Coherence, cohesion, and declarative memory: Discourse patterns in patients with hippocampal amnesia

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INTRODUCTION

- Defined as surface indicators of relations within and between sentences (Halliday & Hasan, 1976), cohesive ties are a linguistic device that gives our communication continuity, allowing us to make connections across utterances, speakers, and topics. Given that we routinely return to and elaborate on conversations across long stretches of interaction (days, and longer), cohesive ties also link our communicative histories across time.

- Investigations of discourse cohesion, and coherence, have been fruitful in identifying discourse level impairments in individuals with various cognitive-communication impairments, e.g., TBI, dementia.

- Deficits in working memory (e.g., Dijkstra et al., 2004), executive function (e.g., Davis & Coelho, 2004) have all been associated with impairments in cohesion and coherence in patients with TBI and dementia.

- We believe there are compelling reasons to investigate the contribution of declarative memory to cohesion and coherence. Taking advantage of a rare patient group with selective and severe declarative memory impairments (e.g., TBI, dementia).

- Deficits in working memory (e.g., Dijkstra et al., 2004; Youse & Coelho, 2005), executive function (e.g., Davis & Coelho, 2004) have all been associated with impairments in cohesion and coherence in patients with TBI and dementia.

METHODS

Participants

- Six patients (2 female) with bilateral hippocampal damage and severe declarative memory impairment
- Anosia (n=4)
- Herpes simplex encephalitis (HSE) (n=2)
- 2 groups of healthy comparison participants, matched pairwise to amnesia participants on age, handedness, education and sex

Table 1. Patients’ Demographic, Neuropsychological and Anatomical Characteristics

| Patient | Sex | Age | Handedness | Education | Sex | WCST | GMI | WAIS-III | Etiology | Chronicity | Etiology | Hand | Side of Amnesia |
|---------|-----|-----|------------|-----------|-----|------|-----|---------|---------|------------|---------|-------|-------|------------------|
|         |     |     |            |           |     |      |     |         |         |            |         |       |       |                  |
| 2571    | R   | 70  | R          | 12        | M   | 102  | 6   | 30      | Anoxia  | 11         | Anoxia  | R     | L     | due to Anoxia (1951) |
| 2308    | M   | 80  | R          | 12        | M   | 106  | 5   | 34      | Anoxia  | 11         | Anoxia  | R     | L     | due to Anoxia (1951) |
| 1846    | M   | 53  | L          | 12        | M   | 73   | 3   | 12      | Anoxia  | 11         | Anoxia  | L     | R     | due to Anoxia (1951) |

Table 2. Summary of Cohesion and Coherence Variables

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<th>Cohesion</th>
<th>Referential</th>
<th>Personal</th>
<th>Demonstrative</th>
<th>Local</th>
<th>Global</th>
<th>Procedural</th>
<th>Narrative</th>
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<td>Statically significant (p&lt;0.05) variables indicated in green</td>
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RESULTS

Percentage of Total Ties and Number Per T-unit:

1. Referential: Personal; Demonstrative
2. Lexical
3. Conjunction: Causal; Temporal; Additive; Adversative
4. Percentage of complete ties
5. Markers per T-unit

Table 3. Average Number of Cohesive Markers Per T-unit by Discourse Type

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<th>Discourse Type</th>
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Figure 1. Hippocampal Damage due to Anoxia (1946)

Figure 2. Hippocampal Damage due to HSE (1951)

Figure 3. Average Number of Cohesive Markers Per T-unit by Discourse Type

DISCUSSION

- Declarative memory impairments alone are sufficient to disrupt aspects of cohesion and coherence across some discourse tasks.
- That declarative memory would be implicated in discourse cohesion makes good sense. The declarative memory system supports the creation of representations for successive events including information about the co-occurrence of people, places, and things, and the ability to link the spatial, temporal and interactional relations among them across time (Cohen & Barnh, 2003).
- The fact that the patients with hippocampal amnesia were not impaired across all discourse tasks is consistent with the notion that these tasks may place differential demands on declarative memory.
- Finally, these findings contribute to our understanding of the requisite memory demands of distinct discourse forms and to the nature of discourse impairments in patients who have declarative memory impairments such as TBI and dementia.

FUTURE DIRECTIONS

- Much of the work on cohesion has focused on the spoken productions of one individual during a small discourse time period. Yet, in face to face communication there are numerous multimodal means of establishing and displaying “interational cohesion” that spans larger time scales.
- Consequently, it is possible that the experimental tasks frequently used in the literature underestimate the extent of impairment in various cognitive-communication disorders in communicating in the real-world.
- To increase ecological validity, future work should examine cohesion across speakers (as in conversational samples of two or more people) and across time (days, weeks, or longer) and across communicative resources (talk, gesture, eye gaze).

SELECTED REFERENCES


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