Distributed impact of cognitive-communication impairment: Disruptions in the use of definite references when speaking to individuals with amnesia

Introduction

Successful referencing depends on speakers and listeners establishing a shared perspective so that each has confidence that they are talking about the same thing (Agha, 2007; Clark, 1992; Hanks, 1990). Agha (2007) differentiates between *interactionally successful acts of referring* and *denotationally successful or correct forms of referencing*, noting "that the social consequences of an act of referring may depend on its degree of interpersonal success, or on its denotational appropriateness, or on both" (p. 89). Clark's (1992) studies of collaborative referencing using a barrier task protocol were designed, in part, to examine how the common ground of participant pairs (matchers/directors) evolved through repeated acts of referring to the same target cards and how that common ground impacted referencing forms for those cards. The finding from Clark's data that we focus on here is how consistently his directors used definite referencing expressions (e.g., use of definite articles) to mark their shared experiences of referring to target cards—i.e., on first trials with novel cards directors always used indefinite descriptions (0% definite references), whereas on subsequent trials definite referencing expressions dominated (83-93%). In our work using the barrier protocol to study collaborative referencing practices of participants managing neurogenic communication disorders, our pairs' use of definite referencing expressions was not so consistent. Specifically, for pairs managing aphasia (Hengst, 2003) directors used definite references more often than Clark's pairs, and not only on subsequent trials (87%), but also on first trials (40%); in contrast, pairs managing amnesia (Duff et al, in preparation) used definite references less often, with 10% on first trials and 56% on subsequent trials.

Definite references (see Agha, 2007; Clark, 1992; Hanks, 1990) are *denotationally* constructed to indicate a specific or known referent, allowing the speaker to signal his/her belief that the listener can identify the referent from a set of shared or situationally specific referents. Such signaling devices include linguistic forms that presuppose shared experience or knowledge with the label/object, including use of definite and demonstrative articles (e.g., *the, this*), or possessive pronouns and proper nouns (e.g., *your, Mary*). Language impairments such as agrammatic aphasia disrupt the use of definite references both in terms of errors and omissions (e.g., Bates et al., 1987), and aphasic errors may account for the overuse of definite references documented by pairs with aphasia (see above). However, disruption of linguistic resources cannot account for the reduced use of definite referencing expressions found in data on the individuals with amnesia as directors in the barrier task.

We propose that reduced use of definite referencing forms by pairs managing amnesia is due (in part) to the interactional consequences for *language-and-memory-in-use* of the pairs' ongoing management of memory disruptions. Such consequences should be visible in the referential practices of the healthy partners in these interactions as well. For example, in interacting with their memory-impaired partner, familiar partners might avoid using definite referencing to explicitly draw attention to shared information. Anecdotal evidence suggests that referencing

specific events that a memory impaired person does not recall can evoke significant stress for interlocuters. This is consistent with our work documenting differences of partners' discourse (e.g., fewer episodes of reported speech) when communicating with an amnesic vs. a healthy (non-memory impaired) participant.

The current study focuses on productions of communication partners. To do this, participant pairs managing amnesia switched roles (i.e., communication partners became directors) and completed another 4-session barrier task protocol. Specifically, this study will: 1) use existing coding procedures (Duff et al., in preparation; Hengst, 2003) to code the referential expressions of these partner-directors in the barrier task trials as definite or indefinite; 2) track changes in their use of indefinite and definite references across trials; and 3) compare these data to previous analyses of definite referencing during the barrier task in which the individuals with amnesia were directors. In addition to furthering our understanding of the communicative/linguistic consequences of amnesia in interactional discourse, the analysis may also inform models of common ground and referential deictics.

Methods
Participants and Data Set
The study includes 8 participant pairs—4 individuals with hippocampal amnesia and 4 comparison participants, each of whom was paired with a familiar partner of their choosing. Participants with amnesia were 47 to 54 years old, had profound declarative memory deficits (mean WMS-III = 62.7; WAIS-III = 104) and hippocampal damage (see Table 1). Familiar partners (e.g., spouse, friend) had no history of brain damage.

The follow-up study was conducted at least six months after the original protocol. In this study, *the familiar partners* were responsible for verbally directing participants with amnesia to place a new set of 12 tangram cards. Details of the protocol are reported elsewhere (see Duff et al. 2006), but briefly, pairs sat at a table facing each other separated by a low barrier, and each participant had a board with 12 numbered spaces and identical sets of playing cards. Pairs completed 24 barrier task trials across two days. All sessions were videotaped.

Data Analysis
Two researchers (primary and secondary coders, third and first authors, respectively) will complete all analysis across four phases. First, transcripts are marked to indicate boundaries between each *card placement sequence* (CPS—all utterances dedicated to identifying, selecting, and placing a target card). Second, the initiating referencing expression (IRE—directors' first attempt to label target card prior to input from the matcher) for each CPS is identified. Third, all IREs are coded as one of seven types of referencing expressions (see Table 2). Finally, the two coders together review all coding against the videotapes making any necessary changes. Reliability coding will be completed on approximately 10% of the data.

Results/Discussion
To date, over half of the analysis is complete, and we anticipate having the full analysis and reliability completed by March. However, preliminary data suggests that the difference between amnesia vs comparison pairs in the use of indefinite references observed in Duff et al. (in preparation) was not limited to just the productions of the amnesia participants but also extended

to their partners. This would support the assumption that disruption in language-and-memory-in-use is not limited to the productions of the individuals with declarative memory impairments but rather extends to the discourse of their communication partners. These results take on more significance when considering the pairs' performance on the collaborative referencing task itself— amnesic participants displayed collaborative learning across trials *at a rate equal to that of healthy comparison participants* (Duff et al., 2006). Taken together, these findings provide a nice illustration of Agha's (2007) distinction between "interactionally successful" and "denotationally correct" referencing and further display the complex patterns and interactions of spared and impaired abilities in individuals with cognitive-communication impairments. These findings also contribute to our growing understanding of common ground by displaying a bifurcation of common ground—i.e., as the pairs display common ground in their successful performance of card placements (and increasingly more succinct labels) and disruptions in the discursive declarations of such shared knowledge through the use of definite references. Finally, attending to both interactional and denotational referencing lets us begin to document how discourse indexes social identities and relationships—i.e., the lack of reliance on definite reference here represents a constant reminder of the lack of awareness of shared relationships and histories.

References
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Table 1. Demographic and neuropsychological characteristics of the amnesia participants

Participant	Etiology	Sex	Hand	Ed. (Years)	Age at Testing (Years)	WAIS-III FSIQ	WMS-III GMI	AVLT Trial 5 / Delay	CFT Delay	Boston Naming Test	Token Test
			Demographic					**Neuropsychological**			
2563	Anoxia	M	L	16	47	102	75	7/1	7	52	44
2363	Anoxia	M	R	16	45	98	73	9/0	5	58	44
0001	Anoxia	F	R	9	54	90	54	7/0	2	56	44
0002	CHI	F	R	23	45	126	49	3/0	0	59	44
Mean (SD)				16.0 (5.7)	47.7 (4.2)	104.0 (13.4)	62.7 (13.1)	6.5 (2.5) / 0.25 (0.5)	3.5 (2.8)	56.3 (3.1)	44.0 (0)

Note. CHI = Closed Head Injury; HSE = Herpes Simplex Encephalitis; M = male; F = female; Hand = Handedness; L = left; R= right; Ed. = education; WAIS-III = Wechsler Adult Intelligence Scale-III; FSIQ = Full Scale Intelligence Quotient; WMS-III = Wechsler Memory Scale-III; GMI = General Memory Index; AVLT = Auditory Verbal Learning Test; CFT = Complex Figure Test.

Table 2. Types of referential expressions

Noun Phrase Type	Description	Example
1. Description	*Indefinite* description of target card marked by the use of indefinite articles (a, an) and descriptive carrier phrases (It looks like a, It has a)	"looks like a couple of hills"
2 Elementary	*Definite* reference including noun and modifiers, produced by one speaker, in a single intonational group	"the dragon reading the book"
3. Episodic	*Definite* reference including noun and modifiers, produced by one speaker, but in two or more intonational groups	"the one reclining in the chair…3…with his feet stickin' out, against the tree."
4. Provisional	*Definite* reference produced by one speaker, who without prompting significantly alters or replaces it	"Two is the Indian in a…Chez lounge. He's not the Indian though, no, he's not the Indian. He's just got the whole squares …he's got his knee-knees up."
5. Installment	*Definite* reference, jointly produced, with director offering noun and modifiers in multiple tone groups, and matcher giving explicit acceptances of each installment	**R**: "The square is his head and the triangles look like his arms" **M**: "yeah" **R**: "sticking straight up" **M**: "m huh" **R**: "that's number seven." **M**: "Okay."
6. Placeholder	*Definite* reference initiated with a placeholder expression, filler words, & silent pauses, which is then completed by either the original speaker or he partner	"uh starting to kneel down…3…head not attached."
7. Proxy	*Definite* reference, initiated by 1 partner and completed by the other, with grammatical construction and intonational contour maintained across speakers	**A**: "Eleven is the um the-" **S**: "Hills."