

## INTRODUCTION

Decreased conversational skills negatively affect quality of life following brain injury because successful social, familial, academic, and/or vocational reintegration rests on the recovery of effective communication (Galski, Tompkins, & Johnston, 1998). Effective communication skills require the integrity of a number of cognitive abilities that are frequently disrupted following closed-head injury (CHI) (McDonald, Togher, & Code, 1999; Sohlberg & Mateer, 2001). There is a paucity of empirical information regarding the role of cognitive dysfunction in the conversational discourse deficits observed in individuals with CHI. Although intervention studies have suggested that training of specific skills does not generalize to functional activities (Cicerone et al, 2000; Palmese & Raskin, 2000; Park, Proulx, & Towers, 1999), no treatment study to date has utilized performance on a functional communicative task, such as conversational discourse, as an outcome measure. The present study investigated whether improvements in attention would facilitate conversational discourse for an individual with CHI. Two treatment protocols were investigated, one attention-based and one social skills-based. It was hypothesized that attention training would provide greater benefit by improving attention as well as conversational discourse while social skills training would improve only conversation.

## METHOD

### *Participants*

One individual with a CHI, D.H., participated in this study. D.H. was diagnosed with a CHI by neurological report and met rigid inclusion criteria based on language and cognitive test scores. In addition, the participant demonstrated deficits in two or more of the four types of attention tested by the Attention Process Training Test (Sohlberg, Johnson, Paule, Raskin, & Mateer, 1994) and also had deficits in conversational discourse subjectively described by family members as interfering in meaningful communication. D.H.'s demographics and testing scores are presented in Table 1.

### *Treatment measures*

The following tests served as pre- and post- treatment measures of attention: a) *Attention Questionnaire* (Sohlberg et al., 1994) which allowed the participant to rate the frequency of occurrence for different attentional problems; b) *Attention Process Training Test (APT-Test)* (Sohlberg et al., 1994) which provided a screening measure of attentional skills based on the theoretical framework of the APT-II program; c) *Test of Everyday Attention (TEA)* (Robertson, Ward, Ridgeway, & Nimmo-Smith, 1996) which tested attention via the use of tasks that closely approximate commonly occurring activities; d) *Auditory Verbal Memory Task (AVMT)* (Tompkins, Bloise, Timko, & Baumgaertner, 1994) a measure of complex working memory; and e) *Wechsler Memory Scale Revised (WMS-III)* (Wechsler, 1997) *digit span*, which measured short term and working memory, *logical memory*, which measured short term memory and long term storage and retrieval, and *paired associates*, which measured long term storage and retrieval and new learning.

During baseline sessions and weekly treatment probes, the participant engaged in 10-minute conversations with the examiner and a family member or friend. Each conversation was audiotaped and later transcribed verbatim with each utterance being assigned to one of the speakers. Conversations were analyzed for response appropriateness (Table 2).

### *Treatment Conditions*

Table 3 illustrates the sequence of treatment conditions. A single subject A-B-A-C-A multiple treatments comparison design (McReynolds & Kearns, 1983) was utilized to evaluate the effects of two treatment programs, the Attention Process Training Program II (APT-II) (Sohlberg et al., 1994) and Interpersonal Process Recall (IPR) (Helffenstein & Wechsler, 1992) on conversational performance.

IPR (Helffenstein & Wechsler, 1992) suggests that if an individual is videotaped during an interpersonal interaction and is then shown the videotape immediately following, he or she is better able to recall his or her feelings in greater detail. This approach provides the individual with the opportunity to verbalize insights related to the underlying dynamics of the interaction.

The APT-II (Sohlberg et al., 1994) consists of hierarchically organized tasks designed to simultaneously rehabilitate both attentional processes as well as speed of cognitive processing (Palmese & Raskin, 2000). The tasks involved the use, manipulation, and repetition of auditory and visual stimuli focusing on sustained, selective, alternating, and divided attention.

### *Data analysis*

Treatment data were graphed and visually inspected for treatment effects and generalization. Treatment effect sizes were calculated using the  $f$  statistic (Kromrey & Foster-Johnson, 1996) which is an index of the magnitude of change in performance from pre- to post-treatment. In this case the effect of the first treatment introduced in the treatment sequence was compared to the effect of the combination of the two treatments on conversational discourse.

### *Reliability*

Ten percent of the discourse samples were reanalyzed for interjudge and intrajudge reliability. Interjudge reliability ranged from 80% to 95%. Intrajudge reliability ranged from 85% to 95%.

## RESULTS

The results will be discussed in terms of the conversational measures Comments and Adequate Plus. Each measure will be described for the two dyads sampled, participant with examiner and participant with family member or friend. D.H. did not produce many Obliges or Adequate Responses; consequently, these two measures were not included in the data analysis. In addition, attention and memory test scores will be summarized.

The treatment sequence was the IPR followed by the APT-II. Treatment probe data are shown in Figures 1 to 4, treatment effect sizes are shown in Table 4. Overall, DH's results from the treatment probes, Attention Questionnaire (Sohlberg et al., 1994), and pre- and post- testing suggested only minimal change from baselines, thus only partially supporting the research hypotheses. Although these results suggested little functional change in attention ability and conversational skills relative to baseline levels, the examiner, DH, and her family observed a variety of qualitative changes.

## DISCUSSION

Treatment effect sizes suggest that both treatments were active; however, the participant's performance was variable throughout the study reducing the magnitude of change

observed. In spite of the fact that D.H. demonstrated minimal definitive changes on the conversational measures selected, by the end of both treatment protocols, her conversations seemed to be more natural and she appeared to take a greater responsibility for initiating and sustaining the flow of the conversation. In addition, D.H. described herself as having a greater awareness of her “areas of weakness” and was more cognizant of how to handle conversationally-difficult situations. This awareness helped to reduce her level of frustration and improved her performance. D.H. reported feeling more confident and comfortable during conversations. These subjective changes appeared to improve her overall quality of life.

It is unclear at this time if the APT-II, the IPR, or the combination of both treatments was the most effective approach to treating conversational discourse deficits demonstrated by this individual. Such equivocal results are rarely reported in the treatment literature but are equally important in eliminating subject selection bias and offer support for patient-specific clinical decision-making (Ylvisaker et al., 2002). Implications for clinical practice and future research will be discussed.

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Table 1. Participant characteristics at time of participation in this study.

<b>Participant: DH</b>	
<b>Age</b>	47
<b>Gender</b>	Female
<b>Time Post-Onset</b>	29 months
<b>Injury</b>	Motor vehicle accident
<b>Site of Lesion</b>	Left basilar skull fracture, a left frontal subdural hematoma, and multiple brain contusions
<b>Length of Treatment</b>	9 weeks inpatient
<b>Education</b>	Associates degree and vocational training
<b>Occupation Prior to Injury</b>	Project manager for a large corporation (23 years)
<b>Occupation Following Injury</b>	Unable to return to work
<b>Living Situation</b>	Living at home with her husband and two teenage children
<b>WAB A.Q.</b>	99.3
<b>GOAT</b>	99
<b>DRS</b>	144
<b>RLA</b>	X (purposeful and appropriate)

Note: WAB A.Q.= Western Aphasia Battery Aphasia Quotient (Kertez, 1982); GOAT = Galveston Orientation and Amnesia Test (Levin, O'Donnell, & Grossman, 1979); DRS = Dementia Rating Scale (Mattis, 1976); RLA = Ranchos Los Amigos Level of Cognitive Functioning (Hagen 1998)

Table 2. Measures used to analyze conversations (Blank & Franklin, 1980; Coelho, Liles, & Duffy, 1991; Coelho, Youse, & Le, 2002).

<b>Category</b>	<b>Measure</b>	<b>Definition</b>	<b>Example</b>
Appropriateness: Speaker Initiations	Obliges	Utterances containing explicit requirements for a response.	“Where do you live?”
	Comments	Utterances not containing an explicit demand for a response.	“It’s a nice place to work.”
Appropriateness: Speaker Responses	Adequate	Utterances that appropriately met the initiator’s verbalization.	In response to the question, “What time is it?” the response might be “It’s three o’clock.”
	Adequate Plus	Utterances that are relevant and elaborate on the theme, providing more information than was requested.	In response to the question “What time is it?” the response might be, “It’s three o’clock. I know that because I just passed the new clock at the Dime Savings Bank.”
	Inadequate	Utterances in which the information offered is invalid, irrelevant, or insufficient to meet the constraints established by the initiator’s utterance.	In response to the question, “What time is it?” the response might be, “I’m 37 years old.”

Table 3. A-B-A-C-A Treatment Design.

	<b>A</b>	<b>B</b>	<b>A</b>	<b>C</b>	<b>A</b>	
<b>Condition</b>	Baselines	First Treatment	Post - Treatment 1 Baselines	Second Treatment	Post-Treatment 2 Baselines	Four-week Follow-up
<b>Length</b>	One week	Six weeks	One week	Six weeks	One week	One week
<b>Duration</b>	3 sessions	Two one hour sessions	3 sessions	Two one hour sessions	3 sessions	3 sessions
<b>Testing</b>	<b>Attention Battery</b> Questionnaire APT-Test TEA AVMT WMSDS WMSLM WMSVPA		<b>Attention Battery</b> Questionnaire APT-Test TEA AVMT WMSDS WMSLM WMSVPA		<b>Attention Battery</b> Questionnaire APT-Test TEA AVMT WMSDS WMSLM WMSVPA	<b>Attention Battery</b> Questionnaire APT-Test TEA AVMT WMSDS WMSLM WMSVPA
<b>Treatment</b>		IPR		APT-II		
<b>Treatment Probes</b>	Four 10-minute conversations. Two with examiner, two with family or friend	Weekly 10-minute conversations. One with the examiner, one with family or friend	Four 10-minute conversations. Two with examiner, two with family or friend	Weekly 10-minute conversations. One with examiner, one with family or friend	Four 10-minute conversations. Two with examiner, two with family or friend	Four 10-minute conversations. Two with examiner, two with family or friend

Note. Questionnaire = APT Attention Questionnaire; APT-Test = Attention Process Training Test; TEA = Test of Everyday Attention; AVMT = Auditory Verbal Memory Task; WMSDS = Wechsler Memory Scale III Digit Span subtest; WMSLM = Wechsler Memory Scale III Logical Memory subtest; WMSVPA = Wechsler Memory Scale III Verbal Paired Associates subtest; APT-II = Attention Process Training-II; IPR = Interpersonal Process Recall



Table 4. Treatment effect sizes for DH

	<b>Comments</b>		<b>Adequate Plus Responses</b>	
	With Examiner	With Family/Friend	With Examiner	With Family/Friend
<b>Post IPR</b>	.43	.40	.33	1.66
<b>Post IPR &amp; APT-II</b>	.69	.56	.23	.52

Note: Effect sizes < .02 = trivial; .2 = small; .5 = moderate; .8 = large

Figure 1. Treatment probe data for DH's performance on Comments with the examiner for pre-treatment (1-2), IPR Treatment (3-8), post-treatment 1 (9-10), APT-II Treatment (11-16), post-treatment 2 (17-18), and four-week follow-up (19-20).

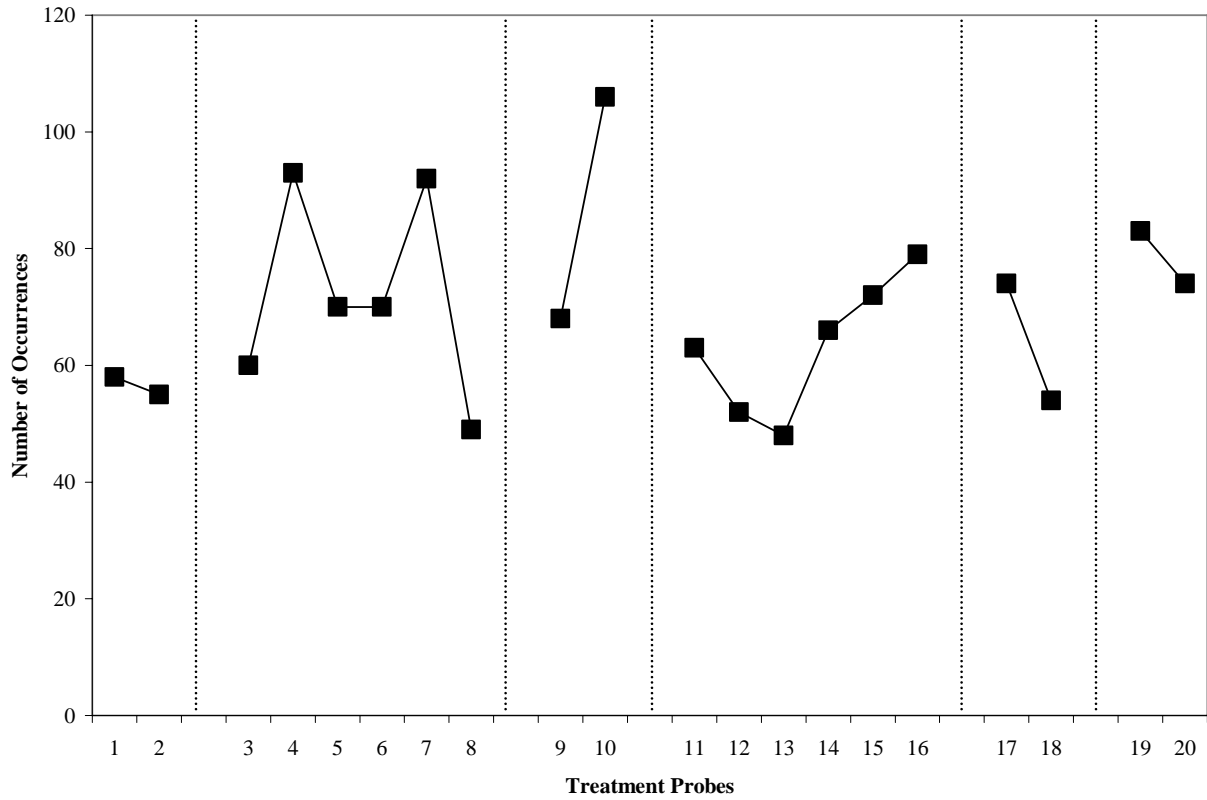


Figure 2. DH's performance on Comments with family and friend for pre-treatment (1), IPR Treatment (2-7), post-treatment 1(8-9), APT-II Treatment (10-15), post-treatment 2 (16-17), and four-week follow-up (18-19).

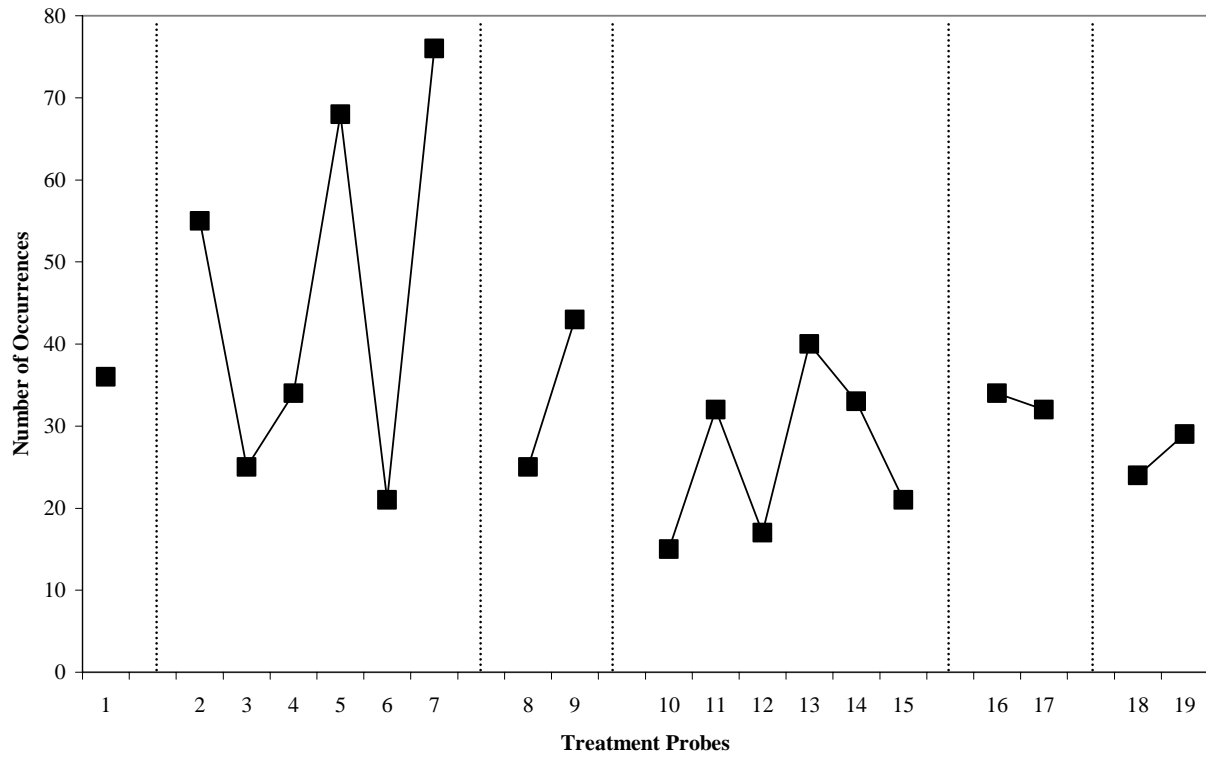


Figure 3. DH's performance on Adequate Plus responses with the examiner for pre-treatment (1-2), IPR Treatment (3-8), post-treatment 1 (9-10), APT-II Treatment (11-16), post-treatment 2 (17-18), and four-week follow-up (19-20).

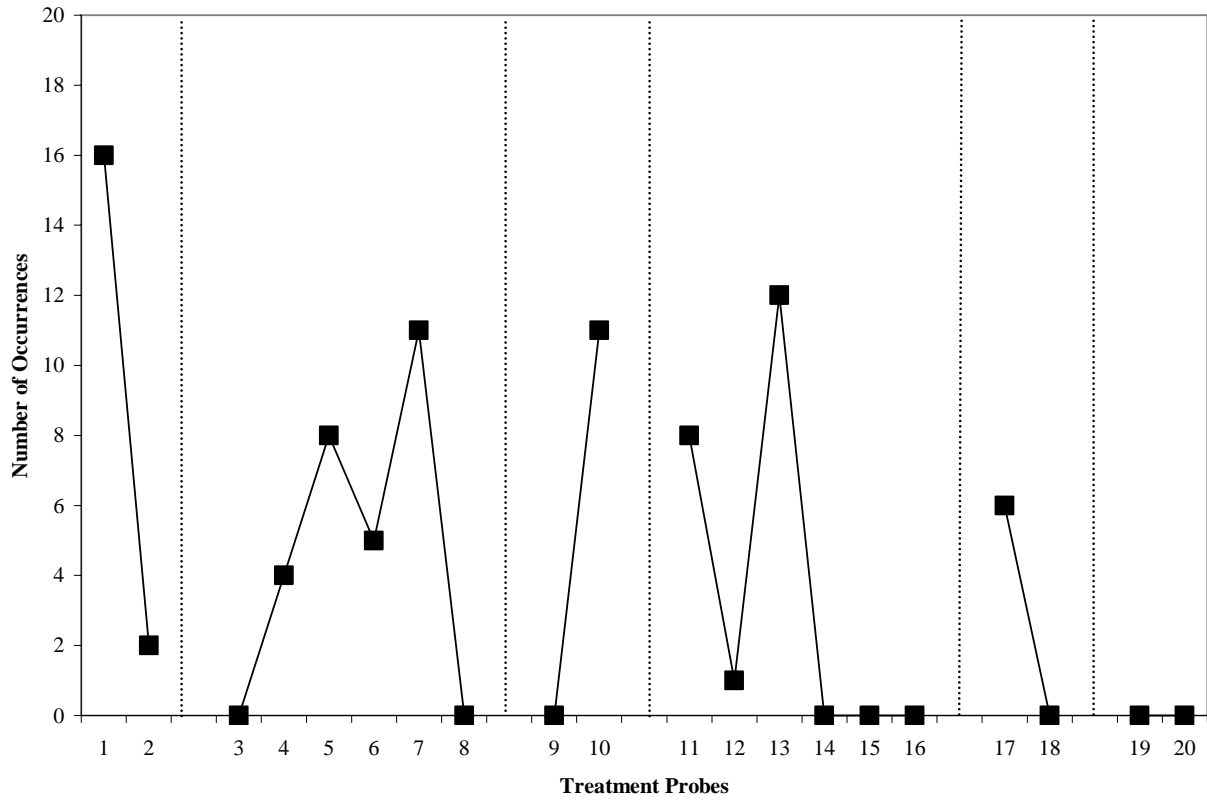


Figure 4. DH's performance on Adequate Plus responses with family and friend for pre-treatment (1), IPR Treatment (2-7), post-treatment 1 (8-9), APT-II Treatment (10-15), post-treatment 2 (16-17), and four-week follow-up (18-19).

