

Training Communication Partners of People With Traumatic Brain Injury: Reporting the Protocol for a Clinical Trial

Leanne Togher,¹ Skye McDonald,² Robyn Tate,^{3,4} Emma Power¹ and Rachel Rietdijk¹

¹ *Speech Pathology, Faculty of Health Sciences, The University of Sydney, Australia*

² *School of Psychology, The University of New South Wales, Australia*

³ *Rehabilitation Studies Unit, Northern Clinical School, Faculty of Medicine, University of Sydney, Australia*

⁴ *Royal Rehabilitation Centre Sydney, Sydney, Australia*

This article reports on the design of a three-arm, nonrandomised controlled trial of interventions targeting social communication skills following traumatic brain injury (TBI) in adult participants. People with severe TBI were allocated to one of the three groups: the TBI group, where only the person with TBI was trained, the JOINT group where both the everyday communication partner (ECP) and the person with TBI were trained together, and a delayed treatment control condition. The trial is comparing whether including everyday communication partners in the training process provide additional benefit when compared to training the person with TBI alone; and additionally, whether training the person with TBI alone is more effective than no training. A range of primary and secondary outcome measures will be used to evaluate outcomes. Publishing the protocol prior to the results of the trial being available has several important benefits (Godlee, 2001). The original hypotheses and intentions of the research are made explicit to ensure that the process of conducting this clinical trial is transparent to readers, and so that comments may be made before results are finalised. It provides the opportunity to outline a detailed description of this intervention and methodology, or to acknowledge changes to methodology, which may assist with eventual clinical application of the intervention. This article also informs the research community of the work that is underway to promote opportunities for collaboration and reduce unnecessary duplication of research. The protocol for this trial has previously been registered on Current Controlled Trials (<http://www.controlled-trials.com/ISRCTN57815281>).

Keywords: traumatic brain injury (TBI), communication partner training, cognitive-communication deficits, social skills, rehabilitation

Social Communication Impairment Following Traumatic Brain Injury

Traumatic brain injury (TBI) results from an external insult to the brain, and in severe cases can lead to lifelong devastating disability. According to the

World Health Organization, TBI will surpass many diseases as the major cause of death and disability by the year 2020 (Hyder, Wunderlich, Puvana-chandra, Guraj & Kobusingye, 2007). It is estimated that 10 million people are affected worldwide annually leading to a significant pres-

Address for correspondence: Associate Professor Leanne Togher, National Health and Medical Research Council Senior Research Fellow, Speech Pathology, Faculty of Health Sciences, University of Sydney, PO Box 170 Lidcombe NSW 1825, Australia. E-mail: l.togher@usyd.edu.au

sure on health and medical resources. TBI most often affects young adults who suffer devastating life-long disabilities; however, there is also a higher incidence in early childhood and the elderly (Bruns & Hauser, 2003). The majority of TBIs in young adults are the result of road traffic crashes, while typically children and the elderly sustain injuries as a result of falls. There has also been an increase in the number of injuries resulting from violence and war, particularly in low- and middle-income countries (Hyder et al., 2007). With normal life expectancies and the addition of more casualties each year, the burden of TBI on the community is cumulative.

Communication skills impairment is a frequent sequelae of severe TBI and a major contributor to the burden of managing TBI for families and carers (Wedcliffe & Ross, 2001). Communication difficulties for people with TBI include word finding problems, excessive talkativeness, poor turn taking and repetitiveness (Snow, Douglas, & Ponsford, 1995). Some of these problems reflect disorders of language function, but the majority arise from more generic cognitive deficits reflecting fronto-temporal pathology and diffuse axonal injuries. Slowed information processing, impaired working memory/attention and executive dyscontrol may translate into deficiencies (e.g., inertia, rigidity, poor conceptualisation and planning) or excesses (such as disinhibition) of cognition and behaviour (Tate, Hodgkinson, Veerabangsa, & Maggioletto, 1999). Inertia and rigidity can lead to a flat presentation, seeming disinterest in the conversation, and inability to generate and maintain topics. Excesses can interfere due to frequent interruptions, disinhibited responses, swearing and perseveration on topics. Additionally, impairment in executive functioning affects the ability of people with TBI to flexibly apply the rules of social behaviour to varying situations, resulting in their behaviour being seen as less socially skilled (Godfrey & Shum, 2000).

People with TBI and their family members continue to identify significant communication difficulties, a feeling of disadvantage in conversations, and avoidance of social situations as ongoing issues after the acute phase of TBI (O'Flaherty & Douglas, 1997). There is little natural recovery in social communication skills based on follow-up at 2 years postinjury (Snow, Douglas, & Ponsford, 1999).

Loss of communicative competence presents a major obstacle to reintegration into the community because it makes the person with TBI more taxing and less rewarding to interact with socially

(Bond & Godfrey, 1997). Performance in conversational, narrative and procedural discourse tasks has been shown to have significant correlation coefficients with their level of community integration (participation in home, leisure, educational and vocational activities) and overall quality of life (Galski, Tompkins, & Johnston, 1998). People with TBI often have difficulty maintaining pre-injury relationships and experience a shrinking of their social networks (Elsass & Kinsella, 1987; Tate, Lulham, Broe, Strettle, & Pfaff, 1989). The nature of their close relationships also changes, with close family members and friends needing to make adaptations to the way they communicate with the person with TBI (Bute, Donovan-Kicken, & Martins, 2007).

Communication Partners of People With TBI

Caring for people with TBI is frequently stressful, with high levels of caregiver burden and stress (Machamer, Temkin, & Dikmen, 2002). One of the main sources of this stress has been identified as problems communicating with the person with TBI (MAA, 1998). Interactions between people with TBI and their regular communication partners, such as caregivers, can be difficult due to impairment in the social communication skills of the person with TBI. However, given that conversations are dynamic, with both participants contributing to the success of the interaction, it is important to also consider the potential of communication partners to positively or negatively influence the conversation.

Research suggests that that the communication problems experienced by people with TBI can be exacerbated by their communication partners' inadequate responses. In interviews, communication partners report negative reactions to the communicative efforts of their family member with TBI (O'Flaherty & Douglas, 1997). Analyses of conversations have also demonstrated that communication partners behave differently when interacting with people with TBI (Togher, Hand, & Code, 1997a). For example, in a study of telephone conversations where TBI participants requested information from a range of communication partners, they were asked for and were given less information than matched control participants. Therapists and mothers never asked people with TBI questions to which they did not already know the answer. Additionally, TBI participants were more frequently questioned regarding the accuracy of their contributions and contributions were followed up less often than matched control participants.

Communication partners used patronising comments, flat voice tone and slowed speech production when talking to people with TBI. This was in contrast to the control interactions, where participants were asked for unknown information, encouraged to elaborate, did not have their contributions checked frequently, and had their contributions followed up. This suggests that a broader approach to social skills remediation, which takes into account the role of the communication partner, may be required.

Approaches to Improving Social Communication Skills Following Traumatic Brain Injury

Despite its pivotal role in social reintegration, there has been surprisingly little research to examine the effectiveness of remediation of disorders in social communication after TBI. However, there is reason for optimism in this area. Two avenues of intervention which have shown promise are: (1) training people with TBI with the skills necessary for successful social interaction; (2) and training the communication partners of people with TBI to use strategies for promoting more successful interactions.

Recent studies suggest that behavioural and cognitive deficits suffered by TBI patients, thought to contribute to their loss of communicative competence, are amenable to remediation (Cannizzaro & Coelho, 2002; Cramon & Cramon, 1992; Flanagan, McDonald, & Togher, 1995; Helffenstein & Wechsler, 1982; Medd & Tate, 2000). Furthermore, a systematic review of treatment outcomes in TBI indicated that the broad area of social skills, which encompasses communication skills, was one of only two areas that proved amenable to treatment (Carney et al., 1999).

This has been further demonstrated in two recent studies focusing on improving social skills of people with TBI. A randomised controlled study of a social skills program for people with TBI (McDonald et al., 2008) suggested that treatment effects following social skills training in people with severe, chronic brain injuries are modest and limited to direct measures of social behaviour and perception. Another recent randomised controlled trial (Dahlberg et al., 2007) also supports the effectiveness of social skills training after brain injury, using a training group format with a specific focus on communication skills. The treatment group had significantly greater improvements compared to the control group across several domains of communication,

including blinded assessors' perceptions of participants' general participation, quantity of information, clarity of expression and social style. There was also a significantly greater improvement in the treatment group compared to the control group in participants' self-report of social communication skills. This body of research suggests that people with TBI have the potential to improve their social communication skills with use of a training group format.

Training of Communication Partners as a Treatment Approach

Although research demonstrates that interventions for social communication skills for people with TBI can be effective, the extent of improvement may be limited by impaired underlying cognitive processes. Given the cognitive impairment associated with TBI, a more effective method of intervention may be to modify the social environment and to provide appropriate supports, such as training carers and family members in communication strategies (Godfrey & Shum, 2000). The International Classification of Functioning, Health and Disability (ICF) (WHO, 2001) has highlighted the need for interventions which aim to increase an individual's participation in their life situation, and there is potential to achieve this through enabling communication partners to provide supports which maximise opportunities for people with TBI to have successful communicative interactions.

It has been demonstrated that modifying the communicative environment changes the behaviour of the person with TBI. For example, when people with TBI were placed in a powerful information-giving role, such as a guest speaker talking about the experience of having a serious injury, their communication approximated matched control participants (who had a spinal injury) (Togher, 2000). People with TBI also had better levels of participation when in an environment with a trained mentor who provided prompts, modelling and structured activities, compared to pre-intervention and post-intervention baseline periods (Bellon & Rees, 2006). Similarly, in interactions between staff members and people with TBI, there was a trend towards increased compliance, attention and participation of the person with TBI when the staff member used more positive communication strategies (Shelton & Shryock, 2007). These results suggest that greater opportunities and increased conversational competence can be created for the person with TBI using a facilitative context, potentially through training their communication partner.

This approach has previously been investigated in a training study where police officers were taught communication strategies enabling them to manage service encounters with people with TBI (Togher & Grant, 1998). The TBI speakers telephoned the police to ask their advice both before and after the police had been trained. Training resulted in more efficient, focused interactions. This program was followed by a single case study that focused on improving communication interactions between an everyday communication partner (a paid attendant caregiver) and a 28-year-old man with TBI (Togher & Grant, 2001). The intervention involved teaching the structure of casual conversation (Ventola, 1979) in combination with the strategies of collaboration and elaboration (Ylvisaker, Sellars, & Edelman, 1998). Pilot data indicated that the caregiver improved his ability to facilitate communication by using collaborative statements, explicitly acknowledging difficulty in the interaction, confirming his partner's contribution and asking questions in a supportive manner. Despite evidence suggesting its effectiveness, training programs to provide communication strategies for caregivers of people with TBI are currently nonexistent and urgently called for (Holland & Shigaki, 1998).

Further evidence for the effectiveness of training communication partners of people with TBI can be gained from the substantial body of research supporting the use of this approach with the communication partners of adults with aphasia. Turner and Whitworth (2006) completed a review of the literature in this area including nine studies, and reported that all interventions had favourable outcomes for participants. The results of two recent randomised controlled trials have indicated that communication partners who received training in supporting the conversations of people with aphasia are significantly better at acknowledging and revealing the competence of people with aphasia, than a control group who did not receive the training (Kagan, Black, Duchan, Simmons-Mackie, & Square, 2001; Legg, Young, & Bryer, 2005). Additionally, Kagan et al. (2001) found that the people with aphasia had significantly better interaction and transaction during a conversation with a trained volunteer, compared to conversation with a control volunteer who had not received training.

Aims of the Project

Interventions for social communication skills can involve training people with TBI, or training their

communication partner. There is preliminary evidence supporting both approaches, however the relative effectiveness has not been compared. This project is a group comparison study with the aim of determining which method is the more effective approach: (1) treating communication deficits of the person with TBI directly or (2) training particular people with whom the TBI speaker interacts, specifically caregivers and family members in the same sessions as the person with TBI, to enable successful interactions with the TBI person to occur. The efficacy of the different approaches will be evaluated in comparison to a delayed treatment control group, in terms of improving the degree and quality of participation in conversation of people with TBI as measured by independent raters and detailed analyses of language and behaviour. The project will also determine (a) the social-communication outcome for the individual with TBI, (b) the level of burden of the caregiver/family member, and (c) the longer-term effectiveness of the therapy program.

Study Design

A nonrandomised control trial will be used to examine outcomes of treatment for social communication impairment. The intervention will be trialled across all three brain injury rehabilitation centres in metropolitan Sydney: Liverpool Brain Injury Rehabilitation Unit; Royal Rehabilitation Centre Sydney; and Westmead Brain Injury Rehabilitation Unit. The study design, protocol and information and consent forms have been approved by each of the relevant hospital ethics committees. See Figure 1 for a visual representation of the study design.

Participants

Recruitment of 46 participants with TBI and their carers will occur over 3 waves (i.e., 14–16 participants per wave). TBI participants will be selected from clients recommended by staff at local Brain Injury Units. Inclusion criteria are: (1) a moderate–severe TBI at least 9 months previously defined as a score on the Glasgow Coma Scale (GCS) of 9–12 (*moderate*), 8 or less (*severe*), and/or a period of post-traumatic amnesia (PTA) of 1–24 hours (*moderate*) more than 24 hours (*severe*); (2) significant social skills deficits; (3) be of at least average premorbid intelligence; and (4) have a regular communication partner with whom they interact on a daily basis. Exclusion criteria to screen out participants who are unlikely to benefit from training are: (a) drug and alcohol addiction

or active psychosis, (b) aphasia, (c) a non-English speaking background (d) severe amnesia, and (e) severe dysarthric (motor speech) impairments which make speech unintelligible. Caregivers will interact with the person with TBI on a regular basis, have not sustained a brain injury or have a known psychiatric history.

Sample Size

On the basis of previously published work in this area we expect a large effect size for the primary outcome variable, which are scales derived from the Measure of Participation in Conversation (MPC) and Measure of Support in Conversation (MSC) (Kagan et al., 2001; Kagan et al., 2004). Power analysis has indicated that for $n = 14$ per group, the MPC Transaction scale has a power of 94% with $\alpha = 0.05$ two-tailed, the MSC Acknowledge Competence scale is 98% and MSC Reveal Competence scale has > 99% power at $\alpha = 0.05$ two-tailed. A fourth scale, the MPC Interaction, has a power of only 37% and therefore would be considered a secondary scale for the purposes of

the current study. Our preliminary data collection of the first wave in this current study indicated high retention rates, and therefore we anticipate no more than a 10% attrition rate. We have therefore made a conservative estimation that $N = 46$ will accommodate a 10% attrition rate and use this as a minimum sample size.

Allocation to Groups

Preliminary discussions with clinicians at rehabilitation centres indicated that there would not be an adequate core number of participants who would have a communication partner available to participate in intensive therapy to allow a randomised design for this trial. The original design involving a randomised component was modified to use a nonrandomised method of allocation to groups to ensure recruitment of the required numbers of participants. Participants will be allocated to groups on the basis of their availability and their communication partners' availability to attend the group and individual sessions on the scheduled days. Allocation to groups will occur after participants have completed initial assessment, as indicated in

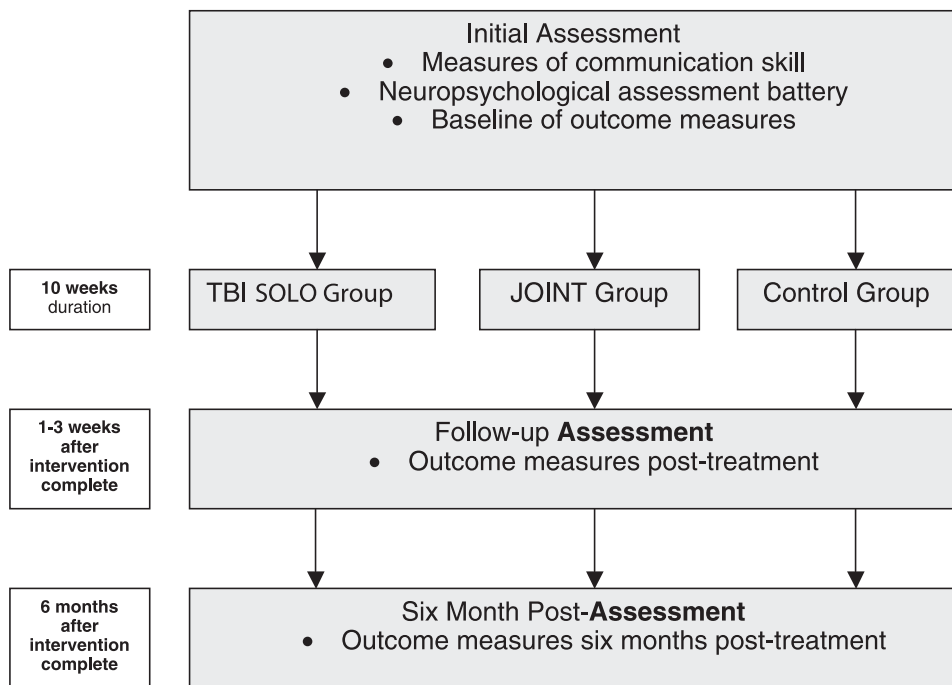


FIGURE 1
Study design.

Figure 1. Participants will be allocated to one of three interventions:

1. social communication training, involving training the person with TBI only, with no training provided to their communication partner (TBI SOLO)
2. social communication training, involving training both a communication partner and the person with TBI (JOINT)
3. delayed treatment control condition. This group will receive training following completion of the postassessment phase (CONTROL).

Blinding

As allocation will occur after initial assessment has been completed, the speech pathologist conducting the initial assessment will not be aware to which group each participant will be allocated. Speech pathologists administering follow-up assessments and performing ratings of recorded conversation samples will also be blinded to group allocation. It will not be possible to blind the speech pathologists conducting the therapy or the participants.

Treatment Fidelity

Steps that will be taken to ensure treatment fidelity are:

- use of a treatment manual (Justice & Snell, 2007)
- collection of data on participants' attendance rates. Participants will need to attend at least 80% of sessions to be considered to have completed the program.
- collection of data on participants' completion of home-based tasks. This information will be used to describe the frequency at which participants completed tasks designed to promote generalisation of skills from therapy sessions. Homework completion from the previous week will be reviewed in each individual session (except in the first session). Degree of 'Home Practice Completion' is categorised into three categories: (1) 'Fully Complete' — home practice completed according to instructions and for the length of time requested for each task; (2) 'Partially Complete' — some tasks completed but the time spent on these is substantially less than the time set for the conversation and/or the participants hold a general conversation without targeting the practice to specific goals/ target behaviour; and (3) 'Not Completed' — no tape-recorded

conversations or set tasks were completed. At completion of the training, an overall, single rating representing degree of Homework completion (*Complete, Partial* or *Not Complete*) will be generated based on the weekly home practice data.

Communication and Neuropsychological Assessment

Participants will complete a battery of assessments to obtain a baseline measure of their communication and cognitive skills and contribute to the participant description. This battery will include:

- *Scales of Cognitive Ability for Traumatic Brain Injury* (SCATBI; Adamovich & Henderson, 1992): A measure of cognitive and linguistic skills, involving five subtests assessing areas of underlying impairment (Perception/Discrimination, Orientation, Organisation, Recall, and Reasoning).
- *Functional Assessment of Verbal Reasoning and Executive Strategies* (FAVRES; MacDonald, 2005): A measure of cognitive-communication difficulties assessing the ability to participate in functional communication contexts, involving four complex verbal reasoning tasks that simulate everyday situations and require processing of text and discourse.
- *Wechsler Adult Intelligence Scale® — Third Edition* (WAIS III; Wechsler, 1997a): Provides measures of premorbid ability, verbal reasoning, working memory and information processing speed.
- *Wechsler Memory Scale® — Third Edition* (WMS III; Wechsler, 1997b): A measure of ability for new learning.
- *Wisconsin Card Sorting Test®* (WCST; Heaton, Chelune, Talley, Kay, & Curtiss, 1993): A measure of executive functioning and reasoning
- *Controlled Oral Word Association Test* (CFL; Benton, Hamsher, & Sivan, 1994): A measure of executive functioning, flexibility and inhibition.
- *The Trail Making Test A and B* (TMT A and B; Reitan, 1958): A measure of attention focussing and shifting, and cognitive flexibility.
- *Rey Figure* (Meyers & Meyers, 1995): A measure of planning and nonverbal memory.

Background of Social Skills Interventions

Communication disorders after TBI are broad, reflecting more general disorders in behaviour and cognition. For this reason, a broad based approach to their remediation is appropriate using principles of communication skills training to address both verbal and nonverbal behaviour. The most researched approach, social skills training, has traditionally emphasised behavioural rather than cognitive mechanisms for achieving change that is a useful strategy for people with TBI given the cognitive limitations usually experienced by these individuals (e.g., Flanagan et al., 1995; Prigatano & Fordyce, 1985). The communication skills program to be evaluated here will use a modification of this behavioural approach including role-plays, cues to assist self-monitoring and positive reinforcement to motivate clients to attempt tasks and to aid confidence (Helffenstein & Wechsler, 1982). These approaches have proven efficacy for increasing the likelihood of TBI trainees performing positive behaviours (e.g., active listening, engaging in questions which promote conversational interaction), as well as in eliminating or significantly reducing the frequency of negative behaviours, such as interrupting, swearing and making inappropriate sexual remarks (Gajar, Schloss, Schloss, & Thompson, 1984). In addition to traditional approaches, the treatment will be augmented to include concepts based on sociolinguistic theories of communication (Eggs & Slade, 1997) and principles of Vygotskian learning theory (Ylvisaker, Jacobs, & Feeney, 2003). In order to maximise relevance and generalisability (Godfrey & Shum, 2000; Ylvisaker et al., 2003) the focus will be on everyday discourse, such as chat which is a frequently occurring communicative activity for people with TBI.

We will use a combination of individual and group sessions for communication skills training because this approach has particular therapeutic as well as economic benefits. Group members benefit from observing the performance of others on remediation tasks (i.e., vicarious learning), particularly when targeted problems are similar or address the same underlying principle. Group participation is often more enjoyable for participants than one-on-one work with a therapist, and peer pressure and feedback may in some instances be viewed by the recipient as more 'valid' than the same input from a therapist. Group sessions will be augmented by the assignment of homework tasks, which will increase the quantity of treat-

ment without involving additional cost, and assist in the generalisation of treatment effects.

Although this is a structured program, there will be flexibility to address individual needs. Specific problem behaviours for each participant will be identified, based on ratings of the pre-therapy assessments. The therapy program will be customised to target the problem behaviours specific to each participant. In individual sessions, specific problem behaviours can be addressed as required. There may be a need to consider aspects of participants' mood and self-esteem during these sessions, but participants with any serious psychological issues will be referred to clinical psychology to address these issues.

Participants in both the TBI SOLO and JOINT groups will receive training based upon behavioural techniques adapted for TBI (Tate, 1987) and previously validated social skills resources (Flanagan et al., 1995). The program will be further augmented for the present study to include formal, structured role-plays and informal social conversation situations with the purpose of teaching the person with TBI to differentiate between situations, and communicate according to the expected structure. For example, formal discourse types, such as shopping encounter talk will be contrasted with informal discourse, such as story-telling (narrative structure) and casual conversation. These discourse types have been previously well described (Eggs & Slade, 1997) with clear characteristics for training purposes.

Additionally, the JOINT group will provide education and training to the communication partner to improve their ability to interact with the person with TBI successfully. Based on previous work (Togher, Hand, & Code, 1997b; Togher, McDonald, Code, & Grant, 2004; Ylvisaker, Feeney, & Urbanczyk, 1993; Ylvisaker et al., 1998) we have identified common communication problems observed in the interaction between staff, families and others in the community and people with TBI that can be targeted for training. These include: (a) over-compensating by speaking too slowly or in other ways infantilising the individual, (b) not giving injured individuals an opportunity to communicate, (c) failing to provide natural consequences for communication successes or failures, (d) asking injured individuals questions that they already know the answer to, (e) repeatedly checking on accuracy, and (f) failing to follow up information given by the person with TBI. These behaviours actually impede communication performance and undermine relationships.

Our training program developed for caregivers (Togher & Grant, 2001) and refined for police officers (Togher & Hand, 1998; Togher et al., 2004) will form the basis for this intervention. The training manual includes small group activities and role-plays to focus on the provision of appropriate feedback and support, and the structure of everyday interactions. Significant others will receive training in how to encourage people with TBI to communicate effectively. Specifically, training will use the elaborative and collaborative strategies suggested by Ylvisaker (1998). These are scaffolding procedures specifically designed to facilitate communication, cognitive and social recovery in people with TBI.

The TBI SOLO group is intended to parallel the key concepts of the JOINT group, but without a communication partner present, in order that the key contrasting feature between the groups will be the presence or absence of the support of the communication partner. Whereas the JOINT group will be focused on training communication partners to support people with TBI to participate effectively in the structure of everyday interactions, the TBI SOLO group will focus on training people with TBI directly to participate effectively in these interactions. For example, communication partners in the JOINT group receive training in elaboration techniques designed to assist their partner with TBI to extend the amount of information provided in conversations. The TBI SOLO group has a parallel session involving training in behaviours that assist in extending conversation.

For both groups, initial sessions will introduce concepts related to communication, and the impact of brain injury on communication. Strategies that promote more successful communication will then be introduced in the middle sessions. In the final sessions, group participants will further refine their use of communication strategies and plan for ongoing practice. Some examples of possible goals of individual participants are, 'For (person with TBI) to increase the number of questions used in conversations', or 'For (person with TBI) to reduce the length of turn in conversations'. In the JOINT group, participants with TBI and their communication partners will have parallel goals. For example, the goal of the participant with TBI may be, 'For (person with TBI) to initiate new topics in conversations', while the goal of the communication partner may be, 'For (communication partner) to allow (person with TBI) to take more turns in the conversation'. See Appendix A for a summary of the topics that will be covered in each group session for the TBI SOLO and the JOINT group.

Intervention Procedure

Each participant in the TBI SOLO and JOINT groups will receive approximately 3.5 hours of treatment/week for 10 weeks. This will include a weekly group session of 2.5 hours duration (with a 15-minute break), and a weekly individual session of 45–60 minutes duration. Group size will be limited to six participants in the TBI SOLO group, and 12 participants in the JOINT group (six people with TBI and six communication partners). A uniform manualised approach will be used to structure the group program. Group sessions will typically include review of home-based tasks using tape-recorded samples of interactions taken throughout the previous week, introduction of new information and strategies, role plays and examples, practice of strategies and feedback on use of techniques. A protocol will also be followed for individual sessions, including individualised goal setting, feedback on home-based tasks, problem-solving of issues raised by the participants, and practice and troubleshooting relating to any new strategies introduced in the group session.

Primary Questions

- Is any combination of treatment (TBI SOLO vs. JOINT) more efficacious than no training (CONTROL) alone?
- Is the combined training for both the person with TBI and the 'significant other' (JOINT) more effective than the individual treatment (TBI SOLO)?

Secondary Question

- Will the combined treatment approach (JOINT) lead to earlier gains in communicative behaviour (greater cost-effectiveness) than the TBI alone (SOLO) condition?

Hypotheses

1. Communication skills training for people with TBI alone (TBI SOLO) will improve communication skills and communication participation. It will have little effect on their communication partner's behaviour.
2. A combined approach (JOINT condition) will improve the 'significant other's' communicative behaviour towards the person with TBI and lead to the most improvement of social skills and communication participation of the

person with TBI relative to the single (TBI SOLO) approach (above).

3. Any combination of treatment will be more efficacious than no treatment (CONTROL) social activity alone.
4. The combined treatment approach (JOINT) will lead to earlier gains in communicative behaviour (greater cost-effectiveness) than seen in the TBI training program in isolation (TBI SOLO).

Outcome Measures (Quantitative)

As outlined in Figure 1, data on outcome measures will be collected at the initial assessment, at one to three weeks after the group intervention is complete and at six months after the intervention is complete. Three discourse samples will be collected on each occasion: (1) casual conversation, in which the participants will be asked to have a chat about any topic for a few minutes, (2) purposeful conversation, in which the participants will be asked to generate a list of situations they are expecting to face over the next few weeks in which communication will be important to them and (3) a problem solving discourse task where participants will be asked to determine the use and name of an unfamiliar object (Kilov, Togher, & Grant, in press).

Primary Outcome Measures

1. Measure of Participation in Conversation (MPC; Kagan et al., 2001; Kagan et al., 2004). The primary measure will evaluate the person with TBI's level of participation in conversation in terms of his/her ability to interact or socially connect with a partner and to respond to and/or initiate specific content before and after therapy (Kagan et al., 2004). Two trained raters who will be blind to group allocation will score a 5-minute videotape of social interactions between the person with TBI and their significant other on a 9-point Likert scale, presented as a range of 0 to 4 with 0.5 levels for ease of scoring. The scale ranges from 0 (*no participation*) through 2 (*adequate participation*) to 4 (*full participation in conversation*). Psychometric data have been reported (Kagan et al., 2004) attesting to the robust nature of this measure. Interrater reliability was estimated using intraclass correlations. This is a conservative statistical procedure that takes into account both agreement and association (Kagan et al., 2004). Using this approach, interrater reliability on the MPC and Measure of Support in

Conversation (MSC) measures ranged between .91 and .96 ($p < .001$). Construct validity was measured by correlating informal clinical judgments by speech pathologists of communicative proficiency with MPC and MSC ratings on ten individuals with brain injury. There was a significant positive correlation between informal clinical judgment and scores on all categories of the measures for both raters (rater 1: rho ranged from between .87–.95, $p < .01$ –.001; rater 2: rho ranged from between .83 to .88, $p < .001$ –.003).

2. The La Trobe Communication Questionnaire (LCQ; Douglas, O'Flaherty, & Snow, 2000). Perceived communicative ability will be measured from the point of view of both the person with TBI (Form S, self report) and their carer (Form O, nominated close other) via the average score on the LCQ (Douglas et al., 2000). The LCQ is 30-item questionnaire which is commonly used in TBI clinical and research outcomes practice and will provide a subjective primary outcome measure in addition to the objective measure above. Recent research on the reliability and validity of the LCQ (Douglas, Bracy, & Snow, 2007) has demonstrated high test–retest stability for both Self and Other ratings (Form S, Self-Report $r = 0.81$, Form O, Close Other $r = 0.87$). In terms of construct validity, the LCQ has high internal consistency for both Self and Close Other forms (Cronbach alpha: TBI Self: 0.91, and Close Other 0.92). Additionally, the underlying factor structure of the LCQ was examined in a normative sample using self-ratings ($n = 147$; Douglas et al., 2000). Principal Component Factor analysis extracted six components, Conversational Tone, Effectiveness, Flow, Engagement, Partner/Sensitivity, and Conversational Focus. These components accounted for 48.9% of the variance and reflect both the complex interaction of cognitive and communication processes and the multi-dimensional nature of conversation.

Secondary Outcome Measures

1. Discourse measures. In order to provide a detailed analysis of the structure and flow of a spontaneous conversation, recent innovations in discourse analyses will be used to analyse a problem solving activity with the significant other (Kilov et al., in press). The participants will be asked to determine the use of an unfamiliar object. Their interaction will be measured using *exchange structure analysis* to examine how information exchange occurs (Togher et al., 1997a) and *generic structure potential analysis*, which examines the structural elements of the text (Togher,

2004). In contrast to basic language assessment, discourse analyses, focusing upon the way in which conversation is managed, have proven sensitive to communication dysfunction after TBI. Exchange structure analysis (ESA) based upon systemic functional linguistics (Halliday, 1994) examines the way information is exchanged. It provides measures of who has the power in interactions (who is giving information) and how misunderstandings are negotiated. Generic structure analysis (GSA) examines the overall structure of interactions. The analysis is expressed as the percentage of moves making up chunks of discourse, such as the parts of a shopping encounter or conversation (Ventola, 1979). Communication is marked according to whether structural elements are INCOMPLETE, INAPPROPRIATE, UNRELATED and REPEATED. These measures have been used extensively in previous research with TBI (Togher, Hand, & Code, 1996; Togher et al., 1997a; Togher et al., 2004) with proven reliability and validity (Togher et al., 1997a, 1997b). Again, this analysis will be conducted on videotape samples by the researchers.

2. Social skills measures. To examine broader aspects of social skills including, but not limited to the linguistic components of a conversational exchange we will use assessment measures taken from the social skills literature. Specifically these will include:

- *Global Ratings of Quality of Conversations* (Bond & Godfrey, 1997) based on the two videoed interactions (i.e., casual conversation and purposeful conversation). Two trained, blind raters will rate how Appropriate, Effortful, Interesting and Rewarding each conversation was on a 9 point scale from 0–4. Bond and Godfrey (1997) used intra-class correlation coefficients and established high interrater reliability with four raters on the four global ratings scales ($r = 0.89$ to $r = 0.92$). An additional scale, Task Completion, will be added to the original measures outlined by Bond and Godfrey (1997) to determine how well the participants achieve the specified goal of the conversation.
- Social perception ability before and after training will be measured by *The Awareness of Social Inference Test* (McDonald, Flanagan, & Rollins, 2002). This test requires TBI participants to interpret the emotion of speakers engaged in everyday conversations (as depicted on videotape) as well as the meaning and intentions behind their specific comments, some of which are not literally true

(i.e., lies or sarcastic comments). It is a standardised, valid and reliable formal assessment commonly used in TBI. Test–retest reliability of TASIT ranges from 0.74 to 0.88. Alternate forms reliability ranges from 0.62–0.83. TASIT has convergent and divergent validity, that is, it correlates with socially relevant standard learning tasks (WMS III Logical Memory and Face Recognition) but not with nonsocial learning tasks (i.e., WMS III Verbal Paired Associates, Rey Figure recall). Subtests also correlate with standard face perception, emotion matching and theory of mind tasks. TASIT also has concurrent validity as performance on TASIT correlates with real world social competence as assessed in vivo in people with severe TBI (McDonald et al., 2006).

- Global ratings of the contributions made by the communication partners via the *Measure of Skill in Supported Conversation* based on the video-taped interactions of people with TBI (Kagan et al., 2001; Kagan et al., 2004). Two trained, blind raters will rate degree of support provided by the communication partner on a 9-point scale from 0–4 pre and post-training. Reliability and validity measures are presented above with the primary outcome measure (MPC).

3. Social participation. Participants' social functioning and activity level (including employment activity) will be assessed pre- and post-training via structured interview with the communication partner using the *Sydney Psychosocial Reintegration Scale* (SPRS; Tate et al., 1999). There are two forms of the SPRS. A standard version of the SPRS (Form A) measures 'change since the injury' for the person with brain injury in three domains; occupational activities (work, recreation), interpersonal relationships and independent activities of daily living. A complementary version (Form B), containing the same set of 12 items, measures 'current competency' (Tate, Pfaff, Veerabangsa, & Hodgkinson, 2004). Form B will be used in the present study to track current functioning in these three domains at pre, post and follow-up assessments. The SPRS has been developed for people with TBI and the psychometric properties of Form B have recently been examined in 66 people with brain injury (Tate et al., 2004). The SPRS has high internal consistency ($\alpha = .93$), stability (1 week, intraclass correlation coefficient [ICC] = .90), and interrater agreement (ICC = .84). Good concurrent validity has been established with the London Handicap Scale (ICC

= -0.71) and comparability between forms A and B was excellent (ICC = .97).

4. Confidence and self-esteem. Decreased social communicative confidence and self-esteem can be a devastating consequence of social communication disability, and the participant's confidence and self-esteem will be examined with two self-esteem measures prior to and after training to measure effects of training on feelings of self-worth and confidence. The Rosenberg Self Esteem Scale (RSES) (Rosenberg, 1965) is a simple 10-question measure of global self worth/esteem. Participants are provided with 10 statements dealing with general feelings about themselves and required to answer the degree to which they agree or disagree on a 4-point scale — from *strongly agree* to *strongly disagree*. Psychometric studies into the RSES have occurred in both adolescents and young adults and indicate that the RSES is stable ($r = 0.85$), (Demo, 1985) with good internal consistency ($\alpha = 0.80$; Shahani, Dipboye, & Phillips, 1990). Although considered a unidimensional measure, in adults, factor analysis has identified that the RSES may measure two correlated dimensions of self-esteem, self-derogation and self-enhancement (Shahani et al., 1990). The Coopersmith Self-Esteem Inventory (CSEI; Coopersmith, 1987) assesses attitude toward oneself in general, and in more specific contexts. Participants state whether a set of 25 generally favourable or unfavourable aspects of a person are 'like me' or 'not like me'. The psychometric properties of the CSEI have been established largely in young adults (college students) and indicate that it is stable ($r = 0.80$ to 0.82) and demonstrates concurrent validity with the Rosenberg Self-Esteem Scale ($r_s = 0.59$ to 0.60) (Blascovich & Tomaka, 1991).

5. Caregiver satisfaction. The Modified Care Burden Scale (CBS; Machamer et al., 2002) will be administered to communication partners to evaluate the consequences of supporting the person with TBI and communication difficulties and any change in the feeling of burden after training. It is 30-item scale that includes questions on the negative aspects of caring (22 items) from the Caregiver Burden Interview (Zarit, Reever, & Bachpeterson, 1980), as well as 8 items on the positive aspects of caring (Teri, Logsdon, Uomoto, & McCurry, 1997). Although the modified scale has been used in research with people with TBI (Machamer et al., 2002), psychometric studies have largely been conducted with stroke and dementia populations for the Caregiver Burden Interview (CBI) portion. The CBI has good reliability (internal consis-

teny: $\alpha = 0.87$ – 0.93 , stability: $r = 0.71$ – 0.76) and convergent validity (significant correlations with caregiver psychological wellbeing, 0.52 – 0.80) (Visser-Meily, Post, Riphagen, & Lindeman, 2004).

6. Cost-effectiveness analysis. In addition to pre-assessment, post-assessment and follow-up assessment, participants in the TBI SOLO and JOINT groups will be recorded in a 5-minute conversation with their significant other pre-injury, in weeks 4 and 7 of training, and at the post-training and 6-month follow-up assessments. At the completion of treatment, data will be analysed to identify the time where a clinically significant change occurred. Our hypothesis is that this will occur first with those TBI participants whose communicative partners are also undergoing training. Training conditions will be compared to evaluate the most cost-effective treatment as indicated by the group that made a 0.5 change in the shortest amount of time.

Statistical Methods

Data will be analysed using the software package SPSS (version 17) (SPSS Inc., 2008). Initial analyses will involve repeated measures mixed analyses of variance (ANOVAs) on the 2 sets of contrasts, using Kagan et al.'s (2001) conversational rating scale and LCQ (primary outcome measures) and the secondary measures, including the discourse measures, social skills measures (e.g., rewardingness (Bond & Godfrey, 1997), TASIT scores, social participation and carer satisfaction measures. Significant changes in these scores will indicate effectiveness of treatment for improving conversational competence, basic social skills, general levels of social functioning and carer satisfaction. Repeated measure mixed ANOVAs comparing postassessment and 6-month follow-up scores will provide information concerning the durability of training effects. Finally, a preliminary examination of cost effectiveness of the different treatments will be evaluated by comparing the time taken for participants in each treatment condition to demonstrate an average of 0.5 improvement on the MPC scale (Kagan et al., 2001).

Our design has sufficient power to detect differences even with participant attrition, estimated to be 10%. The primary endpoint with respect to efficacy of training will be the proportion of people with TBI achieving a shift of 0.5 as measured on the MPC scale. Kagan et al. (2001) report this to be a clinically significant change. Intention to treat analyses will also be used to deal with noncompliance and attrition (Hollis & Campbell, 1999).

Qualitative Outcome Measures

Qualitative feedback data will be collected to examine and understand the perceptions, thoughts and feelings of participants with TBI and their communication partners in relation to their experience of the communication skills training program. This will provide social validation data to compliment quantitative data. Specifically qualitative data will be collected to seek: (a) an understanding of the treatment participant's experience of the social communication skills training program, (b) information on consumer satisfaction with the program and their outcomes, (c) consumer information on potential strengths and changes to the program, and (d) social validation data to compliment quantitative findings. Traditionally, the inclusion of qualitative data from participants in the study would be considered to be subjective, to contain bias and not to be included as part of the evidence for the intervention. However, Kovarsky and Curran (2007) consider that, '... because communication is a complex social phenomenon, proof of intervention efficacy (including the social magnitude of an effect) requires triangulation of observable, material behavior with more phenomenally grounded accounts of clients experiences with assessment and intervention activities' (2007, p. 59).

Creswell (2003) outlines 4 forms of qualitative data: observations, interviews, documents and audio and visual material. Qualitative data collected in this study includes all four methods outlined by Creswell (2003) including;

1. Field notes compiled from each group and individual sessions:
 - (a) Observations of behaviours and comments made by participants WITHIN group and individual sessions;
 - (b) Feedback from participants on weekly home practice and achievements/issues within that week (may have been verbally related or written on book/sheets/journal);
 - (c) Feedback from participants on comments made to them by others in relation to communication;
 - (d) Research clinician and participant listening and discussion of taped conversations from outside the clinic;
 - (e) Discussion of progress with goals with participants;
 - (f) Agreed to Achievement Summary compiled at the end of the 10-week program;

- (g) Research clinician's journal on observations.
2. Brief qualitative structured videotaped interviews completed in the final individual session.

The researchers responsible for data collection in this study (EP and RR) are also the clinicians providing the treatment for participants. Consequently, the role of clinician and researcher with vested interest in perhaps positive outcomes of the treatment and social desirability for participants are acknowledged. While field data will be collected in each individual or group session where observed or offered by the participants, the major component of the qualitative data analysis will be the information provided by each participant from the interview in the final individual session. The interview will follow a protocol from suggestions by Creswell (2003) to provide a consistent format for data collection across the participants and clinicians. The protocol contains a heading, instructions to the interviewer including video set up, opening statements, key elements to address and probes and follow-up dialogue to explore material further and methods for checking back to ensure the validity of the data. TBI SOLO participants will be interviewed alone and the JOINT participants will be interviewed together but given the opportunity to speak individually if they wish.

Analysis of qualitative data will follow a 6-step generic analysis procedure outlined by Creswell (2003, pp. 191–195) with specific use of a constant comparative analysis technique to develop themes based on Glaser and Strauss (1967). Each videotaped interview will be transcribed verbatim and matched with its corresponding field notes. Transcriptions and field notes will be read through to familiarize the researcher with the data and develop initial general themes. Constant comparative analysis (Glaser & Strauss, 1967) will be used within and across transcripts used to identify conceptually discrete units within the structure of the interview protocol. A more detailed coding of the themes will then be developed. Finally, themes will be described using participants' quotes in order to answer the question: 'What were the lessons learned?' from the participant experience with the training program (Creswell, 2003).

Discussion

There is an urgent need for effective interventions for social communication skills for people with

TBI. Impairments in social communication have significant and ongoing consequences for people with TBI and their families, including less rewarding interactions, loss of pre-injury relationships, inability to perform pre-injury social roles and burden on caregivers.

Initially, it was planned that this study would be a randomised controlled trial (RCT), however, in the process of participant recruitment; it became clear that there would not be sufficient participants with communication partners to allow for the randomisation process to occur. Therefore, it was decided to proceed with a non-randomised controlled trial, where participants were allocated to groups according to whether they had a communication partner who could be involved in the study. It is possible that this will result in differences between groups at baseline, such as differences in the severity of communication disorder between groups. This will be dealt with by conducting between group comparisons at baseline, and, in the case of significant differences being present an analysis of covariance will be completed.

As this is now a non-RCT, there are implications for scoring this methodology using the PEDro scale (Maher, Sherrington, Herbert, Moseley, & Elkins, 2003), as it can now only score a maximum of 8 out of 10 (compared to a possible 10 out of 10 with an RCT). Nonetheless, this remains the most robust design available given the numbers of potential TBI participants available, even in a large metropolitan city in Australia. The particular research design features which we can control include attention to description of the participants, statistically comparing the groups at baseline, completing blind assessment of at least one primary outcome measure, encouraging participant retention in the study, using intention to treat analysis, using between group statistical comparisons and providing measures of variability. Planning these design features prior to the study's commencement ensures that the methodology complies with the PEDro scale and therefore provides the highest level of evidence possible given difficulties with recruitment.

The trial is currently in progress and data collection for the three waves has recently been completed. A total of 106 participants who met the study criteria were referred to the researchers by local speech pathologists. Forty-eight of these participants agreed to take part in the study. Four participants did not complete the screening testing. The remaining 44 participants completed the pre-training screening and assessment and were allocated to groups based on communication

partner availability (CONTROL: $n = 14$, TBI SOLO: $n = 15$, JOINT: $n = 15$). Of the 44 participants allocated to groups, 93.18% (41/44) completed the post-training assessment and 87.50% (38/44) completed the six month follow-up assessment. The study has been able to recruit 44 of the proposed 46 participants and also maintain high retention rates for both post training and follow-up assessments.

Currently, quantitative assessment and questionnaire data is being entered into a SPSS database and trained raters are rating the videotaped conversation samples on the Measure of Participation in Conversation and Measure of Support in Conversation. Qualitative data has been collated and transcribed. The videotape rating will be complete in August 2009 and quantitative and qualitative data analysis will be complete by December 2009.

This study will represent an important step forward in research into interventions for social communication impairment following TBI. It is the first study with a control group to examine treatment efficacy of training familiar communication partners of people with a TBI. It is also the first study that will compare training of people with TBI to training of their communication partners. This will provide important information for speech pathologists to use in guiding their decisions about which treatment approach to choose when targeting social communication skills.

The interventions used in this trial are based on a foundation of studies demonstrating the effectiveness of social skills training programs (e.g., Dahlberg et al., 2007) and the potential for interventions targeted at training communication partners (e.g., Togher et al., 2004). The theoretical basis of the interventions is drawn from well-established observations of the behaviour of communication partners in conversations with people with TBI (Togher et al., 1997a; Ylvisaker et al., 1998), and known features of different types of discourse (Eggs & Slade, 1997). This background provides strong evidence for the potential efficacy of these interventions.

The outcome measures will provide comprehensive information about the impact of the treatment on a range of domains. Data will be collected on actual performance in conversations, blind assessor ratings of conversational attributes, self perception ratings of communication skill by people with TBI and their communication partner, ratings of participation, confidence and self-esteem, caregiver satisfaction and comparisons of cost-effectiveness.

Acknowledgment

This study was supported by a National Health and Medical Research Council (NH&MRC) project grant.

References

- Adamovich, B., & Henderson, J. (1992). *Scales of Cognitive Ability for Traumatic Brain Injury (SCATBI)*. Texas: Pro-ed.
- Bellon, M.L., & Rees, R.J. (2006). The effect of context on communication: a study of the language and communication skills of adults with acquired brain injury. *Brain Injury, 20*(10), 1069–1078.
- Benton, A.L., Hamsher, K., & Sivan, A.B. (1994). *Multilingual Aphasia Examination*. Iowa City, IA: AJA Associates.
- Blascovich, J., & Tomaka, J. (1991). Measures of self-esteem. In J.P. Robinson, P.R. Shaver, L.S. Wrightsman & F.M. Andrews (Eds.), *Measures of personality and social psychological attitudes* (pp. 115–160). San Diego: Academic Press.
- Bond, F., & Godfrey, H.P.D. (1997). Conversation with traumatically brain-injured individuals: A controlled study of behavioural changes and their impact. *Brain Injury, 11*(5), 319–329.
- Bruns, T.J., & Hauser, W.A. (2003). The epidemiology of traumatic brain injury: A review. *Epilepsia, 44*, 2–10.
- Bute, J.J., Donovan-Kicken, E., & Martins, N. (2007). Effects of communication-debilitating illnesses and injuries on close relationships: A relational maintenance perspective. *Health Communication, 21*(3), 235–246.
- Cannizzaro, M.S., & Coelho, C.A. (2002). Treatment of story grammar following traumatic brain injury: A pilot study. *Brain Injury, 16*(12), 1065–1073.
- Carney, N., Chesnut, R., Maynard, H., Mann, N., Patterson, P., & Helfand, M. (1999). Effect of cognitive rehabilitation on outcomes for persons with traumatic brain injury: A systematic review. *Journal of Head Trauma Rehabilitation, 14*(3), 277–307.
- Coopersmith, S. (1987). *Self-esteem inventories*. Palo Alto, CA: Consulting Psychologists Press.
- Cramon, D., & Cramon, G.M.-v. (1992). Reflections on the treatment of brain injured patients suffering from problem-solving disorders. *Neuropsychological Rehabilitation, 2*, 207–230.
- Creswell, J.W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, Calif.: Sage Publications.
- Dahlberg, C.A., Cusick, C.P., Hawley, L.A., Newman, J.K., Morey, C.E., Harrison-Felix, C.L., et al. (2007). Treatment efficacy of social communication skills training after traumatic brain injury: A randomized treatment and deferred treatment controlled trial. *Archives of Physical Medicine and Rehabilitation, 88*(12), 1561–1573.
- Demo, D.H. (1985). The measurement of self-esteem — Refining our methods. *Journal of Personality and Social Psychology, 48*(6), 1490–1502.
- Douglas, J.M., Bracy, C.A., & Snow, P.C. (2007). Exploring the factor structure of the La Trobe communication questionnaire: Insights into the nature of communication deficits following traumatic brain injury. *Aphasiology, 21*(12), 1181–1194.
- Douglas, J.M., O’Flaherty, C.A., & Snow, P.C. (2000). Measuring perception of communicative ability: The development and evaluation of the La Trobe communication questionnaire. *Aphasiology, 14*(3), 251–268.
- Eggs, S., & Slade, D. (1997). *Analysing Casual Conversation*. London: Cassell.
- Elsass, L., & Kinsella, G. (1987). Social interaction after severe closed head injury. *Psychological Medicine, 17*, 67–78.
- Flanagan, S., McDonald, S., & Togher, L. (1995). Evaluating social skills following traumatic brain injury: The BRISS as a clinical tool. *Brain Injury, 9*(4), 321–338.
- Gajar, A., Schloss, P., Schloss, C., & Thompson, C. (1984). Effects of feedback and self-monitoring on head trauma youth’s conversation skills. *Journal of Applied Behavior Analysis, 17*, 353–358.
- Galski, T., Tompkins, C., & Johnston, M.V. (1998). Competence in discourse as a measure of social integration and quality of life in persons with traumatic brain injury. *Brain Injury, 12*(9), 769–782.
- Glaser, B.G., & Strauss, A.L. (1967). *The discovery of grounded theory; strategies for qualitative research*. Chicago: Aldine Pub. Co.
- Godfrey, H., & Shum, D. (2000). Executive functioning and the application of social skills following traumatic brain injury. *Aphasiology, 14*(4), 433–444.
- Godlee, F. (2001). Publishing study protocols: making them visible will improve registration, reporting and recruitment. *BMC News and Views, 2*(1), 4.
- Halliday, M.A.K. (1994). *An introduction to functional grammar* (2nd ed.). London: Edward Arnold.
- Heaton, R.K., Chelune, G.J., Talley, J.L., Kay, G.G., & Curtiss, G. (1993). *Wisconsin Card Sorting Test*. Philadelphia: Psychological Assessment Resources.
- Helffenstein, D.A., & Wechsler, F.S. (1982). The use of Interpersonal Process Recall (IPR) in the remediation of interpersonal and communication skill deficits in the newly brain-injured. *Clinical Neuropsychology, 4*, 139–143.
- Holland, D., & Shigaki, C. (1998). Educating families and caretakers of traumatically brain injured patients in the new health care environment: A three-phase model and bibliography. *Brain Injury, 12*(12), 993–1009.
- Hollis, S., & Campbell, F. (1999). What is meant by intention to treat analysis? Survey of published randomised controlled trials. *British Medical Journal, 319*(7211), 670–674.
- Justice, L.M., & Snell, M.E. (2007). Illustration of a three-step process for identifying the level and qual-

- ity of empirical support for manualized treatments. *Evidence-Based Communication Assessment and Intervention*, 1(1), 37–47.
- Kagan, A., Black, S.E., Duchan, J.F., Simmons-Mackie, N., & Square, P. (2001). Training volunteers as conversational partners using 'Supported Conversation with Adults with Aphasia' (SCA): A controlled trial. *Journal of Speech, Language and Hearing Research*, 44, 624–638.
- Kagan, A., Winckel, J., Black, S., Duchan, J.F., Simmons-Mackie, N., & Square, P. (2004). A set of observational measures for rating support and participation in conversation between adults with aphasia and their conversation partners. *Topics in Stroke Rehabilitation*, 11(1), 67–83.
- Kilov, A., Togher, L., & Grant, S. (in press). Problem solving with friends: Discourse participation and performance of individuals with and without traumatic brain injury. *Aphasiology*.
- Kovarsky, D., & Curran, M. (2007). A missing voice in the discourse of evidence-based practice. *Topics in Language Disorders*, 27(1), 50–61.
- Legg, C., Young, L., & Bryer, A. (2005). Training sixth-year medical students in obtaining case-history information from adults with aphasia. *Aphasiology*, 19(6), 559–575.
- MAA. (1998). *Training needs of attendant carers*. Sydney, Australia: Motor Accidents Authority.
- MacDonald, S. (2005). *Functional assessment of verbal reasoning and executive strategies*. Ontario, Canada: CCD Publishing.
- Machamer, J., Temkin, N., & Dikmen, S. (2002). Significant other burden and factors related to it in traumatic brain injury. *Journal of Clinical and Experimental Neuropsychology*, 24(4), 420–433.
- Maher, C.G., Sherrington, C., Herbert, R.D., Moseley, A.M., & Elkins, M. (2003). Reliability of the PEDro scale for rating quality of randomized controlled trials. *Physical Therapy*, 83(8), 713–721.
- McDonald, S., Bornhofen, C., Shum, D., Long, E., Saunders, C., & Neulinger, K. (2006). Reliability and validity of 'The Awareness of Social Inference Test' (TASIT): A clinical test of social perception. *Disability and Rehabilitation*, 28, 1529–1542.
- McDonald, S., Flanagan, S., & Rollins, J. (2002). *The Awareness of Social Inference Test*. Edmonds, England: Thames Valley Test Company.
- McDonald, S., Tate, R., Togher, L., Bornhofen, C., Long, E., Gertler, P., et al. (2008). Social skills treatment for people with severe, chronic acquired brain injuries: A multicenter trial. *Archives of Physical Medicine and Rehabilitation*, 89(9), 1648–1659.
- Medd, J., & Tate, R. (2000). Evaluation of an anger management therapy programme following acquired brain injury: A preliminary study. *Neuropsychological rehabilitation*, 10(2), 185–201.
- Meyers, J., & Meyers, K. (1995). *Rey complex figure and recognition trial*. Odessa, FL: Psychological Assessment Resources.
- O'Flaherty, C.A., & Douglas, J.M. (1997). Living with cognitive-communicative difficulties following traumatic brain injury: Using a model of interpersonal communication to characterize the subjective experience. *Aphasiology*, 11 (9), 889–911.
- Prigatano, G., & Fordyce, D. (1985). Neuropsychological Rehabilitation Program. Presbyterian Hospital, Oklahoma City, Oklahoma. In B. Caplan & G. Bray (Eds.), *Handbook of contemporary rehabilitation psychology*. Springfield, IL: Charles Thomas Publishing Co.
- Reitan, R.M. (1958). Validity of the trail making test as an indication of brain damage. *Perceptual and Motor Skills*, 8, 271–276.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Shahani, C., Dipboye, R.L., & Phillips, A.P. (1990). Global self-esteem as a correlate of work-related attitudes: A question of dimensionality. *Journal of Personality Assessment*, 54(1–2), 276–288.
- Shelton, C., & Shryock, M. (2007). Effectiveness of communication/interaction strategies with patients who have neurological injuries in a rehabilitation setting. *Brain Injury*, 21(12), 1259–1266.
- Snow, P., Douglas, J., & Ponsford, J. (1995). Discourse assessment following traumatic brain injury: A pilot study examining some demographic and methodological issues. *Aphasiology*, 9(4), 365–380.
- Snow, P.C., Douglas, J.M., & Ponsford, J.L. (1999). Narrative discourse following severe traumatic brain injury: A longitudinal follow-up. *Aphasiology*, 13(7), 529–551.
- SPSS Inc. (2008). *SPSS Statistics Release 17.0.1*. Upper Saddle River, NJ: Prentice Hall.
- Tate, R. (1987). Behaviour management techniques for organic psychosocial deficit incurred by severe head injury. *Scandinavian Journal of Rehabilitation Medicine*, 19, 19–24.
- Tate, R., Hodgkinson, A., Veerabangsa, A., & Maggiotto, S. (1999). Measuring psychosocial recovery after traumatic brain injury: Psychometric properties of a new scale. *Journal of Head Trauma Rehabilitation*, 14(6), 543–557.
- Tate, R.L., Lulham, J.M., Broe, G.A., Strettlles, B., & Pfaff, A. (1989). Psychosocial outcome for the survivors of severe blunt head injury: The results from a consecutive series of 100 patients. *Journal of Neurology, Neurosurgery, and Psychiatry*, 52, 1128–1134.
- Tate, R.L., Pfaff, A., Veerabangsa, A., & Hodgkinson, A.E. (2004). Measuring psychosocial recovery after brain injury. *Archives of Physical Medicine and Rehabilitation*, 85, 538–545.
- Teri, L., Logsdon, R.G., Uomoto, J., & McCurry, S.M. (1997). Behavioral treatment of depression in dementia patients: A controlled clinical trial. *Journals of Gerontology Series B-Psychological Sciences and Social Sciences*, 52(4), P159–P166.
- Togher, L. (2000). Giving information: the importance of context on communicative opportunity for people

- with traumatic brain injury. *Aphasiology*, 14(4), 365–390.
- Togher, L. (2004). Assessing communication after traumatic brain injury (TBI): Discourse tasks are not all created equal. *Brain Impairment*, 5, 13.
- Togher, L., & Grant, S. (1998). Community policing: A training program for police in how to communicate with people with traumatic brain injury. Unpublished manuscript.
- Togher, L., & Grant, S. (2001). *Communication training program for carers*. Sydney, Australia: University of Sydney.
- Togher, L., & Hand, L. (1998). Use of politeness markers with different communication partners: An investigation of five subjects with traumatic brain injury. *Aphasiology*, 12 (7/8), 491–504.
- Togher, L., Hand, L., & Code, C. (1996). A new perspective in the relationship between communication impairment and disempowerment following head injury in information exchanges. *Disability and Rehabilitation*, 18 (11), 559–566.
- Togher, L., Hand, L., & Code, C. (1997a). Analysing discourse in the traumatic brain injury population: telephone interactions with different communication partners. *Brain Injury*, 11 (3), 169–189.
- Togher, L., Hand, L., & Code, C. (1997b). Measuring service encounters in the traumatic brain injury population. *Aphasiology*, 11 (4/5), 491–504.
- Togher, L., McDonald, S., Code, C., & Grant, S. (2004). Training communication partners of people with traumatic brain injury: A randomised controlled trial. *Aphasiology*, 18(4), 313–335.
- Turner, S., & Whitworth, A. (2006). Conversational partner training programmes in aphasia: A review of key themes and participants' roles. *Aphasiology*, 20(6), 483–510.
- Ventola, E. (1979). The structure of casual conversation in English. *Journal of Pragmatics*, 3, 267–298.
- Visser-Meily, J.M. A., Post, M.W., Riphagen, II, & Lindeman, E. (2004). Measures used to assess burden among caregivers of stroke patients: A review. *Clinical Rehabilitation*, 18(6), 601–623.
- Wechsler, D. (1997a). Wechsler Adult Intelligence Scale — Third Edition (WAIS-III). San Antonio, TX: The Psychological Corporation.
- Wechsler, D. (1997b). Wechsler Memory Scale — Third Edition (WMS-III). San Antonio, TX: The Psychological Corporation.
- Wedcliffe, T., & Ross, E. (2001). The psychological effects of traumatic brain injury on the quality of life of a group of spouses/partners. *South African Journal of Communication Disorders [die Suid-Afrikaanse Tydskrif vir Kommunikasieafwykings]*, 48, 77–99.
- WHO. (2001). *The International Classification of Functioning, Disability and Health — ICF*. Geneva: Switzerland: Author.
- Ylvisaker, M., Feeney, T.J., & Urbanczyk, B. (1993). Developing a positive communication culture for rehabilitation: Communication training for staff and family members. In C.J. Durgin, N.D. Schmidt & L.J. Fryer (Eds.), *Staff development and clinical intervention in brain injury rehabilitation* (pp. 57–81). Gaithersburg, MD: Aspen.
- Ylvisaker, M., Jacobs, H.E., & Feeney, T. (2003). Positive supports for people who experience behavioral and cognitive disability after brain injury: A review. *Journal of Head Trauma Rehabilitation*, 18(1), 7–32.
- Ylvisaker, M., Sellars, C., & Edelman, L. (1998). Rehabilitation after traumatic brain injury in preschoolers. In M. Ylvisaker (Ed.), *Traumatic brain injury rehabilitation. Children and adolescents* (pp. 303–329). Newton, MA: Butterworth-Heinemann.
- Zarit, S.H., Reever, K.E., & Bachpeterson, J. (1980). Relatives of the impaired elderly: Correlates of feelings of burden. *Gerontologist*, 20(6), 649–655.

APPENDIX A

Group Training Program

Session 1

Introductions.

Introductory session where the purpose of training, group guidelines and home practice expectations are established and members introduced to each other and clinicians.

Session 2

Brain Injury and Communication. An educational component on TBI and communication including how cognitive, physical and behavioural symptoms that may impact on communication using video case studies.

Session 3

Effective communication — 1. Explores the forms and purposes of communication, different contexts and communication structures used in each context, different roles in communication and how communication role affects outcomes of interactions.

Session 4

Effective communication — 2. Extends Session 3 and examines general communication facilitation strategies, and explores barriers and facilitators to good communication in everyday life.

Session 5

Collaboration (titled ‘Starting and Participating in Conversations’ for the TBI SOLO group). Focuses on techniques that help conversations to be a collaborative, more equal and organised process. For the JOINT group, it also helps communicative partners provide structure and support to the person with TBI for their conversations.

Session 6

Elaboration (titled ‘Extending Conversations’ for the TBI SOLO group). Focuses on the concept of keeping conversations going’ by exploring techniques that help to organise and link topics, with use of both questions and comments. For the JOINT group, this session assists communication partners to scaffold conversations for the person with TBI without taking over the conversation.

Session 7

Asking questions. Explores the use of appropriate and helpful questions to start and keep conversations going. For the communication partners in the JOINT group, this session also suggests how to avoid negative, or ‘testing’ questions and instead focus on a positive questioning style.

Sessions 8–10

Improving skill and confidence. Then revise the information and practise each technique learnt in previous sessions with actual conversations. Session 10 also celebrates group member’s achievements and outcomes with a group lunch.

Each group session contains session handouts, a mix of role plays, information content, conversational practice and each pair is encouraged to play recorded home practice tapes to discuss with the other group members. A morning tea break each week allows people to socialise with and get support from group members. Individual participant sessions follow the same protocol with a client-specific focus.