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Verbal Play as an Interactional Discourse Resource in Early Stage Alzheimer's Disease

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Abstract

Background—Verbal play, the creative and playful use of language to make puns, rhyme words, and tease, is a pervasive and enjoyable component of social communication and serves important interpersonal functions. The current study examines the use of verbal play in the communicative interactions of individuals with Alzheimer's disease as part of a broader program of research on language-and-memory-in-use.

Aims—To document the frequency of verbal play in the communicative interactions of individuals with very mild Alzheimer's disease (AD) and their familiar communication partners. To characterize the interactional forms, resources, and functions of playful episodes.

Methods—Using quantitative group comparisons and detailed discourse analysis, we analyzed verbal play in the interactional discourse of five participants with very mild AD and five healthy (demographically matched) comparison participants. Each participant interacted with a familiar partner while completing a collaborative referencing task, and with a researcher between task trials.

Results—A total of 1,098 verbal play episodes were coded. Despite being in the early stages of AD, all the AD participants used verbal play. There were no significant group differences in the frequency of verbal play episodes or in the interactional forms, resources, or functions of those playful episodes between AD and healthy comparison pair sessions.

Conclusions—The successful use of verbal play in the interactions of individuals with very mild AD and their partners highlights an area of preserved social communication. These findings represent an important step, both clinically and for research, in documenting the rich ways that individuals with early stage AD orchestrate interactionally meaningful communication with their partners through the use of interactional discourse resources like verbal play. This work also offers a promising clinical tool for tracking and targeting verbal play across disease progression.

Alzheimer's disease (AD), the most common form of dementia, is a progressive neurodegenerative disease that deleteriously impacts social communication. In addition to the well-documented disruptions in basic linguistic abilities in individuals with AD (e.g., Appell, Kertesz, & Fisman, 1982; Bayles, 1991; Bayles & Tomoeda, 1983; 2007; Bourgeois & Hickey, 2009; Salmon, Butters, & Chan, 1999), a growing number of researchers have taken up an interactional sociolinguistic approach to investigating the impact of Alzheimer's disease on communication across everyday settings, discourse practices, and conversational partners (e.g., Guendouzi & Müller, 2006; Hamilton, 1994; 2008; Ramanathan, 1995; 1997;

Sabat, 2001; Shadden, 1995). The current study contributes to this growing line of work by examining the use of verbal play in the communicative interactions of individuals with AD and their familiar communication partners.

Verbal Play as an Interactional Discourse Resource

From an interactional sociolinguistic perspective, *verbal play*, or the playful manipulation of language, is an enjoyable and pervasive component of daily interaction and serves important interpersonal functions (Crystal, 1998; Sherzer, 2002). Instances of verbal play can be as isolated as playing with the sounds and meanings of a single word to make a pun, to rhyme words, and to use voices and sound effects to tease someone in the moment, or as expansive as when a joke or playful theme is extended over the course of a conversation and even returned to in later interactions. Attempts at verbal play, whether or not they are deemed skillful, are well recognized as such by communicative partners who not only routinely respond to the playful episode itself – for example by laughing at the joke – but who also actively participate in creating, maintaining, and returning to the playful thread across long stretches of interaction. Verbal play also appears to be a strong indicator of interpersonal health. Research suggests that verbal banter and teasing is a sign of trust and that successful teasing may not only reflect, but may also facilitate trusting social relationships (e.g., Straehle, 1993). Likewise, Crystal argues that the use of verbal play “is a sign that all is well with human relationships. And conversely, when a couple or a family begin to be irritated by each other’s language play, or to stop using it, it is a sure sign that the relationship is breaking down” (1998, p. 53). With respect to AD, disruptions in verbal play, or decreasing attempts at such play, by those with AD or their interactional partners may emerge alongside the progression of the disease, signaling a breakdown not only in communication, but also in their social relationships.

While we are unaware of any studies that have examined the use of verbal play in individuals with AD, previous work with neurogenic populations has revealed interesting patterns of spared and impaired verbal play use. In a study of individuals with aphasia and their familiar communication partners as they worked together to complete a collaborative referencing task, Hengst (2006) reported that, despite managing a severe language impairment, verbal play was a pervasive communicative resource that was available and successfully deployed (verbally and non-verbally) throughout these interactions, serving diverse communicative and social functions. In another study, we examined the use of verbal play in the communicative interactions of individuals with hippocampal amnesia and their communication partners as they completed a similar collaborative referencing task (Duff, Hengst, Tranel, & Cohen, 2009). Individuals with hippocampal amnesia have stable yet profound impairments in declarative memory (i.e., the ability to acquire information about new facts and events and to consciously recollect the events of daily life) with other forms of memory intact (e.g., procedural memory) in the context of generally preserved intelligence and cognition (e.g., language, attention, reasoning; Eichenbaum & Cohen, 2001). In our study of verbal play we found that the healthy comparison participants produced significantly more verbal play episodes than the amnesia participants: twice as many, on average. While there were no group differences observed for interactional forms, resources, or functions (described below) of the verbal play episodes, compared to the healthy comparison participants, the episodes produced by the amnesia participants were more rotely produced and these pairs seldom sustained or returned to playful themes across time (Duff et al., 2009). Of particular interest was the way the familiar partners of the amnesia participants would abandon playful themes when their memory-impaired partner did not recognize the playful history or lost the thread of the playful episode. These findings suggested that profound memory impairments, in the context of preserved linguistic

functioning, can disrupt the deployment of verbal play in social interaction and may contribute to these patients' reports of social isolation.

The Current Study

The current study, examining verbal play in individuals with very mild Alzheimer's disease, is part of a programmatic line of research examining the contribution of declarative memory to meeting the real-world demands that communication places on language-and-memory-in-use (e.g., Duff, Gupta, Hengst, Tranel, & Cohen, 2011; Duff, Hengst, Tranel, & Cohen, 2007; 2008; 2009; Kurczek & Duff, 2011). While the bulk of this work has been conducted in individuals with severe and selective declarative memory deficits or hippocampal amnesia, here we extend this line of work to examine the use of verbal play in individuals with very mild Alzheimer's disease. The goal of this study is to systematically document and characterize both the extent and types of verbal play in the communicative interactions of individuals with very mild Alzheimer's disease and their familiar partners as they complete a collaborative referencing task (Duff, Gallegos, Cohen, & Tranel, 2011) using existing coding procedures (Duff et al., 2009; Hengst, 2006) to identify interactional forms, resources, and functions of playful episodes.

Hippocampal amnesia and early stage Alzheimer's disease have in common impairments in anterograde declarative memory caused by damage or pathology to the hippocampal system in the medial temporal lobes (MTL; Braak & Braak, 1990; Eichenbaum & Cohen, 2001; McKhann et al., 1984; Van Hoesen, Hyman, & Damasio, 1991). Indeed, declarative memory deficits are hallmark and among the first symptoms to be reported in AD. Given the striking disruptions in the use of verbal play observed in our previous work in participants with hippocampal amnesia and the presence of declarative memory deficits in both populations, we predicted deficits in the quantity and quality of verbal play in the participants with very mild AD. Specifically, in the discourse of participants with AD and their communication partners, we expect fewer total verbal play episodes and fewer extended episodes relative to healthy comparison participants. However, whereas individuals with hippocampal amnesia have stable and selective declarative memory deficits, individuals with AD have additional neurological, behavioral, and cognitive impairments that worsen with disease progression (Minati, Edginton, Bruzzone, & Giaccone, 2009; Van Hoesen & Damasio, 1987). Thus, in AD, we may observe a more complex pattern of disruption in verbal play use. Irrespective of outcome, this study promises to contribute to our understanding of the impact of Alzheimer's disease on the use of a rich and pervasive discourse practice, verbal play, and on interactional aspects of communication more broadly. Furthermore, documenting and characterizing the availability and interactional nature of verbal play in the social interactions of individuals with very mild AD and their partners is an important first step, both clinically and for research, in tracking the progressive deterioration of interactional communication in this population.

Method

Participants and Dataset

Analysis was performed on interactional data obtained as five communication pairs managing Alzheimer's disease (individuals with AD and their familiar partners) and five comparison pairs (healthy participants and their familiar partners) completed a collaborative referencing task (Duff, Gallegos, et al., 2011).

The five participants with AD were all females, were 77.0 years old, on average ($SD = 5.5$), and had 14.8 years of education, on average ($SD = 3.4$). The diagnosis of probable AD for each participant was made by a neuropsychologist based on the National Institute of

Neurological and Communicative Diseases and Stroke/Alzheimer's and Related Disorders Association (NINCDS) criteria (McKhann et al., 1984). All AD participants were classified as having very mild AD based on the Washington University Clinical Dementia Rating scale (Morris, 1993). The time between diagnosis of probable AD and participation in the original study ranged from one to four weeks. Neuropsychological testing confirmed that all were severely impaired for both verbal and nonverbal memory disproportionate to any deficits in general cognitive or intellectual functioning. Performance on the California Verbal Learning Test (Delis, Kramer, Kaplan, & Ober, 1987) and the Rey-Osterrieth Complex Figure Test (Schmidt, 1996) indicated severely defective memory that was at least 2 standard deviations below population means. Speech and language abilities were within normal limits on the Boston Naming Test, the Controlled Oral Word Association Test, and the category (animal) fluency test. Table 1 presents the demographic and neuropsychological information for the AD participants.

Comparison participants were matched pairwise to the participants with very mild Alzheimer's disease on age ($M = 79.6$ years; $SD = 6.4$), sex, education ($M = 15.0$ years; $SD = 2.2$), and handedness. All healthy participants were screened to be free of dementia using the Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975) and participants had to have a score greater than 27 to be eligible. Each of the participants with AD and the healthy comparison participants selected a familiar communication partner with whom they would complete the collaborative referencing task. For the AD participants, the partners were two spouses, a daughter, a niece, and a close friend. For the comparison participants, the partners were three spouses, a sister, and a close friend. The familiar partners of the participants with Alzheimer's disease and comparison participants were similar in age (62.6 years versus 79.6 years) and education (15.6 years versus 16.8 years).

The collaborative referencing task procedures were identical to those in our previous work with the exception of the number of trials. In our original study (Duff, Hengst, Tranel, & Cohen, 2006) participants completed the collaborative referencing task on 24 trials across two days (six trials per session, two sessions per day). Pilot testing revealed that 24 trials was too fatiguing for the AD participants, so we reduced the task to a total of 12 trials, with 6 trials conducted in each of two separate sessions on a single day. There was a minimum of 30 minutes between each session. During each trial, participant pairs sat facing each other across a low barrier, with a board containing 12 numbered spaces and a set of 12 Chinese tangram playing-cards in front of each person. The barrier allowed them to see each other's facial expressions and gestures while blocking their board and cards from view by one another. Each member of the pair was assigned either the role of director (always the participants with AD and the healthy comparison participants) or matcher (always the familiar partners). The director began each trial with her cards on her board and communicated to the matcher how to fill the numbered spaces so that at the end of the trial the two boards were identical. Participants were instructed to treat the task as a game and to have fun, but no specific attempt was made to encourage or elicit verbal play. The researcher left the room during task trials, but interacted freely with participants between trials while checking accuracy of card placements and setting up for the next trial.

More than 12 hours of videotaped data were available for analysis (6.3 hours AD pairs versus 6.4 hours comparison pairs). Discourse was transcribed and analyzed across the entire session (i.e., interactions before, during, and after task trials) and for all participants (the director, the matcher, and the researcher when present) using a three-stage consensus transcription process (Duff et al., 2008). During the first stage, audio portions of the sessions, including all utterances, audible sounds, and pause times, were transcribed with inaudible and unintelligible utterances marked accordingly. During the second stage, the original transcriber watched the video portion of the interactions, adding gestures and

making any corrections needed to the audio content of the transcript. During the final stage, a consensus transcriber and the original transcriber watched the video together and generated a final version of the transcript that reflected corrections and additions made according to discussion and consensus of the two transcribers. While the between trial interactions were not available for all participants (data following four individual trials among the AD pairs and one trial among the comparison pairs were unavailable), there were no group differences in the quantity of discourse available for analysis as measured by the number of words (57,290 words AD pairs versus 57,258 words comparison pairs).

Data Analysis

Identifying episodes—We coded and analyzed verbal play throughout the 20 sessions (two sessions for each of 10 pairs) through repeated viewings of the videotapes, along with use of the transcripts, to document identified episodes. Coding was performed by a team of five research assistants and the two authors using a three-phase consensus coding procedure. First, a broad description (Crystal, 1998) and definition (Duff et al., 2009; Hengst, 2006) of verbal play were used to capture all instances of laughter, telling funny stories or jokes, playing with sounds or making puns, overt teasing of others or self-deprecating humor, use of marked or playful voice or registers, singing or song-like intonations, and use of sound effects. During this first phase, a primary coder identified all such instances of verbal play, marked the boundaries in the transcripts where each episode began and ended, and characterized the resources, functions, and interactional forms of each episode (see below). During the second phase, a secondary coder reviewed the videotapes and transcripts, noting agreements and disagreements with the coding from the first phase of coding and marking any episodes not identified by the primary coder.

During the final coding phase, the primary and secondary coders along with a consensus coder (M. Duff or S. Shune) reviewed and finalized all episode identifications and resource and function coding. While all episodes of laughter were captured in the first two phases, episodes that were laughter only (i.e., without any playful use of verbalizations or language) were excluded during the final coding phase. Episode boundaries were clarified to distinguish between extended single episodes of verbal play consisting of one or multiple utterances connected by the same theme and separate playful episodes, including series of unrelated episodes and exchanges on the same theme that were temporally disconnected (e.g., across trials or sessions).

Characterizing resources, functions, and interactional form—Procedures for coding resources, functions, and interactional form were adapted from Hengst (2006) and have been described previously (Duff et al., 2009). For the analysis of resources we coded three types: verbal, prosodic, and gestural. *Verbal resources* included linguistic resources, such as playing with sounds and meanings of words (e.g., rhyming: *talk fasty wasty*; diminution: *teeny tiny*) as well as playful names or nicknames (e.g., *Scotty dog*; *dancing samurai*), and expressions (e.g., *let the good times roll*; *my dogs are barkin'*). *Prosodic resources* included sound effects, humming, and singing (e.g., *we are the champions... [sings] of the world*) as well as marked shifts in voicing and exaggerated prosody (e.g., *oh wee::: [high pitched voice]*). *Gestural resources* included gestures that contributed meaningfully to playful episodes (e.g., skeptical *raised eyebrows*, *high fives* for celebration). Episodes could have multiple resources.

To identify the communicative functions of playful episodes, we categorized each as having one of four functions: joking/storytelling, teasing, referencing, and other. The *joking/storytelling functions* captured jokes and funny stories with narrative structure of everyday events (e.g., A little boy in-in Tipton paid me a compliment and I said am I beautiful? He

said no but you would be if you'd dye your hair and wear lipstick [laughs]). *Teasing functions* included playful episodes directed towards or at the expense of others, such as competitive teasing, scolding, and sarcasm (e.g., rock on, mama; boy you did a better job the first time [laughs]), as well as episodes directed towards oneself, such as bragging or self-deprecating comments and complaints (e.g., *I'M BLOWIN' IT!*). *Referencing functions* included playing with the sounds, words, and meanings of labels used to identify the target cards (e.g., *wedgie shoe; kabuki dancer*). The *other functions* documented playful episodes not captured by the above categories.

To examine the interactional form of the playful episodes, three production forms were coded: *simple*, *simple+*, and *extended*. *Simple episodes* were short, spanning just one to three contiguous turns in the form of either single-utterance episodes, or episodes consisting of a playful utterance and a response by one or more interlocutors. *Simple+ episodes* contained multiple (more than three) contiguous turns, although they did not contain more than three turns that significantly and meaningfully contributed to the verbal play episode with additional content (e.g., they contained turns involving only a laugh or an expression of agreement such as *mhm*). *Extended episodes* consisted of multiple (more than three) thematically related and contiguous utterances. Extended episodes included participants telling funny stories about everyday events and extended playful conversational exchanges, such as banter (verbal dueling) or exaggerated arguments.

Coding reliability—The two initial coding passes resulted in 87.6% agreement between the two coders. Coding differences were attributable to the number of new episodes coded in the second pass and disagreements about episode boundaries (e.g., single vs. multiple episodes). Disagreements on the final coding pass were resolved through discussion and consensus. Point-by-point intra- and inter-rater reliability were obtained on the final consensus coding pass for approximately 25% of the data (3 trials and the following between-trial talk, randomly selected per pair) for the three verbal resources and the four verbal functions. Intra-rater and inter-rater reliability was 86.1% and 82.7% for resources and 88.1% and 81.7% for functions, respectively.

Results

Frequency of Verbal Play

A total of 1,098 verbal play episodes were coded, with each of the participant pairs contributing between 81 and 166 episodes (AD pair sessions ranging from 81-166 episodes; comparison pair sessions ranging from 92-166 episodes). Contrary to what was predicted, there was no group difference in the number of episodes produced (AD sessions $M = 108.2$; $SD = 34.8$; and comparison pair sessions $M = 111.4$; $SD = 31.2$; $t(8) = -0.153$, $p = .882$). While there was some variability in the number of episodes produced within each group, perhaps reflecting individual variation in the engagement of verbal play behaviors, the variability across groups was remarkably similar. Further, all communicative participants initiated similar numbers of episodes across groups (e.g., matcher in AD pairs vs. matcher in comparison pairs; see Figure 1). The relative contribution of the director, matcher, and examiner was remarkably similar across groups and there were no significant differences noted in the participants' contributions between groups ($t(8) = .588$, $p = .573$; $t(8) = -.566$, $p = .587$; $t(8) = -.019$, $p = .985$, for director-initiated, matcher-initiated, and examiner-initiated, respectively).

Resources, Functions, and Interactional Forms of Verbal Play

All participant pairs utilized a full range of verbal, prosodic, and gestural resources during the production of verbal play. Overall, participants in both groups utilized multiple resources

(a combination of either two or three resources, including verbal, prosodic, and gestural; 80.1% and 73.0% for AD and comparison pairs, respectively) during episodes to a greater extent than single resources (most commonly verbal only; 19.9% and 27.0%). The differences between the groups were not statistically significant ($t(8) = 1.471$, $p = .180$ for single resources used).

Additionally, all participant pairs utilized verbal play for the entire range of functions coded (i.e., joking/storytelling, teasing, referencing, and other) and the distribution of playful episodes for each function was similar across groups: teasing 54.6% and 49.7%; referencing 20.9% and 25.1%; other 15.6% and 18.2%; and joking/storytelling 8.8% and 6.9%, for AD and comparison pair sessions, respectively. Examination of the proportion of episodes produced by the AD and comparison pairs revealed no significant group differences (two-tailed Mann-Whitney U Test and a Bonferroni correction for multiple comparisons (alpha of .0125): teasing $U = 16.0$, $p = .548$; referencing $U = 11.0$, $p = .841$; other $U = 11.0$, $p = .841$; and joking/storytelling $U = 16.0$, $p = .548$).

The majority of all verbal play episodes in both groups of participants were coded as simple, extending across only one to three turns (61.1% and 66.8% for AD and comparison pair sessions, respectively). In contrast to what was predicted, there was no significant difference in the number of playful episodes coded as extended in the AD pair (29.9%) versus comparison pair (22.8%) sessions ($t(8) = -1.940$, $p = .088$). The remaining episodes in both groups were coded as simple+ (9.0% and 10.5% for AD and comparison pair sessions, respectively).

Thematically Linked Episodes

All pairs produced thematically linked episodes where instances of play, around the card labels and/or the task itself, were sustained and returned to over multiple turns, trials, and even sessions. One such series of episodes from an AD pair involved sustained playful banter over whose labels were most appropriate for specific cards and the consistency of the director's labels. After the matcher encouraged the director to use the same labels trial to trial, in referencing the next card the director teased that it might have been a horse, but now it's a dog [laughs]. She later playfully scolded the matcher that [laughs] see you're not seein' 'em the way I'm seein' 'em. The matcher continued this theme on a later trial stating, I call it a dog, I let you call it a boat before [laughs], and later, *I don't see no boat in that!* Later still, the director playfully admitted that they would have been able to finish the task *sooner than that but we was arguin'.*

There were subtle differences, however, between groups. For comparison pairs, these thematically linked episodes were dynamic and evolved across trials, as when one comparison pair sustained and built on a line of play related to the director's labeling of one card as *the damned urn*. When met with matcher resistance (*Watch your language! [laughs]*), the director went on to introduce *the damned horse*. Later, when warned by the matcher that they were being videotaped, the director's labels became *your favorite urn* and *your favorite horse*. For the AD participants, their contributions to these extended episodes were often more repetitive and rote. In one example, the matcher offered the label *the man praying* for a card on an early trial. Later when the matcher again lobbied for this perspective, there's no man praying with a square on his back [laughs], the director teased, *if you say so* and the matcher asserted, *I say so [laughs]*. Once this playful theme had been established, the matcher would return to it (Doesn't it look like a man kneelin' down prayin'? Very angelic; Yeah that's my man prayin', right? That's what we decided). Across the trials, the director recognized these playful attempts but always responded with a rote response (*Well if you say so*).

The level of engagement and support exhibited by the partners in the AD pairs is also noteworthy. Although some of the extended verbal play episodes of the participants with AD became rote and repetitive over time, their partners sustained these episodes in the moment and even built on and extended them across trials. These partners also created playful moments by taking up and responding to ambiguous comments or self-critical statements of the participant with AD regarding their performance (*I'm not good*) as if they were playful. In doing so, the familiar partners created a playful environment where attempts at verbal play (successful or not) were encouraged and supported.

Discussion

We examined the spontaneous use of verbal play in the communicative interactions of individuals with very mild Alzheimer's disease (AD) and their familiar partners as they completed a collaborative referencing task. Contrary to our predictions, there were no significant group differences in the frequency of verbal play episodes between the AD and healthy comparison pair sessions. There were no differences between groups in the type or distribution of resources, functions, or interactional forms used in service of deploying verbal play. The AD pairs also participated in similar quantities of extended verbal play episodes during these interactions. These findings provide clear evidence that verbal play is a robust interactional discourse resource and that it was still available to and used by all the participants with AD, despite their being in the early stages of Alzheimer's disease, and their familiar partners.

These results are in stark contrast to the use of verbal play in participants with hippocampal amnesia. In our previous work, we reported that amnesia participants produced significantly fewer verbal play episodes than their demographically matched healthy comparison participants and that the amnesia pairs seldom sustained or returned to playful themes across time (Duff et al., 2009). Here, no such differences were observed between AD and comparison pairs. Given the presence of declarative memory impairment in both amnesia and early AD, why do we observe disruptions in verbal play in participants with hippocampal amnesia and not in individuals with very mild Alzheimer's disease?

One possibility is that patients with hippocampal amnesia have a more severe impairment in declarative memory than the participants here, who have very mild AD and who are in the very early stages of the disease, that is not captured by the available neuropsychological testing (i.e., both groups are near floor levels on standardized measures of memory: *M* CVLT delay = 1.4 for AD participants (see Table 1); *M* AVLT delay = 0.25 for amnesia participants (see Duff et al., 2008)). While we do not have complete neuroanatomical data on all the amnesia and AD participants in these studies, there is evidence in the literature that these groups differ significantly in terms of the extent of hippocampal pathology and that memory impairment is correlated with hippocampal volume in clinical populations (e.g., Allen, Tranel, Bruss, & Damasio, 2006). In a study of five patients with hippocampal amnesia, who were demographically and neuropsychologically similar to the amnesic patients in our previous work, Gold and Squire (2005) reported a reduction in hippocampal volume of approximately 40%, suggesting that this represents a near complete loss of hippocampal neurons (also see Mayes, Holdstock, Isaac, Hunkin, & Roberts, 2002). In contrast, much smaller hippocampal volume reductions are observed in patients with mild Alzheimer's disease (e.g., approximately 5%; Schuff et al., 2009). While AD is associated with other cellular pathologies (plaques, tangles) not present in amnesia, the significant impairment in verbal play observed in patients with hippocampal amnesia (but not in very mild AD) may be related to greater hippocampal pathology and memory impairment severity. Future research examining the use of verbal play in individuals with more

advanced AD and/or more extensive MTL pathology is warranted and may provide further evidence for this interpretation.

Other factors that may contribute to the observed differences in overall frequency of verbal play use between our studies are differences in the onset of the memory impairment (sudden vs. progressive) and length of time the communication pairs have been managing the memory impairment. Cognitive deficits associated with brain injury or with the progression of dementia can disrupt long-standing patterns of social and communicative interactions resulting in a loss of communicative involvement among previously routine partners. These changes represent significant challenges to the psychosocial functioning of patients and their families, requiring communication partners to renegotiate their social relationships and interactional practices. The participants with amnesia from our previous study became memory impaired following a sudden neurological event (e.g., anoxic event, closed head injury) and at the time of that study the communication pairs had been managing the memory impairment, and its consequences, for years (3-18 years; Duff et al., 2009). In striking contrast, the participants with AD were recently diagnosed (within one month) and had a gradual onset of memory decline that was perhaps initially interpreted in the context of normal aging. We wonder if the extent to which the well-preserved use of verbal play in the pairs managing AD is related to an ongoing and more gradual renegotiation of interactional practices. For example, while there were very few thematically related verbal play episodes across trials in our data from individuals with hippocampal amnesia compared to those here with AD, both groups produced episodes that were repetitive and rote. One significant difference, however, is the way the communication partners responded. Whereas the partners of the individuals with hippocampal amnesia responded with obvious signs of frustration and irritation and even no response at all (i.e., abandoning attempts at extended verbal play), the partners of the individuals with AD often kept these playful threads going, even working to make ambiguous comments and actual self-deprecating comments playful. This is not to say that the partners in the AD pairs did all the work; remember that looking just at the number of verbal play episodes initiated by the healthy directors and those with AD, there were no significant differences. It does, however, raise the possibility that more pronounced cognitive disruptions over extended periods of time may place a greater toll on partners' communicative involvement. This has important implications for educating, counseling, and training communication partners.

Other differences between our previous work on verbal play in amnesia and the current study may be more attributable to age (mean age for amnesia and AD participants were 49.0 and 77.0 years, respectively) than etiology. The distribution of verbal play episodes for each of the functions did not differ between AD and healthy comparison pairs or between amnesia and healthy comparison pairs. However, whereas older pairs (with or without AD) had more verbal play episodes coded as teasing (54.6% and 49.7% for AD and comparison pairs, respectively) than referencing (20.9% and 25.1% for AD and comparison pairs, respectively), the younger pairs (with or without amnesia) produced more verbal play episodes coded as referencing (48.1% and 53.0% for amnesia and comparison pairs, respectively) than teasing (37.5% and 32.9%, for amnesia and comparison pairs, respectively). Importantly, in contrast to other studies of aging and discourse, this observed difference between older and younger pairs (irrespective of the presence or absence of brain damage) is not viewed as a deficit for older adults. Rather, this finding reflects a difference in how pairs engaged with each other (the social nature of discourse) and the task. That is, the older pairs used verbal play more to support the interaction (i.e., teasing each other, making self deprecating remarks) and the younger pairs used it more to support successful completion of the task (i.e., playing with the sounds and words of the labels). This is likely also related to the observation that the older pairs (with AD or not) produced more extended verbal play episodes (more than three contiguous turns; 38.9% and 33.2% for AD and

comparison pairs, respectively) than did the younger pairs (6.8% and 9.5% for amnesia and comparison pairs, respectively). While the effect of age on the use of verbal play awaits further investigation, these findings suggest that age influences the communicative functions of verbal play in our collaborative referencing task and may also impact the deployment of other interactional discourse resources (e.g., reported speech, conversational narrative) more broadly.

Given the numerous empirical and clinical reports of linguistic and communication impairments and impoverished and reduced opportunities for interactional engagement in Alzheimer's disease, particularly in the late stages of the disease (e.g., Bayles & Tomoeda, 2007; Ramanathan, 1997; Ripich, Zioli, & Lee, 1998), the finding here that verbal play was still available to and used by all the participants is striking and the clinical implications are significant. One of the ultimate goals in the management of Alzheimer's disease is to identify resources and strategies that will allow patients to remain as functional and socially integrated as possible, for as long as possible (Yorkston, Bourgeois, & Baylor, 2010). The successful use of verbal play in the discourse of individuals with very mild AD and their partners highlights an area of preserved communicative ability that should be capitalized on in intervention. Drawing attention to interactional discourse resources like verbal play and the ways that individuals with AD orchestrate interactionally meaningful communication with their partners promises to provide us with a set of clinical and research tools that can be used to track and target social communication and engagement through disease progression and across populations with neurogenic communication disorders (see Hengst, 2006).

Acknowledging that interactional discourse resources, like verbal play, require the coordination and collaboration of all communicative partners (whether the spouse, caregiver, or clinician), we have advocated for the development of *rich communicative environments* that support opportunities for the co-construction of socially complex, collaborative communication (see Duff et al., 2007; 2008; Hengst & Duff, 2007). Whereas traditional interventions often target the impairments of an individual, we are proposing that intervention be directed at the functional activity (e.g., telling a story, playing a card game) in which communicative partners are engaged and the resources (e.g., verbal play) that support successful completion of the activity. With respect to individuals with profound impairments in memory and learning where memory function will not be restored to support the full range of communicative abilities – particularly in those populations where there is progressive deterioration (e.g., dementia) – we suggest interventions targeted at the communication partners and interactional environment. Indeed, Ramanathan (1997) has argued that the deterioration in communication abilities in AD is, in part, the product of their cognitive decline, but is also attributed to these individuals' shrinking social world and reduced quantity and quality of interactions with their communication partners. Specifically, in addition to working with communication partners to support and collaborate with their memory impaired partner on their attempts at verbal play, we suggest intervention targeted at structuring and creating diverse opportunities for interactional enrichment and engagement through meaningful, goal-directed communication and social interaction (see Hengst, Duff, & Dettmer, 2010).

Converging evidence across animal, human, and clinical populations point to the benefits of enrichment, social interaction, and engagement (e.g., Hertzog, Kramer, Wilson, & Lindenberger, 2008; Nithianantharajah & Hannan, 2006; van Praag, Kempermann, & Gage, 2000). In the healthy aging literature, research has suggested that humor, laughter, and meaningful social interaction and engagement may provide a physical, cognitive, and psychosocial buffer from the negative changes associated with aging (e.g., Adams & McGuire, 1986; Bassuk, Glass, & Berkman, 1999; Hertzog et al., 2008; Solomon, 1996; Tennant, 1990; Tse et al., 2010). In the Alzheimer's literature there is the finding that social

network size modifies the association between AD pathology and cognitive functioning. Bennett and colleagues (2006) found that even for individuals with severe disease pathology, cognitive functioning remained higher in those individuals with AD who had larger social networks (e.g., number of friends and family members with whom they have at least monthly contact). Furthermore, the affective benefits of engagement and interaction are enduring. We have shown that the feeling of emotion can endure beyond the conscious recollection for the events that initially triggered the emotion, suggesting that the benefits of a visit or telephone call from family members or hearing a funny story or joke from a nurse may endure after the visit is over and the punchline is forgotten (Feinstein, Duff, & Tranel, 2010).

In summary, verbal play is a pervasive interactional discourse resource that is available to and used successfully by individuals with very mild AD in their social communication with familiar partners. This finding is an important first step, both clinically and for research, in tracking and targeting the progressive deterioration of interactional communication in this population. By creating rich communicative environments and opportunities for social engagement, we are beginning to capture the interactional aspects of communication that are difficult to observe with traditional assessment methods and that hold great promise therapeutically for maintaining and facilitating the use of functional everyday communication.

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Figure 1.
Total number of verbal play episodes by group and participant

Table 1
Demographic and Neuropsychological Data of Participants with Very Mild Alzheimer's Disease

	001AD	002AD	003AD	010AD	013AD
Age at Testing	71	84	80	72	78
Education	12	12	16	20	14
Sex	F	F	F	F	F
Handedness	R	R	R	R	R
CDR Score ^a	0.5	0.5	0.5	0.5	0.5
CVLT Delay ^b	0	1	0	0	6
CFT Delay ^c	7.5	4.5	8.5	2	3.5
COWA Test ^d	35 (10)	32 (10)	35 (10)	30 (9)	33 (10)
Boston Naming Test ^d	43 (5)	N/A	56 (13)	53 (10)	53 (10)
Animal Fluency Test ^e	15	N/A	11	12	14
WAIS-III Digit Span Forward ^f	6 (-0.10)	7 (0.88)	6 (0.09)	6 (-0.10)	5 (-0.84)
WAIS-III Digit Span Backward ^f	6 (1.38)	5 (0.73)	2 (-2.18)	4 (-0.34)	3 (-1.12)
Trail Making Test Part A ^g	33 (11)	65 (7)	48 (9)	30 (12)	38 (11)
Trail Making Test Part B ^g	58 (13)	208 (7)	D/C (2)	122 (9)	119 (10)
WAIS Similarities Subtest ^h	8	8	N/A	10	N/A
WAIS Block Design Subtest ^h	15	10	16	10	8

Note. AD = Alzheimer's disease; F = female; M = male; R = right; CDR = Clinical Dementia Rating; CVLT = California Verbal Learning Test; CFT = Complex Figure Test; COWA = The Controlled Oral Word Association Test; WAIS = Wechsler Adult Intelligence Scale. Bolded scores are severely defective and/or are at least 2 standard deviations below the mean. N/A indicates that the participant did not complete the task during testing.

^aFor the CDR scores, 0.5 = very mild dementia, 1 = mild dementia, and 2 = moderate dementia;

^bThe scores for the CVLT delayed test are raw scores out of 16 possible points;

^cThe scores for the CFT delayed test are raw scores out of 36 possible points;

^dScores for the COWA and Boston Naming Tests are raw scores with age corrected scaled scores in parentheses;

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^eAnimal Fluency Scores are raw scores;

^fScores for Digit Span Forward and Backward are numbers for the longest digit span the participant could repeat with Z-scores in parentheses;

^gTrail Making Test A and B scores are in seconds with age corrected scaled scores are in parentheses;

^hScores for the Similarities and WAIS Block Design subtests are in age corrected scaled scores.