCE, X² RESULTS

	G1 Freq.		G2 Freq.		G3 Freq.		G4 Freq.		Total Freq.	
	Cind.	PB&J	Cind.	PB&J	Cind.	PB&J	Cind.	PB&J	Cind.	PB&J
RHD	110	15	43	37	178	35	535	68	930	185
Control	29	21	33	13	139	22	482	116	723	190

Cinderella X^2 (9, N=38) = 34.94, p < .00001; PB&J X^2 (9, N=38) = 27.2, p < .00001

TABLE 5 - RHD CORRELATIONS

	MC Score: PB&J	MC Score: Cind.	%g3+g4: PB&J	%g3+g4: Cind.	CLQT-EF Score
MC Score: PB&J					
MC Score: Cind.	0.533*				
%g3 + g4: PB&J	0.24	NA			
%g3+g4: Cind.	NA	0.74*	0.36		
CLQT-EF Score	0.45	0.70*	0.28	0.58*	
Note: *p < .05					

TABLE 6 – MAIN CONCEPT ANALYSIS
Cinderella Story Narrative

	RHD			Control		
% of normative sample (max. possible score)	33% (102)	50% (57)	66% (30)	33% (102)	50% (57)	66% (30)
Range	5-94	3-54	0-30	23-92	16-56	10-30
Mean (SD)	48.16 (22.19)	32.89 (13.51)	18.79 (9.90)	55.11 (19.05)	38.26 (10.96)	23.74 (5.39)
1-tailed ind. samples t-test	0.15	0.09	0.03*			

TABLE 7 – MAIN CONCEPT ANALYSIS
Peanut Butter & Jelly Procedural Narrative

	RHD			Control		
% of normative sample (max. possible score)	33% (30)	50% (12)	66% (9)	33% (30)	50% (12)	66% (9)
Range	5-24	2-10	2-9	12-27	3-12	3-9
Mean (SD)	13.00 (5.84)	7.17 (2.18)	6.61 (2.03)	17.32 (4.90)	9.16 (2.22)	7.58 (1.77)
1-tailed ind. samples t-test	0.010*	0.005*	0.07*			

Discussion

- GC code frequencies differ significantly for RHD vs. controls.
- Cinderella: RHD G4 codes lower and G1 codes higher than controls.
- PBJ: RHD G4 codes much lower than controls; G2 & G3 codes higher.
- Ppts with RHD produced fewer main details that were overtly related to the tasks both for storytelling and a simple procedural task.
- Moderate association between the MC scores on the two tasks.
- No significant correlation between % of G3 & G4 codes on the two tasks.
- PBJ: Ppts with RHD made a lot more G2 coded (remotely related or tangential/egocentric utterances). This task is personal; Cind. is not.
- The greater the proportion of stimulus-related utterances, the better the scores on accuracy and completeness in main concepts.
- Better EF scores are assoc. with higher % of stimulus-related utterances.
- PBJ: Lack of significant correlations between % of G3 and G4 scores and MC scores demonstrates that even with a low percentage of stimulus-related utterances, ppts with RHD could get the main points across on this simple task with a lot of extra verbiage.
- PBJ: Lack of significant association with CLQT-EF suggests this task may be too short and too simple to be affected by executive function skills.

Future Directions

- Continue to add to RHDBank database.
- Examine if improving executive functioning could improve performance on global coherence and main concept usage.
- Explore how to use discourse analyses in assessment and treatment progress monitoring
- Further mine RHDBank data to refine understanding of discourse in RHD.

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