

Using "Cookie Theft" Descriptions to Delineate Characteristics of Cognitive-Communication Impairments

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Purpose

The researchers sought to determine whether they could devise a simple and efficient method of using Cookie Theft picture descriptions to discriminate normal and abnormal language performance and to pinpoint factors contributing to the cognitive-communication impairments of acquired brain injury (ABI) survivors. Following the work of previous researchers, potential contributors to cognitive-communication impairments included decreased conveyance of essential information; excessive verbosity because of irrelevant or redundant content; inclusion of incorrect content; and dysfluent presentation because of excessive inclusion of elements such as non-word fillers, word or phrase repetitions, mazes or utterance revisions, self-corrections, or abandoned statements.

Participants

20 adult survivors of severe ABI:

- 17 male and 3 female
- Age: 19 - 51 years ($M = 33.38$ yrs; $SD = 9.61$)
- >1 year post-injury ($M = 15.30$ yrs; $SD = 9.13$)
- Did not have aphasia
- At or above Rancho Level VII
- Education: 8 - 14 years ($M = 11.75$ yrs; $SD = 1.41$)
- Vision and hearing within normal limits
- Residing either in a transitional living or an assisted living facility

20 adults without neurological impairments:

- 17 male and 3 female
- Age: 21 - 49 years ($M = 32.07$ yrs; $SD = 8.70$)
- Education: 12 - 16 years ($M = 13.60$ yrs; $SD = 1.64$)
- Vision and hearing within normal limits

Procedures

Picture description monologues were elicited from all participants using the Cookie Theft picture from the *Boston Diagnostic Aphasia Examination*. No time limit was imposed, and all sessions were digitally recorded for later transcription and analysis.

Analysis Steps

1. Transcribe sample verbatim, writing contractions as separate words.
2. Remove incorrect statements including erroneous words not self-corrected, ambiguous pronouns, or non-specific nouns appearing alone.
3. Remove words contributing to dysfluencies including:
 - (a) non-word fillers or unintelligible words
 - (b) mazes, revisions, and abandoned utterances
4. Remove words providing structural support including:
 - (a) statements about the task
 - (b) empty speech that does not provide descriptive information about the picture, non-specific speech, or words or phrases indicating continuation
 - (c) conjunctions and adverbs that provide temporal information
 - (d) articles and "some" when it functions as an adjective
 - (e) unambiguous pronouns other than first person pronouns or pronouns appearing as the only nouns in prepositional phrases
5. Remove words functioning as repetitions of previously-stated content.
6. Remove words contributing to content units as specified by Yorkston and Beukelman (1980).
7. Remove words contributing to elaborations of content units. Elaborations can only relate to words included in content units.
8. Remove words contributing to irrelevancies. This will include all of the remaining words in the sample.

Cut-off Scores

Interjudge Reliability
 Computed across 3 judges using 25% of samples:
 Incorrect words = 99.31%
 Dysfluencies = 97.91%
 Structural words = 95.18%
 Redundancies = 98.91%
 Content units = 95.88%
 Elaborations = 94.94%
 Irrelevancies = 97.74%

- Total words: $<-2SD$ or $>+2SD$
- Any incorrect words
- % dysfluencies: $>+2SD$
- % structural words: $<-2SD$ or $>+2SD$
- % redundancies: $>+3SD$
- % content units: $<-2SD$ or $>+3SD$
- % elaborations: $>+2SD$
- % irrelevancies: $>+3SD$

Results

Analysis unit	Participants with ABI			Participants without ABI			p-value
	Range	Mean	SD	Range	Mean	SD	
Total words	27-172	95.10	38.80	36-115	67.95	24.24	.0115
% incorrect	0-6.58	1.11	2.11	0	0.00	0.00	.0243
% dysfluent	0-31.30	9.75	7.53	0-15.65	7.24	4.96	.2208
% structural	22.22-51.82	35.81	7.99	29.57-45.45	36.76	4.90	.6519
% redundant	0-13.25	2.37	3.76	0-5.56	0.84	1.82	.1096
% content units	12.61-72.73	30.63	12.77	31.30-61.11	42.84	8.45	.0010*
% elaborations	0-22.92	10.92	5.84	0-19.57	10.40	6.17	.7849
% irrelevant	0-25.00	9.59	7.21	0-8.16	1.92	2.81	<.0001*

* indicates significant group difference given $p = .0063$

Participant #	% incorrect	z-score equivalents for ABI participants						
		Total words	Dysfluencies	Structural words	Redundancies	Content units	Elaborations	Irrelevancies
1	0.00	2.602	.694	-.493	4.564	-1.546	-.078	1.490
2	0.00	.621	-.488	-1.602	6.806	-1.790	1.244	1.888
3	6.58	.332	2.252	.016	-.458	-1.799	-.193	-.213
4	0.00	1.322	-.049	.048	-.458	-1.046	1.070	1.095
5	3.49	4.293	1.351	-.858	.820	-2.936	.199	5.722
6	0.00	-.328	-1.123	.661	3.199	.256	-1.416	1.095
7	0.00	1.405	1.109	-1.902	-.458	-.661	.540	2.453
8	0.00	2.230	.193	.359	-.458	-1.189	.838	1.067
9	1.15	.786	.162	.708	-.458	-1.261	.922	.136
10	0.00	1.735	.005	3.075	-.458	-2.163	-.508	2.549
11	0.00	.167	-.061	1.286	-.458	-1.125	.340	.800
12	0.00	3.963	.384	1.831	.546	-3.554	-.797	8.203
13	0.00	1.776	2.353	1.876	-.458	-3.576	-1.103	6.042
14	0.00	-1.442	-1.460	-1.939	-.458	3.536	-1.687	-.682
15	0.00	-.823	-.200	.150	-.458	-1.617	2.030	.800
16	0.00	.043	-1.460	-.997	2.722	-.610	-.511	5.498
17	0.00	1.941	4.847	-2.890	-.458	-2.290	.005	3.643
18	3.70	-1.690	1.524	-2.970	-.458	-1.125	-.485	7.215
19	1.11	.910	1.226	-1.381	1.976	-2.044	.475	3.661
20	6.15	2.560	-1.149	1.133	1.653	-2.337	.807	2.051

Shading indicates abnormalities.

Discussion

By examining all word analysis categories in which an individual differed substantially from the norm, a cognitive-communication impairment profile emerged. 17/20 ABI participants demonstrated abnormal language production behaviors. None of the participants without ABI demonstrated abnormal behaviors.

ABI participants demonstrated language production behaviors consistent with one or more of five profiles of cognitive-communication impairments:

- **Generating inefficient discourse** (#1, #5, #8, #10, #12, #13, #14, #15, #16, #17, #18, #19, #20)
- **Conveying inaccuracies** (#3, #5, #9, #18, #19, #20),
- **Repeating oneself** (#1, #2, #6),
- **Generating multiple dysfluencies** (#3, #13, #17),
- **Generating a paucity of speech** (#14, #18).

Clinical Implications

Major concerns of practicing clinicians regarding discourse analysis of ABI survivors include:

- selecting appropriate elicitation and analysis procedures and
- the amount of time required to learn analysis procedures, transcribe samples, and perform analyses.

Given these concerns, clinicians need to be certain their efforts result in accurate and reliable identification of factors contributing to cognitive-communication impairments.

Based on the current findings, Cookie Theft picture descriptions result in elicitation of language samples that are:

- relatively short
- have predictable content
- can be analyzed in consistent and reliable manners
- can serve to identify specific profiles of factors contributing to cognitive-communication impairments.

By using a spreadsheet program to assist with tallying words, computing proportions, and transforming raw scores to z-scores, clinicians can perform analyses rapidly and accurately.