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Traumatic Brain Injury and Social Communication

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TRAUMATIC BRAIN INJURY AND SOCIAL COMMUNICATION

by

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Bachelor of Arts, University of Wisconsin-Madison, 2009

A Research Paper

Submitted in Partial Fulfillment of the Requirements for
the Master of Science Degree

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in the Graduate School
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TRAUMATIC BRAIN INJURY AND SOCIAL COMMUNICATION

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A Research Paper Submitted in Partial

Fulfillment of the Requirements

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Master of Science

in the field of Communication Disorders and Sciences

Approved by:

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Graduate School
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INTRODUCTION

People who sustain moderate-severe traumatic brain injuries (TBIs) often have impaired social communication skills which can decrease their quality of life because of limited engagement with others and vocational difficulties. Despite the information known about the effects of TBI on social communication skills, surprisingly few assessment tools exist that were specifically designed for use with this population. In addition, limited empirical research has been conducted related to intervention methods for this population. Past researchers have often relied on tools meant to assess other populations, which has a significant impact on the reliability and validity of their findings. Reviewing existing research on TBI and social communication skills would be beneficial in highlighting the areas of social communication most often affected by TBI. It may also serve to highlight the lack of quality assessment tools available for use with this population. Furthermore, the existing research may reveal what interventions, if any, exist that have been proven effective. In addition, it could potentially serve as an impetus for future research to be conducted regarding the development of assessment tools and intervention methods that could be used to measure and target social communication skills in people who have sustained TBIs. It is important to study people who have sustained traumatic brain injuries and how it affects their social communication skills because speech-language pathologists need to know what skills are affected, what assessments are available, and what interventions are effective.

SOCIAL COMMUNICATION SKILL DEFICITS

People who sustain moderate-severe TBIs often have impaired social communication skills. This claim is supported by a multitude of research studies. Turkstra et al. (1996) investigated pragmatic communication ability in three adolescents. Two of the adolescents had sustained moderate-severe brain injuries and the third adolescent sustained a mild brain injury. Researchers wanted to find out if the performance of the adolescents with brain injuries differed from their uninjured peers based on four tasks designed to examine various aspects of pragmatic communication. The adolescents who had sustained traumatic brain injuries and 36 of their uninjured peers aged 15-18 years were administered a pragmatic assessment that examined their ability to negotiate requests, hint, describe a simple procedure, and comprehend sarcasm. Performance for two of the three adolescents who had sustained a TBI was poorer than the performance of their peers while the adolescent who sustained the mild TBI performed within normal limits. The authors demonstrated that adolescents who have sustained traumatic brain injuries perform worse on pragmatic communication assessments than their age-matched peers. They also showed that the severity of the TBI can impact the severity of the social communication impairment as indicated by the higher level of performance of the adolescent who sustained the mild brain injury compared to the adolescents who sustained more severe brain injuries. This study had adequate internal validity. However, the external validity may be somewhat compromised. Due to the very small number of participants used in this study it is difficult to determine how well

results can be generalized to other subjects and settings, especially since people who have sustained TBIs are a very heterogeneous group. People who have sustained TBIs differ greatly depending on the severity of the TBI, length post-onset, age at which the TBI was sustained, and many other factors that were not controlled for in this study. Since the authors were looking for a way to accurately assess differences in the pragmatic skills of adolescents who have sustained traumatic brain injuries and their typically-developing peers this may be a concern. The pragmatic assessment that was used included four important aspects of social communication that are not often tested in standard academic testing, however, it would be beneficial to examine how the participants would perform on other aspects of social communication as well. While the results of the pragmatic assessment used were consistent with the neuropsychological testing results of the three subjects, further research needs to be conducted to determine how reliable the results are in determining pragmatic strengths and challenges in all adolescents who have sustained TBIs.

Dahlberg et al. (2006) investigated individuals with TBI and how their ratings of their own social communication impairments compared to ratings made by significant others and clinicians. They also investigated whether there was an association between social communication skills and social integration of the participants. Sixty individuals with TBI who were at least one year post-injury were given tests of social communication, social participation, social integration, and life satisfaction. In addition, significant others and clinicians rated the social communication skills of the participants. Participants identified difficulties with

social communication which were associated with lower ratings of social integration and life satisfaction, with males rating their social communication and social integration higher than females. The significant others and clinicians noted more social communication problems than the participants. Dahlberg et al. (2006) demonstrated that social communication impairments are associated with decreased social interaction and life satisfaction. They also showed that people who have sustained TBIs may underestimate their communication difficulties. This study had adequate internal and external validity. Data collection and analysis appeared to be reliable and accurate. The fact that the significant others of the people who had sustained TBIs identified more problems with social communication than did the people who had sustained TBIs themselves suggests that further research needs to be conducted regarding the self-awareness of limitations in people who have sustained TBIs. If it is determined that many people with TBI have limited self-awareness with regard to their limitations, then assessments and interventions that focus on patient awareness may be beneficial.

Social communication deficits were also examined by Stronach and Turkstra (2008) who investigated the use of cognitive state terms used by adolescents who had sustained TBIs because appreciation and recognition of their own and other's mental states, known as Theory of Mind (ToM), is an integral part of being a successful social communicator. Sixteen adolescents who had sustained TBIs were divided into two groups, TBI-Low and TBI-High, based on performance on a ToM test. The adolescents with TBIs and eight of their

typically developing peers, matched for age and race, completed three-minute conversations, either with a peer or a researcher, and conversations were examined to identify the number of cognitive state terms used in relation to the total number of words produced. The TBI-Low group used significantly less cognitive state terms than the TBI-High or typically developing group. There was not a significant difference between the performance of the TBI-High group and the typically developing group. Results support the author's hypothesis that adolescents with TBI have difficulties on social cognition tasks. Social cognition skills are an essential aspect of effective social communication. Therefore, deficits in these skills may have a significant impact on quality of life. Social cognition skills should be examined closely in individuals who have sustained TBIs in order to ensure detection of potential impairments and implementation of necessary interventions. While the external validity of this study appeared to be adequate, this study had two potential internal validity concerns. First, the conversation elicitation task was not controlled. The participants were allowed to choose any topic of interest and the various topics may not have been comparable in how often or to what extent cognitive state terms were elicited. Second, the conversation partners were not controlled for. Some participants conversed with peers while other participants conversed with researchers which could have impacted the number of cognitive state terms used during conversation. The authors suggest future research that examines whether differences in the location of the brain injury has an impact on performance on this conversational task. The participants' age at injury and length post-onset

might also be important factors to consider in future research.

Turkstra (2008) investigated the performance of 19 adults who had sustained TBIs and 19 controls matched for age and sex. They each completed the Video Social Inference Test (VSIT), a test of working memory that necessitated the participants to view a video in which actors simulated common conversations and to make social inferences along with predictions of future behaviors of the subjects in the video. They also completed the Eyes Test which tests social cognition. The participants who had sustained TBIs performed more poorly on the VSIT than the typically developing control group. Both the TBI group and the typically developing group performed more poorly when they were asked to predict future behavior of the subjects in the video based on the initial social inferences. Turkstra (2008) demonstrated the possibility of using conversation-based assessment to examine one aspect of social communication skills, making social inferences, in adults who had sustained TBIs. It may be possible to use the same type of video-based scenarios to examine other aspects of social communication with which individuals with TBI may struggle, since video may provide more real world cues that assessment using pictures or written language alone may not provide. Because of this, video-based assessment may be a better predictor of social communication performance of individuals with TBI in daily living situations. The internal validity of this study appeared to be adequate. However, one external validity concern was the small number of participants. Using a larger sample may take into consideration additional factors such as the sex of the participant and the location and severity

of the brain injury. It is also unknown how well the results of the VSIT compare to how well the participants communicated in actual social interactions because participants were never asked about the social interactions in their daily lives. It would be interesting to compare test performance to how the participants perform in daily social situations.

In another study by Turkstra et al. (2008) researchers investigated social cognition in adolescents who had sustained TBIs because they believed the ability to empathize with other's mental states, infer intentions, and make judgments about mental states would be compromised in this population. If these important social communication skills were compromised it could lead to a variety of negative outcomes since these skills are vital to being an effective conversational partner. Nine adolescents with TBI and nine of their age-matched peers were each first given the Strange Stories Test, where they were presented with a spoken story along with a line drawing and asked to explain the meanings of inferential language. Each story had four follow-up questions which required identification of a false statement, a description of that statement, explanation of the speaker's intent, and literal understanding of the story content. Next, the participants were given the Faux Pas Test which required them to detect each faux pas in short narratives. Four similar follow-up questions were asked. Finally, participants were given the Comprehensive Assessment of Spoken Language (CASL) Pragmatic Judgment test which required participants to produce context-appropriate responses to probe questions. Performance of the participants on the three tests was compared and results suggested that the adolescents with TBI

did significantly worse generating context-appropriate responses on the CASL Pragmatic Judgment test than their age-matched peers. The Strange Stories Test and Faux Pas Test were each originally designed for use with children with autism spectrum disorders so the authors hypothesized that the CASL would be more sensitive in discriminating the performance of adolescents with and without TBIs; the results supported their hypothesis. However, despite widespread use of the CASL with adolescents with TBI, the authors note that the CASL was not developed for assessment of individuals with acquired cognitive impairments so the reliability and validity for this population are unknown. Turkstra et al. (2008) demonstrated that adolescents with TBI perform more poorly on pragmatic communication tasks than their age-matched peers. The authors also highlighted the challenge associated with identifying appropriate measures of social communication skills in people who have sustained TBIs. Many tests currently used are tests originally designed for other populations and the lack of “well-validated instruments for testing adolescent social cognition” makes it difficult for clinicians to identify individuals who would benefit from intervention to aid in the development of social communication skills (Turkstra et al., 2008, p. 506).

Internal validity appeared to be adequate. One external validity concern associated with this study is that the participants in the study had high language and non-verbal intelligence scores on standardized tests which most likely is reflective of the demographic area from which they were recruited which makes it unlikely that the results could be generalized beyond this sample.

ASSESSMENT TOOLS

Despite the information available about how TBIs affect social communication, few assessment tools are available to evaluate these skills in people who have sustained moderate-severe TBIs. Therefore, most of the assessment tools currently used with the TBI population are tools that were initially designed for use with other populations as discussed in the previous research studies. Turkstra et al. (1995) discuss why this may be the case: “it is difficult to capture in a quantified, systematic manner the pragmatic deficits that may emerge in daily interactions...[p]ragmatic strengths and limitations are best revealed using measures of functional communication, and such measures are rarely included in outcome studies” (p. 330). The lack of quality assessment materials is concerning since speech-language pathologists could potentially encounter many clients who have sustained TBIs throughout their careers and it would be helpful if more tools designed for the TBI population were available to reliably assess them. According to Struchen et al. (2008) “only two self-report measures have been presented in the literature that focus solely on the measurement of social communication abilities in persons with brain injury: The Social Communication Skills Questionnaire (SCSQ) and the La Trobe Communication Questionnaire (LCQ)” (p. 941). Struchen et al. (2008) investigated the construct validity of the La Trobe Communication Questionnaire (LCQ) and the self-ratings of adults with traumatic brain injury because they wanted to find out how they compared to the ratings made by close others and self-ratings of a non-injured control group. Two hundred and seventy-six adults

who had sustained TBIs and were at least one year post-injury completed the LCQ. Additionally, 88 friends and family members as well as 80 non-injured matched controls completed the LCQ. Analysis of the LCQ revealed four factors: Initiation/Conversational Flow, Disinhibition/Impulsivity, Conversational Effectiveness, and Partner Sensitivity. The internal consistency of the four factors was found to be adequate. In addition, sufficient discriminative validity was found in comparing participants who had sustained TBIs to the non-injured controls. No significant discrepancies were found between self-ratings of communication abilities made by participants who had sustained TBIs and the ratings of their close others. Struchen et al. demonstrated that the adults in the study who sustained TBIs were aware of their social communication difficulties as evidenced by the lack of discrepancy between their self-ratings of their abilities and the ratings of their close others. The researchers also demonstrated that the La Trobe Communication Questionnaire can be a useful tool to measure perception of social communication abilities. This research study supports the claim that few assessment tools are available for use with people who have sustained TBIs. While the LCQ has been shown to be a useful self-rating assessment, it is important that a broader range of tools are developed for use with this population so individual strengths and challenges can be accurately and efficiently assessed and appropriate treatment plans can be developed.

In another assessment study, McDonald and Flanagan (2004) recruited 34 adults who had sustained severe brain injuries and 34 matched controls to watch videotaped conversations. While watching the conversations, researchers gave

participants an assessment that required them to interpret speaker emotions, speaker theory of mind, what the speakers wanted their conversational partners to believe (second-order theory of mind), and what the speakers meant when they lied or used sarcasm using sub-tests from The Awareness of Social Inference Test (TASIT). The TASIT was designed to assess recognition of emotions, theory of mind judgments and the ability to make social inferences. Despite being tested on adults without brain injury, the TASIT is “sensitive to deficits following acute TBI and also predictive of real-world difficulties with social encounters” (McDonald & Flanagan, 2004, p. 573). Researchers wanted to investigate the ability to accurately recognize emotions because “although infrequently reported, many people with TBI have difficulty recognizing emotions” (McDonald & Flanagan, 2004, p. 572). The other areas were examined in hopes of acquiring a more complete idea about the social perception abilities of people who have sustained TBIs. The participants were between the ages of 21 and 64 and were recruited from outpatient records from brain injury units in Australia. They were given three sub-tests of the TASIT in a 35-minute period. Results indicated that the participants who had sustained traumatic brain injuries had much more difficulty than their matched controls when it came to interpreting social information from conversations. The participants with TBIs were only able to correctly judge speaker emotions when they were explicitly stated and it was discovered that the participants had more difficulty accurately identifying negative emotions than positive emotions. Participants who had sustained TBIs did not differ significantly from the control group when it came to identifying meaning of

literal comments, but had marked deficits in inferring the meaning of non-literal, or sarcastic, remarks. They were also impaired in their ability to recognize the mental state of others. The TBI group in this study was variable in their performance on these measures. There was a clear distinction between the performance of the TBI group and non-TBI group, but individual performance within the TBI group was correlated to the severity of the brain injury. Those with more severe injuries performed more poorly on the assessment.

The authors demonstrated the potential effectiveness of using sub-tests of the TASIT as assessment tools for evaluating the social communication skills of people who have sustained TBIs. The reliability and validity of the results appear to be adequate. However, like most other assessments used with the TBI population, the TASIT was not originally designed for people with TBIs nor was it normed on people with TBIs so the true reliability and validity of the results are unknown.

INTERVENTIONS

Effective interventions for social communication impairments following traumatic brain injury are unequivocally important in the field of speech-language pathology, primarily because social isolation is one of the most common consequences following a TBI. Being socially competent is one of the most important skills for reintegration into one's home, school, or workplace. Significant difficulties with social communication skills along with the processing, memory, and attention deficits that are also common following a TBI can make reintegration into one's pre-injury social network a daunting task. Several different intervention methods targeting these pertinent skills have been researched. Struchen (2005) published an overview of some of these interventions. In the article, the author stated that many of the social communication interventions used with people who have sustained TBIs are based on social skills training (SST) which includes behavioral approaches such as modeling, role playing, coaching, and positive reinforcement. According to the author, SST has been proven effective with many populations, but empirical research still needs to be conducted regarding the effectiveness of this and other intervention methods for people with traumatic brain injuries. Few empirical studies have been conducted despite widespread knowledge in the area of rehabilitation regarding the substantial effects traumatic brain injury has on social communication. Struchen (2005) used a modified version of the American Academy of Neurology's system for classifying evidence. Using this method, the author identified only one Class I study to date that examined interventions for

social communication deficits. A Class I study is one that uses randomized, controlled clinical trials, a masked outcome assessment and a representative population.

In the Class I study, Helffenstein and Wechsler (1982) randomly assigned 16 people with brain injuries to either 20 hours of interpersonal process recall (IPR) or 20 hours of “non-therapeutic attention” (Struchen, 2005, p. 92). The IPR group received treatment that included video-taped interactions with feedback provided by the study participant, the conversational partner, and the therapist. Following the 20 hours of randomized treatment or non-treatment, the participants were given an assessment. The participants who had received the IPR had reduced anxiety. Furthermore, these participants had a greater improvement in interpersonal and communication skills as judged by professional staff and outside observers who did not know which group received IPR and which group did not. This study demonstrated that interpersonal process recall (IPR) may be an effective intervention method for improving the interpersonal skills of people who have sustained TBIs. The internal and external validity of this study appear to be adequate although the small sample size and lack of information related to location and severity of the brain injury may be a concern that should be addressed in future studies.

In addition to the single Class I study, Struchen also reviewed one Class II study, defined as a study that included evidence from “a prospective matched group cohort study in a representative population with masked outcome assessment that meets the additional criteria of Class I studies (Struchen, 2006,

p. 91). In the Class II study, Thomas-Stonell et al. (1994) recruited 12 adolescents and adults aged 12 to 21 years whose TBIs ranged from mild to severe. The study examined the effectiveness of a computer-based program, TEACHware, for improving cognitive-communication functioning compared to the standard of care. Results of the study showed significant improvements on 8 out of the 28 measures of language functioning assessed in the group that received the TEACHware program. While the study was randomized and controlled, some flaws were apparent. The two groups used in the study, the group receiving the TEACHware intervention and the group receiving the “standard of care”, were randomized, however, the severity of the injuries across the group was lopsided. The control group had a greater number of participants with more severe traumatic brain injuries which could potentially impact the reliability of the findings.

In one of the nine Class III studies reviewed by Struchen (2006), Wiseman-Hakes et al. (1998) implemented a group intervention for six young adults who had sustained severe TBIs. The intervention was created by Sohlberg and colleagues in 1992 and was titled: “Improving Pragmatic Skills in Persons with Head Injury”. Wiseman-Hakes and colleagues modified the original intervention to be used with their group of adolescents. The intervention program consisted of four separate modules designed to focus on different social skills that are often lacking in people post-TBI. The four modules were initiation, topic maintenance, turn-taking, and active listening. Each module had three phases: an awareness phase, a practice phase, and a generalization phase. The entire intervention

program relied on repetition, consistency, and feedback. Feedback and prompts were provided by peers as participants practiced conversational exchanges. At the end of the treatment program significant improvements were discovered in the pragmatic skills of the adolescents as judged by independent observers in a non-therapy setting. Pragmatic gains were maintained at the six-month follow-up. This study by Wiseman-Hakes et al. (1998) provides evidence for the potential for an intervention like the one used in the study to benefit adolescents who have sustained traumatic brain injuries. However, the adolescents that participated in the study were all less than a year post-injury and no control group was used in the study so it is nearly impossible to determine whether the pragmatic improvements were the result of the specific intervention used or the result of spontaneous recovery.

Ylvisaker (2006) stated that “unsuccessful social communication after traumatic brain injury is often a consequence of self-regulatory (executive function) impairments” (p. 246). The author discussed an innovative, self-coaching method of intervention for these people with self-regulatory impairments. The author claimed this self-coaching method differs from traditional social skills training methods in many respects including the use of everyday communication partners or ECPs in the intervention process. Because a large proportion of TBIs occur in younger active people who may have had experiences with sports, the author hypothesized that using the self-coaching metaphor may be meaningful and, therefore, lead to greater gains in overcoming social difficulties. The aim of self-coaching is to improve goal-planning and

successful social behavior in people who have sustained TBIs while decreasing the presence of impulsivity or other undesirable social behaviors. Implementing self-coaching as an intervention necessitates generating 'plays', or scripts, to target any of the deficit areas common after TBI which include difficulty with emotional states and managing daily routines. There are specific procedures for adhering to this self-coaching method, some of which include: finding personally appealing 'plays' for self-regulation, rehearsing the 'plays' repeatedly, trying the 'plays' in real 'games', or real world situations, and modifying the 'plays' if they are not effective. The author offered suggestions for use of the self-coaching method for non-sports fans such as self-conducting for music lovers and self-directing for movie lovers although these alternatives to self-coaching still employ the same basic principles. The author discussed the effectiveness of self-coaching and stated that the success of this type of intervention often depends on how competent the everyday communication partner is in understanding the self-coaching process and aiding in the development and evolution of 'plays'; "training of communication partners has been shown to have a positive effect on communication effectiveness and reacquisition of communication skills in [a]dults with TBI" (Ylvisaker, 2006, p. 255). Ylvisaker (2006) claimed that no intervention will result in a positive outcome without fostering development of a sense of self, participation in meaningful activities, environmental supports, and well-trained communication partners. Self-coaching utilizes each of these and should therefore be considered a viable intervention option for people who have sustained TBIs. This article contained a plethora of information about self-

coaching as an intervention method. Evidence against more traditional methods, such as Social Skills Training, was also presented. Self-coaching as an intervention still needs to be researched in an empirical way in order to establish the effectiveness of it in a randomized and controlled manner, but it appears to offer an interesting and more personalized approach to aid in the remediation of social communication skills in people with traumatic brain injuries.

Dahlberg et al. (2007) stated that even 10 to 15 years after sustaining a traumatic brain injury, people claimed loss of a social network was the most debilitating effect of their TBI and it resulted in decreased overall life satisfaction. This loss of social contact often stems from the communication difficulties experienced by people in the aftermath of a TBI. The authors hypothesized in their study that group training focused on social communication skills would improve individual communication deficits. They also hypothesized that overall satisfaction with life would improve and that these newfound skills would be maintained when assessed six months later. Participants included 52 people, the majority of whom had sustained moderate-to-severe TBIs. Sex, age, and years post-injury data were collected to identify if there were any significant differences between the treatment and the deferred treatment groups. The only difference discovered was that there were more women in the group that received the treatment intervention than the deferred treatment. The treatment group received an intervention that entailed meeting in a living room setting once a week for 90 minutes over a period of 12 weeks. The treatment intervention was based on four basic components. First, two group leaders were present at each session from

different clinical fields so participants were being provided assessment and treatment by people with differing rehabilitation perspectives which fosters inter-professional collaboration. Second, self-awareness and personal goal setting was emphasized heavily. Third, the group setting was used to foster a feeling of togetherness, interaction, and problem-solving. Finally, a focus was placed on generalization of newly acquired skills outside of the treatment sessions. Results of the study indicated that the treatment group made greater gains in “quantity, internal relation, external relation, clarity of expression, social style, and aesthetics” than the deferred treatment group (Dahlberg et al., 2007, p. 1568). This study indicated that the method of intervention used was effective because it resulted in social communication improvement in people who had sustained traumatic brain injuries. This study was randomized and controlled, but some flaws were noted. The participants in the study had, on average, higher levels of education than the general TBI population which makes the successful transferability of this intervention to other people with TBI questionable. Also, the entire treatment was implemented by only two people. While highly experienced in their fields, it is difficult to say whether the treatment would be as effective if implemented by anyone other than those two people.

CONCLUSION

According to the Centers for Disease Control and Prevention (CDC), approximately 1.7 million people in the United States sustain a traumatic brain injury annually. In addition, TBI is a contributing factor in nearly a third of all injury-related deaths in the United States each year. Because of the large number of people affected by TBI annually and the potential for long-lasting, debilitating social communication problems, it is imperative that speech-language pathologists are educated about the common communicative effects of TBI, the assessments available, and which interventions are obtainable and effective. Armed with the knowledge of which assessment tool is best suited to provide information on which pragmatic skills are lacking will result in better and more individualized treatment for people who have sustained traumatic brain injuries.

While the current research has provided valuable information about TBI and social communication, some future research studies are warranted. An empirical study that closely examines the self-coaching method discussed by Ylvisaker (2006) is indicated, using a true pretest-posttest design. The experimental and control groups should be matched for age, sex, location and severity of the TBI, and length post-injury. Both the experimental and the control groups would receive a pre-assessment of their social communication abilities. Then, the control group would receive no treatment or a “traditional” treatment such as Social Skills Training (SST) for a predetermined period of time while the experimental group is exposed to the self-coaching method of intervention for the same predetermined amount of time. The self-coaching intervention would be

administered exactly described by Ylsivaker (2006) in the original article. The groups would receive the same total amounts of their respective treatments during this time period. After the treatment period, both groups would be given a post-assessment to determine what, if any, social communication progress was made. Results of the posttest could then be compared to the pretests of each of the groups to examine which intervention method resulted in the greatest progress. Pretests and posttests would be administered by a highly qualified, objective speech-language pathologists who are in no way involved in conducting the research. It would also be beneficial to have two speech-language pathologists administering the two different interventions. Both speech-language pathologists should be skilled in providing the type of intervention they are assigned to for the study. Then, the experimental and control groups would have equally skilled therapists providing treatment. Building these measures into the research study would help ensure the validity and reliability of the results.

A study replicating the work of Dahlberg et al. (2007) is warranted to determine if the results of the original study can be generalized to other people who have sustained TBIs. The authors noted in the original study that the group of participants they recruited for the study had much higher levels of education pre-injury than the average TBI population. In the replication study, the same research design would be used and the same protocol would be followed for administering the intervention method, but the participants recruited should be more representative of the general TBI population. This would increase the generalizability of the findings and provide more research to support this group

training method as a viable intervention for social communication deficits in people who have sustained traumatic brain injuries.

A study that replicates the work done by Turkstra et al. (1996) is also warranted. First of all, the replication study would include more participants since the first study only had three participants which decreases the likelihood of generalizability. The participants and the control group would also need to as closely matched as possible for age, sex, location and severity of the brain injury, and length post-injury. Other than increasing and better controlling the participants in the study, the same protocol would be followed and the same areas of social communication would be examined. However, it would be beneficial to examine other key areas of social communication such as eye contact, turn-taking ability, topic maintenance, and overall appropriateness as a conversational partner. These skills could be evaluated using a simple, but reliable rating scale and then examining inter-rater agreement. Results of the study could be compared to the previous study to determine if similar results were obtained on a larger scale.

Another future study that closely examines the self-awareness of people who have sustained traumatic brain injuries would provide valuable information as to how much, if any, time should be devoted to interventions that focus on self-awareness. In the study by Dahlberg et al. (2006), results indicated that people with TBI identified less social communication deficits in themselves than their frequent communication partners identified in them. These findings suggest a lack of self-awareness regarding social functioning may be present in people

who have sustained TBIs. Another investigation needs to be conducted. A self-report measure such as the La Trobe Communication Questionnaire or another self-report that targets social communication could be used. Additionally, a report would be filled out by participants' significant others. Furthermore, it would be beneficial to videotape conversational exchanges between the participants and their significant others and have the social communication skills of the participants be rated by objective viewers. This would provide a more unbiased look at the actual social communication deficits exhibited by the participants. By examining the social communication impairments from three viewpoints, a more well-rounded and accurate picture of the participant's abilities would be provided. Also, if the participants failed to recognize as many deficits as their significant others or the objective observers then that would be more evidence to show that self-awareness of people with TBI regarding their social skills may be lacking and it should be an area explicitly targeted in treatment.

Traumatic brain injury, according to the American Speech-Language-Hearing Association (ASHA), may cause difficulty comprehending and producing written and spoken language. It may also cause individuals to experience difficulty with pragmatic skills such as understanding body language and other non-verbal signals. These are all areas where a speech-language pathologist may be needed to help improve social communication functioning. Many speech-language pathologists will encounter at least one client who has sustained a TBI at some point in their careers so it is important that they are armed with the knowledge about how best to assess and treat their various communication

deficits. Currently, a vast amount of information is available about the potential social communication deficits following a TBI. Skills such as conversational turn-taking, topic maintenance, and appropriate commenting and questioning can be affected and need to be addressed by speech-language pathologists working with individuals who are post-TBI. However, most of the assessment tools presently available that are used with this population were designed for other populations which can negatively impact the validity and reliability of the assessment findings. More assessment tools need to be developed and normed on people who have sustained TBIs. Without quality assessment tools it can be difficult to pinpoint the exact deficit areas that need to be targeted in therapy. The addition of new assessment tools may help identify individual social communication impairments. With that knowledge the most appropriate intervention method can be used to help improve the social communication skills of people who have sustained TBIs because, as the American Speech-Language-Hearing Association says, effective communication is a human right and it is the job of speech-language pathologists among others to make it accessible and achievable for everyone.

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