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Interactional problems, adaptation and code-switching in interactions involving Malay-English bilingual speakers with Traumatic Brain Injury: A conversation analysis study

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This PhD has journeyed with me over eight years through the different phases of my personal life. The journey started while I was a fairly young clinician who was keen for more challenges. Along the way, I got into a relationship, battled ill health in the family, got married, and in the last stages of the PhD found out about a little bundle of joy joining the family in the coming months. There is definitely a lot to be thankful for, in the process of completing this journey.

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ABSTRACT

Background:

This thesis is an exploration of talk-in-interaction involving Malay-English bilinguals who have suffered a traumatic brain injury (TBI) and their conversation partners. Current TBI studies focus on a monolingual population, which may omit the possible influence of bilingualism on spontaneous communication. TBI studied from a conversation analysis (CA) perspective is an emerging area compared to impairment or discourse based approaches. However, compared to other acquired neurogenic disorders such as aphasia and dementia, CA studies in TBI are lacking.

Aims:

The key aims are: 1) to understand the problems in conversations involving persons with TBI; 2) to understand how conversation partners adapt their practices of speaking in interactions involving persons with TBI; and 3) to understand the function of code-switching behaviour in persons with TBI.

Methods:

Conversation analytic methods enabled a systematic analysis of talk-in-interaction using naturalistic data. Three participants with TBI of differing severities (mild, moderate and severe) and their conversation partners contributed to 95 minutes of self-recorded audio interactional data. These included a combination of dyadic and multiparty interactions recorded in the home, clinic and outdoor settings. The interaction data were sampled at at least two time points (five months apart), with one participant (with severe TBI) contributing to data over four years. Two neurotypical dyads contributed to 20 minutes of data as a form of comparison when studying code-switching behaviour.

Results:

The data showed that there were interactional problems in conversations involving persons with TBI. These problems included atypical physical and verbal actions (e.g. touching, singing) and problems with understandability on the part of the person with TBI or their conversation partner. The data also revealed adaptive behaviour by conversation partners of persons with TBI within talk-in-interaction. These included displaying “teacher-like” behaviours (e.g. asking test questions) and the adoption of particular interactional roles within multi-party interactions (e.g. clarifying for the person with TBI or for the conversation partner). Lastly, code-switching functions in conversations involving persons with TBI and neurotypical dyads revealed similarities (e.g. using code-switching to emphasise a point), and differences (e.g. the use of code-switching as a scaffolding tool by the conversation partner). The conversations also revealed inappropriate code-switching i.e. using a language unfamiliar to the conversation partner.

Theoretical implications:

There are three key theoretical implications from this study. Firstly, findings from monolingual TBI literature were replicated. These include the presence of inappropriate touching and singing, self-initiation of repair resulting in delays in TCU progressivity, understandability problems resulting from agrammatism, and the use of test questions by

conversation partners. Secondly, this study details multi-party interaction in more depth than previous studies, demonstrating the collaborative behaviour of familiar and unfamiliar conversation partners in helping the bilingual with TBI navigate multi-party conversations. Lastly, using CA methodology in analyzing the interaction between TBI and neurotypical bilinguals allowed the establishment of examples of typical (e.g. to emphasize a point) and atypical (e.g. code-switching into a language not understood by the conversation partner) code-switching behaviour.

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DECLARATION

I, the author, confirm that the Thesis is my own work. I am aware of the University's Guidance on the Use of Unfair Means (www.sheffield.ac.uk/ssid/unfair-means). This work has not been previously been presented for an award at this, or any other, university.

1 INTRODUCTION

1.1 Introduction to the study

This thesis is an exploration of interactions between Malay-English bilingual speakers who have suffered a traumatic brain injury (TBI) and their conversation partners.

Traumatic brain injury is a condition where an insult to the brain from an external mechanical force leads to permanent or temporary impairment of cognitive, physical, and psychosocial functions, with an associated diminished or altered state of consciousness.

Traditionally it has been looked at from a range of perspectives including impairment approaches, discourse analytic approaches and more recently from a conversation analysis (CA) perspective. However, there has been relatively little CA work carried out in this area, especially when compared to CA research into other acquired neurogenic disorders such as aphasia and dementia. In addition, most of the CA research that has been done on TBI (as well as on aphasia and dementia) focuses on a monolingual population. Despite TBI affecting cognition, (and hence possibly affecting language selection and inhibition in bilinguals), little research has been done with participants who are bilingual in spontaneous communication.

This research uses conversation analysis, and this methodology impacts on how the data are collected, transcribed and analysed. The analysis focuses in particular on what types of problems people with TBI experience in conversation, how conversation partners may adapt their talk when in conversation with people with TBI, and the possible impacts of TBI on bilingual speakers. In the Discussion section, I focus on the main theoretical and clinical implications of these findings.

My interest in this topic stemmed from my academic and clinical experiences. As a psychology undergraduate, I was more interested in topics such as cognitive psychology, social cognition, language and cognition as well as psycholinguistics. This interest subsequently led me to pursuing my Masters in speech and language therapy, which equipped me with the knowledge of how to assess language and cognition in people. Learning rehabilitation methods to compensate and restore for these deficits was an added bonus. Clinical attachments gave me the first glimpse of how intertwined language and cognition are, and what happens to communication when people suffer neurological deficits such as stroke, TBI and dementia.

Upon graduation, I started work in an acute hospital in Singapore, where assessing and rehabilitating the communication and swallowing of people with stroke, TBI and dementia became my daily job. In the first three years of clinical practice, despite working hard to develop assessment tools for language and cognitive-communication in the local languages in Singapore (Malay and Mandarin especially), I found myself most dissatisfied with the assessment of clients with TBI.

I remember clearly the words of a nurse looking after my first client with TBI just before I approached him at his bedside – “Be careful! If you are not already tired and confused today, he will make sure to turn your brains inside out!” As a young nurse, she was wondering why someone who could formulate perfect sentences left her feeling confused and dissatisfied after leaving the conversation.

That is what was missing in our knowledge of assessing clients with TBI. Standardized assessment tools, even those that are normed to the local languages and culture, do not allow us to understand these clients holistically. Some clients have very good scores on assessments such as the Psycholinguistic Assessment of Language in People with Aphasia (PALPA; Kay, Coltheart & Lesser, 1992), Mt Wilga High Level Language Test (Mt Wilga; Simpson, 2006) and Scales of Cognitive Ability for Traumatic Brain Injury (SCATBI; Adamovich & Henderson, 1992) but their conversation partners especially close family and friends find it difficult to communicate with them.

Hence, I decided to pursue my PhD in the area of traumatic brain injury, particularly the conversations of bilinguals with TBI. I wanted to find out what were the barriers and facilitators to these persons with TBI having a successful conversation. As a bilingual, I was also interested in the topic of code-switching and wanted to find out if bilinguals with TBI code-switch differently from the neurotypical population.

In the next section of this introductory chapter, I shall briefly discuss Singapore and the context in which this study is set. The last part of this introductory chapter is a summary of the chapters to follow.

1.2 Context of the study

This study is based in Singapore, where I was born and educated and where I am now working. In this section, I will provide a glimpse of what Singapore is, highlighting key information that may be relevant to understanding the participants, their appropriateness of their actions, as well as the design of the study.

1.2.1 Demographics

Singapore, with a land size of 721.5 square kilometers has a population of 5.7 million people, giving a high population density of about 7866 persons for every square kilometer. Singapore has a high-rise landscape in order to accommodate the population on a small land area. Most residents live in tall buildings – public housing HDB dwellings (78.6%) and private condominiums/apartments (16.2%). Only 5% of the population live in landed property.

Out of the 5.7 million people, 3.5 million are citizens, 0.5 million permanent residents and another 1.7 million expatriates and foreign workers. This makes for an interesting cultural, linguistic and social mix for there is at least one foreigner to every two Singaporeans.

Singapore is an ageing population with a median age of 42 years. Life expectancy of residents is 85.4 years for females and 81 years for males.

There are three main ethnicities in Singapore: the Chinese, making up 74.4% of the total population, the Malays, 13.4% and Indians, 9%. The languages most frequently spoken at home are Mandarin (35.6%), English (32.3%), Chinese Dialects (23.8%), Malay (12.2%) and Tamil (3.2%). In terms of religion, there are 44.2% Buddhists/Taoists, 18.3% Chiristians, 14.9% Muslims and 5.1% Hindus. The numbers above reflect the cultural background of the Chinese majority of Singapore.

The bilingual policy is a unique feature of Singapore's education system. It requires students to study two languages: English and a Mother Tongue. Mandarin, Malay and Tamil are offered in all mainstream schools but other languages such as Hindi, French, Italian are available as either third language or in centre-based institutions.

1.2.2 Prevalence of TBI in Singapore

The top ten reasons for hospital admissions in 2018 were: accident, poisoning and violence (8.6%), cancer (5.8%), pneumonia (3.2%), ischemic heart disease (3.1%), intestinal infectious diseases (2.7%), other heart diseases (2.5%), infections of skin and subcutaneous tissue (2.3%), diabetes mellitus (2.1%), cerebrovascular diseases (2%) and acute respiratory infections (1.9%). The major causes of death are cancer (28.8%), heart and hypertensive diseases (23.2%), pneumonia (20.6%) and cerebrovascular disease (6%).

Trauma is the fifth most common cause of death in Singapore and TBI accounts for the majority of reason for major disability. Singapore has an ageing population and with that there may be an increase in the number of TBI cases resulting from falls in the elderly. (Liew et al., 2019). Details of prevalence and risk factors of TBI in Singapore are further expounded on in Section 2.1.1 of the Literature Review chapter.

As can be seen above, patients with TBI are one of the more frequently seen clinical population in the acute hospitals, and hence the focus of this study.

1.2.3 English variants in Singapore

Singapore Standard English (SSE) and Singapore Colloquial English (SCE) are two variants of English used in Singapore. The latter is often called 'Singlish' (Singapore English). SSE is used in formal settings while SCE is used in informal setting, and is the language that is most heard in the community.

There are no major differences between SSE and other versions of Standard English internationally (Leimgruber, 2011). However, SCE is markedly different. One of the key features of SCE phonology is the merger of long and short vowels, making words such as 'bit' and 'beat' undifferentiated. One of the key features in SCE grammar is the presence of discourse particles. These are included at the end of sentences as a marker of meaning. Examples include "ah" – a tentative or continuation marker ("Let's have a try *ah*", "lah" – a mood marker to appeal for accommodation ("I will edit it *lah*"), and "meh" – a marker for skepticism ("His shirt is nice *meh*?"). Another key feature is copula deletion – the verb "be" is deleted in several cases (e.g. "The boat very short one", "My uncle staying there") (see Leimgruber, 2011 for a summary of differences between SSE, SCE and Standard English).

These are highlighted here to help the reader understand the features of SCE that will appear in the excerpts of the analysed data in the analysis chapters.

1.2.4 Malay language

Malay (*Bahasa Melayu*) is the national language of Singapore. This originated from the 1950s when Singapore joined the Malayan Federation (Abdullah & Ayyub 1998;

Lowenberg 1988). Despite gaining independence in 1965, *Bahasa Melayu* remained the national language as its use was then already widespread. Today, the value of *Bahasa Melayu* is largely symbolic, with the national anthem the key identity that remains *Bahasa Melayu* (Lowenberg 1988; Llamzon 1978).

Apart from *Bahasa Melayu*, which is the standard version, there is also *Pasar Melayu*, the colloquial version. *Pasar Melayu* is widely used in informal settings and amongst the older Singaporeans (Aye, 2005). It is characterised by reduction or substitution in phonology (e.g. substitution of /ə/ for /a/), morphology and grammar (e.g. dropping of suffixes that indicate tense), as well as syntax (e.g. *Hari ini kita hendak ke mana?* → *Gi mana hari ni*?) (Nomoto & Soh, 2019).

The Malay speech community is comprised largely of Malays (91.2%) with a significant proportion of Indians (6.0%), Chinese (1.3%) and Others (1.5%) (Department of Statistics, 2001). There is a large proportion of non-Malays who are literate in the language: the Chinese (12.3%) and Indians (10.6%), making Malay a widely understood language and the most ethnically inclusive language besides English.

Of the total literate population above 15 years of age in Singapore, 16.4% can read and understand Malay. Of those literate in Malay, many are bilingual in English and Malay (83.6%). The bilingual literacy rates are particularly higher for those under 45 years of age (above 90%) as compared to those 45 and above (approximately 60%). English and Malay were a compulsory language subject in school for the population aged 45 years and below.

Cavallaro & Serwe (2010) found that the main reason Malay is used is to communicate with the grandparents. It is no longer true that the home is the context of Malay being spoken. They found that English was largely used amongst close family members. They also found that the teenagers use Malay the most, likely because of exposure in school. However, pursuing higher education or entering the work force results in the lessening of the use of Malay and a shift towards English. Interestingly, those of higher economic status were found to be extremely proficient in both Malay and English, and are quick to adapt to the use of Malay with the elderly and English with the younger family members.

1.2.5 Malay culture

Malayness is rooted in family, language (although decreasing, see above section) and religion (Islam). 98.7% of Malays in Singapore are Muslims (Singapore Census of Population, 2010). Malay culture is largely influenced by the teachings of Islam, and it is difficult to separate between culture and religion.

The Malays' core values are familial kinship and *gotong royong* (community togetherness) spirit. An intergenerational home structure is common amongst the Malays with working adults often living with their parents and their children. When caring for the elderly, Malays are more likely to bring them home after hospitalisation than sending them to nursing homes. In fact, prior to starting work in the acute hospital, the concept of sending a sick elderly into a nursing home was not known to me.

The *gotong royong* spirit can be seen in the congregational prayers in mosques, preparation of weddings which are often held at void decks (open space on the first floor of

public housing estates - this is to cater to thousands of invitees), intergenerational gatherings either socially (many Malay families are often seen on a picnic and camping at our beaches with their extended family) or religiously (*tarawih* prayers and family/community *iftar* during Ramadhan). Helping each other regardless of ethnicity and religion is encouraged.

Another value closely linked to Islam is modesty. This applies to both a person's character and physical interaction. Humility is an important characteristic and Malays are told from a young age not to boast about their abilities or possessions. In terms of physical interaction, dressing is one aspect. Many Malay-Muslims ascribe to wearing appropriate attire including a headscarf for the women to protect their modesty. Another aspect is physical touch. Touching between men and women is prohibited unless they are husband and wife, parents and children, siblings or with elder relatives from the paternal lineage.

Some of these cultural values will be displayed in the data section of this thesis and this background is important in relation to evaluating appropriateness of behaviour of the participants with TBI discussed in the thesis.

1.3 Organisation of the thesis

Following this introduction chapter (Chapter One), are Chapters Two (Literature Review), Three (Methods), Four, Five, Six (Analysis) and Seven (Discussion).

The first part of Chapter Two provides an overview of TBI including its pathophysiology and how it affects cognition, language, cognitive communication, pragmatics and conversation. The second part discusses the uniqueness of the TBI population discussed in this study – namely their bilingual language background. Studies examining how bilingualism and code-switching manifest in bilinguals with and without TBI are also covered here. The third part focuses on Conversation Analysis (CA) as a methodology. A summary of what CA is, its methodology and the key themes derived from CA methodology ("organizations of practice"). I also summarize studies that apply CA to the study of bilingualism and code-switching. The fourth part focuses on findings from studies employing CA in communication disorders (mainly TBI, aphasia and dementia but also dysarthria, autism spectrum disorders, etc). The last and fifth part is a summary of the aims of the study and the potential contribution to knowledge derived from the study.

Chapter Three describes the study methodology. The first part outlines the evolution of the study as well as the relevant ethics approval process. The second part introduces readers to the participants of this study including their language, cognitive and social backgrounds. The third part describes the data collection methods and a summary of data obtained. The fourth part describes transcription, data selection and analytic procedures.

Chapter Four is the first of three analysis chapters. This chapter focuses on the person with TBI and the key interactional problems that surface in their conversation with others. Four key interactional problems are discussed. The first interactional problem is the presence of atypical actions, both verbal and non-verbal (physical), displayed by the person with TBI in conversation. The second is self-initiation of repair (SIR) by the person with TBI – resulting in delay of TCU progressivity. The third is understandability problems – when the conversation partner has difficulties understanding the person with TBI. The fourth is also about understandability problems – but when the person with TBI has

difficulties understanding the conversation partner.

Chapter Five focuses on how the conversation partners adapt to persons with TBI in conversation. Key adaptation behaviours displayed by conversation partners are discussed. The first is the display of "teacher-like" behaviour. This consists of actions such as test questions (Levinson, 1992; Schegloff, 2007; Searle, 1969), correct production sequences (Booth & Perkins, 1999; Lindsay & Wilkinson 1999; Lock et al., 2001; Wilkinson et al., 1998), other-initiation of repair (OIR) as a hint to a problem or error, as well as other-repair by conversation partners. The second is collaboration by a conversation partner who is a significant other in multi-party conversations. This includes assisting the person with TBI to communicate information to less familiar conversation partners, and clarifying, both for the person with TBI and also for the less familiar conversation partners.

Chapter Six focuses on code-switching. The organization of this chapter is slightly different from the previous two chapters. In this chapter, data from neurotypical participants will also be discussed. The chapter starts with a summary of the quantitative aspects of code-switching. It then moves on to discussing the function of code-switching in the conversations of neurotypical participant dyads, neurotypical conversation partners of persons with TBI, and persons with TBI.

For neurotypical participant dyads, the functions of code-switching include: 1) to utilize a more specific lexical form of the word; 2) as a compensatory strategy during a word-search situation; 3) to emphasise a point; 4) to neutralize a tense situation; 5) as a form of pragmatic competence – to reciprocate the code-switching displayed by the conversation partner; and 6) when it is contextually relevant to do so (e.g. speaking about medical terms). In addition, when speaking to persons with TBI, neurotypical persons use code-switching as a form of scaffolding or teaching technique to be used with the person with TBI during repair sequences.

For persons with TBI, code-switching in the early stages of recovery appears to be quite functional, namely 1) when the lexical form in the other language is more specific; 2) for temporal concepts; 3) to emphasise a point; and 4) as a form of pragmatic competence – to reciprocate the code-switching displayed by the conversation partner. Evidence of more sophisticated use of code-switching in the later stages of recovery will be discussed including 1) to signal a change in topic; 2) as a form of repair; and 3) for the action of requesting. In this chapter, inappropriate code-switching will also be discussed - using a language that the other person does not know.

Chapter Seven (Discussion) will be a summary and evaluation of the current study. It will start off with a recap of the aims of the study, followed by a summary of the key findings. Next, key theoretical implications will be discussed. The key contribution of this study in the use of CA to study conversations of persons with TBI and their familiar and less familiar conversation partners. This area (using CA in TBI) is less developed compared to the CA literature on persons with dementia or aphasia.

Findings that replicate previous TBI studies will be described (including the use of test questions, the presence of atypical actions like touching and singing), followed by findings that are novel to the field of TBI (including problems of understandability of persons with TBI, and teacher-like behaviours by conversation partners such as collaboration in multi-

party conversations). A key contribution from this study is in the detailed analysis of code-switching behaviour of bilinguals (with and without TBI) in daily conversations. Here, where there are similarities or differences between persons with TBI and those with aphasia and dementia, these will be discussed.

Next to be discussed will be key clinical implications. These include the usefulness and practicality of using CA as an assessment tool for understanding communication strengths and weaknesses of persons with TBI, as well as an intervention tool to evaluate and set goals for communication with persons with TBI. I will also discuss the strengths (using CA methodology, analyzing conversations with familiar conversation partners) and limitations (heterogeneity of the data, absence of video recordings) of the study as well as future directions (collecting more data, longitudinal data, multi-party data and including video data) for studies in this area.

2 LITERATURE REVIEW

This chapter provides an overview of the relevant literature in the field of TBI as well as CA applied to communication disorders. The chapter consists of 5 parts.

Part 1: Overview of TBI summarises the pathophysiology underlying traumatic brain injury and its impact on the person with TBI. The focus is on the impact on cognition, language and the resultant cognitive communication, pragmatic and conversation deficits. The studies discussed utilize various methodologies such as functional magnetic resonance imaging (fMRI), experimental studies, and discourse analysis.

Part 2: TBI and bilingualism is a description of current knowledge on two topics that makes the local TBI population unique. Current knowledge about bilingualism and code switching in the neurotypical population is first presented. This is followed by a summary of the current literature on bilingualism and code switching in the TBI population.

Part 3: Conversation analysis as a methodology describes what is conversation analysis (CA), its unique methodology and the findings from CA regarding what it terms "organisations of practice". These include repair, turns, and sequence organisation. A distinction will also be made between conversation and institutional interaction. This section will conclude with a summary of current literature on bilingualism and code switching using CA methodology.

Part 4: Conversation analysis in communication disorders is a summary of studies in the field of communication disorders using CA as a methodology. A good deal of CA work has been carried out on aphasia and dementia, and we begin this section summarising this literature which is relevant to the current study. We end with a summary of the emerging literature using CA to understand communication disorders in persons with TBI.

Part 5: Aims and contribution to knowledge will highlight the current gaps in knowledge in the field of CA for persons with TBI. This current study's aims and potential contribution to knowledge will be defined.

2.1 Overview of TBI

Traumatic brain injury (TBI) is defined as an alteration in brain function, or other evidence of brain pathology, caused by an external force (Menon, Schwab, Wright & Maas, 2010). This trauma often results in changes in level of consciousness, memory disturbances, and confusion (American Speech-Language-Hearing Association, n.d.)

TBI is a major cause of death and lifelong disability is common amongst those who survive, especially among the younger adults. TBI commonly leads to cognitive deficits (e.g. memory) and psychological health issues (e.g. depression) (Maas et al, 2017). TBI survivors may be impulsive, poor at making decisions and display aggressive behaviours, affecting personal relationships. It also makes community, job and social reintegration difficult. Some may even be placed at institutional settings (Roozenbeek, Maas & Menon, 2013).

The elderly who suffer from a TBI have a lower life expectancy compared to the general population. They may also have chronic health issues. Of interest is the recent research

on the relationship between TBI and dementia (Liew, Ng, Chan, Ragupathi, Teo & Yeo, 2019).

In the paediatric population, brain injury often results in long term cognitive deficits. These include speech, language, memory, attention, intellectual skills, executive functions, and social skills. These deficits have an impact on their ability to return to school, with some having special education needs (Chevignard & Lind, 2014).

TBI severity is classified using Glasgow Coma Scale (GCS) and Post Traumatic Amnesia (PTA) scores. PTA is defined as a period after the injury, in which the person is not oriented to time, person and place, and has difficulties retaining information. A mild TBI is defined by a score of GCS 13 to 15, moderate TBI by a score of GCS 9 to 12, severe TBI by a score of GCS 3 to 8 and a PTA duration of more than 24 hours, whereas a very severe TBI is defined by a score of GCS less than 3 and a PTA duration of more than four weeks (Chua, Ng, Yap & Bok, 2007).

2.1.1 Epidemiology

Causes

The most common causes of TBI are falls, road traffic accidents (RTA), and assault (Hyder, Wunderlich, Puvanachandra, Gururaj & Kobusingye, 2007). In high-income countries, the most common cause are falls, whereas in lower income countries the common causes are RTAs (Khan, Prince, Brayne & Prima, 2015). Among the elderly above 65 years of age in America, falls (60.7%) were the main cause of TBI (Faul, Xu, Wald, Coronado, 2010). TBI can also result from other injuries such as those sustained during assaults, contact sports and work.

Incidence and prevalence

Trauma is the fifth most common cause of death in Singapore and TBI accounts for the majority of reason for major disability. Singapore has an ageing population and with that there may be an increase in the number of TBI cases resulting from falls in the elderly. (Liew et al., 2019).

In a study of 491 head trauma admissions between 2010 and 2012 in a tertiary hospital in Singapore, Lui, Fook-Chong & Teo (2020) found that the median age of patients with TBI here is 67 years. The peak of this age distribution is amongst those 70-79 years of age. The ratio of men to women was 1.96. The ethnicity ratio mirrors that of the national population, indicating that ethnicity is not a risk factor for TBI in Singapore. A majority of these patients suffered mild TBI (82.5%), while the moderate and severe TBI incidence were fairly similar at 7.9% and 9.6% respectively. Falls account for the majority of the causes of TBI (76.8%). RTAs rank second (11.2%), and assault third (6.1%). When the data is sorted by age, falls are the predominant cause of head injury for the elderly, and RTA for the younger population. In all, 94.3% of the study population survived the TBI.

These results are similar to the findings collected in different tertiary hospitals in Singapore – 367 patients who suffered a TBI in 2014 (Liu et al., 2019) and 298 patients who suffered a TBI between 2010-2012 (Lui, Ng, Nalanga, Tan & Bok, 2014). These studies also found

that most suffered only mild TBI and men are more represented than women. They also found a peak of incidence amongst the elderly, mostly caused by falls.

The data appears to be slightly different in a neurointensive care unit of the major trauma centre in Singapore (Wee, Yang, Lee, Cao & Chong, 2016). In this study of 780 patients admitted over a period of 7 years, there was a much higher proportion of patients who suffered a severe TBI (46.8%) compared to those with moderate (23.5%) or mild (29.7%) severity. This study also mirrors international data with bimodal age distribution with two peaks: 21-40 age group (33.7%) and >60 age group (31.8%). The mechanism of injury was also different, with a majority admitted for RTA (48.8%) and falls coming in second (35.1%). What is similar in this study is the finding that RTA is associated with the younger age group (<40 years) while falls associated with the older age group (>60 years).

However, it should also be noted that the setting from which the data was collected in this study is different from the previous two. Given that Wee et al. (2016)'s study in at the neurointensive care unit, the skew towards more severe injuries is inevitable compared to the general hospital and ward setting in the other two studies.

As part of the Well-being of the Singapore elderly (WiSE) study, Cetty et al. (2017) surveyed and tested 2,558 elderly Singaporeans aged 60 years and above. The study was mainly conducted to investigate the prevalence of dementia and its associations. In this study, they found ninety-three individuals (3.6% prevalence) with a history of TBI.

While there are significant concerns about the elderly, one should not overlook the presence of TBI amongst children in Singapore. In a study of 77 children admitted to a local paediatric hospital over a period of 9 years, Hwang, Ong, Ng, Foo, Chua, Sri, Lee & Chong (2018) found that the median age of these patients was 4.5 years, with an interquartile range of 1-9 years. 29.4% of these children were below the age of 2. Falls were the most common mechanism of injury (58%), while RTA and non-accidental trauma (from intentional impact and/or abrupt shaking; NAT) came second (30%) and third (7%) respectively. Unlike the data for the adults, a majority (88%) of the patients in this study suffered moderate-severe TBI. Survival rate was similar to the adults, at 90%. In their study, Hwang et al. (2018) also found that despite having functional outcomes that are similar to survivors without NAT, children with NAT had poorer neurological outcomes.

Risk factors

Multiple studies have shown a bimodal age distribution pattern with young adults and the elderly forming the two peak age groups (Finlayson & Garner, 1994). In a Singapore study, falls are a major contributor to TBI in the elderly, while TBI resulting from high risk activities (assault and RTAs) are a major contributing factor for the younger population (Wee et al., 2016).

Males are more likely to have a history of TBI compared to females. Having a lower education level and socioeconomic status also results in a greater risk for TBI (Cetty et al, 2017, Khan et al., 2015).

Another risk factor is alcohol or substance abuse. Between 40-60% of patients admitted to hospitals with TBIs are intoxicated when admitted. The incidence of brain injury in

alcoholic adults is two to four times greater than the incidence of brain injury in the general population in the US (Brookshire, 2015).

Studies have also shown that Type A personalities are more likely than Type B personalities to experience a TBI (Brookshire, 2015). The former is characterized by competitiveness, impulsivity, belligerence and hostility whereas the latter is characterized by cooperativeness, deliberateness and helpfulness.

Having a TBI itself is a risk factor for additional traumatic brain injuries. The probability of a second TBI is three times greater for individuals who have have had a TBI than for the general population. This risk multiplies, with the probability of a third TBI being eight times greater for a person with two previous injuries (Annegers, Grabow, Kurland et al., 1980).

2.1.2 Pathophysiology

Information about what happens within the brain as a result of traumatic brain injuries come from three main sources: animal studies, studies of the brains of individuals who have died of TBI as well as increasingly so, imaging studies of patients with TBI. Ylvisaker, Szekeres & Feeney (2008) detailed the primary and secondary injury that can happen to the brain, a summary which is presented below.

Primary injury can occur in the form of a closed or penetrating head injury. A closed head injury can happen when a moving object hits the head, the moving head hits a stationary object or when the head is shaken or moved violently. Two injuries are possible: damage to the brain on the site of the impact (coup) and the opposite side (contrecoup), and/or diffuse axonal injury (DAI) when the brain rotates during impact. A penetrating head injury happens when an object penetrates the skull. The damage to the brain depends on the site of entry as well as the speed of entry. Tissue at the site of impact gets damaged. When the object enters at high speed, there is additional destruction of tissue along the path the object takes in the brain (Ylvisaker, Szekeres & Feeney, 2008).

Secondary injuries are pathologic events that happen following severe or even moderate TBIs. These are in the form of 1) haemorrhages, which can be in the meninges or within the cerebral brain tissue; 2) cerebral edema, which is a collection of fluid between the brain and the skull or in the ventricles, resulting in increased intracranial pressure (ICP); 3) ICP, as a result of blood, cerebrospinal fluids and/or water at the site of injury or where there is DAI and can displace parts of brain tissue; 4) hypoxic-ischemic injury (HII) as a result of reduced oxygen and blood supply to the brain; and 5) seizures, which can be early or late onset (which may resut in chronic epilepsy) (Ylvisaker, Szekeres & Feeney, 2008).

2.1.3 Predictors of recovery

Pre-injury, injury and post-injury factors influence the degree of recovery one achieves post-TBI. Pre-injury factors include age, social adjustment, neurological integrity and knowledge base. Injury factors include GCS and post traumatic amnesia (PTA) severity. Post-injury factors include early medical intervention, early rehabilitation, long-term support as well as individual resilience, effort and adjustment (Ylvisaker, Szekeres & Feeney, 2008).

One of the most studied factors that contribute to poorer outcomes in TBI is age. Other things being equal, older adults recover less well than adolescents and young adults. TBI may also precipitate dementia in older adults. However, despite neuroplasticity hypotheses, younger children may have a poorer outcome compared to older children, adolescents and young adults with a similar injury severity. This is especially so when there is injury to the prefrontal regions – this may be an indirect impact, because these young children have yet to acquire knowledge and experience hence may be dependent for the rest of their lives (Ylvisaker, Szekeres & Feeney, 2008).

In local studies, older patients have also been found to have poorer outcomes even when controlling for mechanism of injury and GCS score on admission. The degree of brain injury noted on imaging such as computed tomography (CT) scans is severe despite them suffering low impact injuries such as fall from a height of less than two metres. This could be due to an underlying cerebral atrophy already present in the elderly population (Liew et al., 2019). Even when they suffer from less severe injuries, elderly above the age of 60 present with worse GCS score, greater proportion of deaths and poorer functional outcomes compared to their younger counterparts. (Wee et al., 2016).

Pre-existing psychiatric, behavioural and substance abuse problems are often exaggerated post injury. These persons with TBI may have difficulties coping with post-injury deficits (Ylvisaker, Szekeres & Feeney, 2008). We also know that substance abuse is a risk factor for TBI and possibly contributes to future recurrence.

Neurological integrity is an important factor. Individuals with previous neurological injury including TBI, and even learning disabilities are at a higher risk of suffering from repeated TBIs than others. This is especially so for older adults, resulting in more negative outcomes of TBI (Ylvisaker, Szekeres & Feeney, 2008).

TBI affects the ability to learn new information more than the recovery of previousy acquired knowledge and skills. Hence, those with weaker academic and vocational knowledge base are affected more severely than those with a stronger knowledge base (Ylvisaker, Szekeres & Feeney, 2008). However, those with high levels of skills may find it difficult to return to their premorbid vocation in view of the high cognitive and language demands.

A patient's GCS and PTA severity influences recovery post-injury. The motor component of the GCS correlates well with global outcome at discharge (Choi, Narayan, Anderson & Ward (1988). PTA is a predictor of cognitive, psychiatric and return to work outcomes 6 to 12 months post-injury (Bishara, Partridge, Godfrey & Knight, 1992). Patients with severe TBI (PTA of more than three weeks) are expected to have residual cognitive deficits atone year post-injury (VanZomeren & van den Burg, 1985).

Early medical intervention is the first step to modifying post-injury recovery. Prompt emergency medical attention and appropriate critical care management can lessen the effects of secondary damage and complications from other injuries (Ylvisaker, Szekeres & Feeney, 2008). Early rehabilitation follows closely, and contributes to the reduction in length of stay in the hospital as well as lower costs for rehabilitation overall. Lui et al.'s (2014) study of 68 TBI patients who underwent early rehabilitation within the acute inpatient hospital stay showed that there was a statistically significant functional gain measured by the Functional Independence Measure (FIM) compared to a group of 51

matched historical patients. These patients received between 30 to 120 minutes of individually-tailored therapy and intervention from a multidisciplinary team five days a week.

Availability of long-term support is also essential. Social, emotional and financial support from family, friends, employers, teachers and others are important. A primary focus of TBI rehabilitation is the knowledge, competence, problem-solving skill and resilience of these people in a person with TBI's support network (Ylvisaker, Szekeres & Feeney, 2008). Individuals who are more aware of their deficits and are motivated in their path to recovery have a better outcome than those who are less aware or are unmotivated for rehabilitation (Ylvisaker, Szekeres & Feeney, 2008).

2.1.4 Social outcomes

Life satisfaction

Corrigan, Smith-Knapp & Granger (1998) studied life satisfaction after TBI and found a "honeymoon period". Life satisfaction remains fairly normal with a decline observed in the second year post injury. The "honeymoon period" could have coincided with the poorer awareness of deficits, resulting in a sharp decline when that realisation sets in especially after settling back into life at home and in the community. However, life satisfaction improves after some time when persons with TBI begin to adapt to their environment and manage their new situation.

The findings and hypothesis above is in-keeping with Evans, Sherer, Nick, Nakase-Richardson & Yablon's (2005) findings that persons with TBI who have a better awareness of their deficits post-injury reported poorer life satisfaction as compared to persons with impaired awareness of deficits. Life satisfaction does not appear to have a strong correlation with injury severity, and even conflicting results. Smith, Magill-Evans & Brintnell (1998) reported nil relationship while Corrigan, Bogner, Mysiw, Clinchot & Fugate (2001) found increased life satisfaction with more severe injuries. Pierce & Hanks (2006) hypothesised that Corrigan et al.'s (2001) counterintuitive finding can be explained by a hypersensitivity to symptoms seen in persons with milder injuries. Taking the spotlight away from severity of injury, Pierce & Hanks (2006) found level of satisfaction and involvement in activities as a strong predictor of life satisfaction.

Impact on family

In view of the need to provide long-term support to persons with TBI, family members carry a significant amount of burden. Indeed the impact of TBI for relatives can be as devastating as for the person who is injured (Douglas, 2013).

Rape, Bush and Slavin (1992) identified four stages of family adjustment. These include (1) the initial shock response; (2) emotional relief, denial and unrealistic expectations; (3) bargaining, mourning or working through; and (4) acceptance and restructuring.

Immediately after the injury is the time when family or close partners are most in need for support, reassurance and information. While the person with TBI is in an unconscious, amnestic and confused stage, the family is often in the state of shock and denial, with occasional episodes of panic. In the later stages where the person with TBI has returned

to consciousness and out of PTA, relief comes to family and close partners. However, as progress quickens, they may mistake incidental behaviours as a sign of recovery (Brookshire, 2015).

In the third stage where persons with TBI are now able to participate in purposeful behaviour and often rehabilitation, family and close partners have often come out of the denial stage and enter the stage of hopefulness and optimism. This stage poses the most danger to the family and close partners as anxiety, confusion, and anger can arise as a result of mismatch of expectations from the person with TBI's actual progress. This is precipitated by the unpredictable nature of recovery from TBI (Brookshire, 2015).

As the person with TBI enters the chronic stage, families usually return to a semblance of normal functioning, at least in the sense of daily routine. Most family members and close partners would have returned to work as the person with TBI requires less support (Brookshire, 2015). For those whose family members of close partners with TBI have had a severe injury though, the burden of care continues and is often both emotionally and physically exhausting.

Return to work

In a study by Dikmen, Machamer, Powell & Temkin (2003), only 70% of their TBI population were able to return to work. Doctor, Castro, Temkin, Fraser, Machamer & Dikmen (2005) provided employment rates one year post injury according to severity of TBI. 69% of those with mild TBI, 53.6% of those with moderate TBI, and 37.9% of those with severe TBI successfully gained employment. These rates below those of the general population (90-92%).

Severity of TBI is strongly and negatively correlated to return to work rates (Temkin, Corrigan, Dikmen & Machamer, 2009). A possible reason for failure to return to work could be long-term cognitive deficits, found in 60% of Dikmen et al.'s (2003) participants. Bercaw, Hanks, Millis & Gola (2011) also identified decreased processing speed and ability to learn as factors which were predictive of return to work after controlling for age and injury severity effects. Factors that improve chances of returning to work include better functional status in the early stages of recovery (Cifu et al., 1997)

However, Cifu et al. (1997) advises caution over interpreting such employment data reported above. This is because the numbers do not provide an indication of how well-adjusted these persons with TBI are at work, as well as whether they have returned to pre-injury levels of employment. Machamer, Temkin, Fraser, Doctor & Dikmen (2005) reported difficulties maintaining stable employment 3-5 years post-injury amongst those with poor pre-morbid work history and lower neuropsychological functioning post-injury. In their study, only 46% of those who returned to work maintained stable, uninterrupted employment.

2.1.5 Psychiatric, behavioural and emotional outcomes

Psychiatric issues such as posttraumatic stress disorders (PTSD), anxiety disorders, mood disorders, psychotic symptoms and suicide are challenging outcomes of TBI to manage (Collins, Combs, Miles, Pastorek, Tharp & Kent, 2020). Behavioural changes include aggressive behaviour and impulsivity. 40% of persons with TBI interviewed by Horner,

Selassie, Lineberry, Ferguson & Labbate (2008) reported symptoms of mood or anxiety disorders that were clinically significant. Persons with TBI who have premorbid psychiatric disorders are at higher risk of post-injury depression or anxiety (Hibbard, Uysal, Kepler, Bogdany & Silver, 1998).

Allerdings & Alfano (2006) found that after TBI individuals identified significantly fewer emotional stimuli than demographically matched controls. Consistent with these findings, Babbage, Yim, Zupan, Neumann, Tomita, & Willer (2011) in their meta-analysis concluded that as many as 13–39 per cent of people with moderate to severe TBI may experience significant difficulties with emotion recognition.

Due to the mechanical forces as a result of head trauma, many areas of the brain responsible for the perception of emotionally salient information are impaired. These include subcortical structures such as the amygdala (responsible for processing threat information such as fear) and anterior insula (responsible for autonomic responses to aversive stimuli and reactions to unpleasantness and anxiety) (Calder, Lawrence & Young, 2001). Cortical structures affected include the ventromedial and ventrolateral prefrontal regions (generates emotional experience, responds to emotional information and regulate behaviour in response to it) (Drevets, 2000).

2.1.6 Impact on cognition

Griffen & Hanks (2014) reported a strong negative correlation between TBI severity and cognitive outcomes. In the early days following a brain injury, mild cognitive deficits may present itself. Symptoms include difficulties with recall, reduced attention and slower processing speed. Most researchers would associate these syptoms with “post-concussion syndrome (PCS)”.

Persons with mild TBI may demonstrate difficulties in verbal learning and attention for up to six months. However, for some, these do not present itself at all. (Heitger, Jones, Dalrymple-Alford, Frampton, Ardagh & Anderson, 2006).

Although these could be due to the brain injury, the contribution of psychological distress is possible (Carroll et al., 2004). Iverson, Lange, Brooks & Rennison (2010) describes a “good old days” bias where persons with TBI has a tendency to overestimate their function and abilities prior to the injury.

In the initial stages, persons with moderate-severe TBI are typically in a minimally conscious state, which appears to be a temporary phase of recovery (Evans, Sherer, Nick, Nakase-Richardson & Yablon, 2005). Following the minimally conscious stage is the responsive but confused stage. In this stage, there are difficulties recalling events for a certain duration prior to the head injury (retrograde amnesia). As they recover, the duration pre-injury of the retrograde dementia becomes lesser, but may not eventually be fully recalled (McKinley & Watkins, 1999).

Attentional, processing speed, learning and memory deficits are a common sequale following moderate to severe TBI (Mathias & Wheaton, 2007). Of note, reduction in information processing speed can have knock-on effects on other cognitive domains such as complex attention and executive functioning (Felmingham, Baguley & Green, 2004).

The most rapid cognitive recovery appears to occur during the first five months post-injury. Although recovery may continue for a year and a half following that, it is not as steep (Christensen et al., 2008). Not all domains of cognition recover to the same rate and extent. Slower improvements were noted for more complex functioning (Kersel, Marsh, Navill & Sleigh, 2001).

Millis et al. (2001) found that at five years post-injury, 62.6% remained stable in their cognitive function and 15.2% had deteriorated. Age was a predictor of cognitive status. The older age group deteriorated, the younger age group remained stable while the youngest age group made improvements.

Cognitive performance during one year post injury is a predictor of future cognitive outcomes above and beyond functional and injury severity factors (Hanks et al., 2008). TBI may trigger progressive cognitive decline or worsen pre-existing age-related cognitive decline (Fleminger, 2012). Researchers have found that TBI is a risk factor for future development of Alzheimer's Disease (AD) especially if one is male and already has a genetic predisposition for AD (Fleminger, 2012).

2.1.7 Impact on social cognition

Two key aspects of social cognition are theory of mind and social inferencing, both of which draw on attentional skills and working memory (Snow, 2013).

Theory of Mind (ToM)

ToM allows us to attribute mental states to others, and to ourselves, and to understand that our own mental state may not always be congruent with that of others (Milligan, Astington, and Dack, 2007). ToM helps us understand, predict and interpret the beliefs and feelings of others in our world. ToM is necessary for communicative success after TBI because it enables persons with TBI to draw inferences about what another person is thinking, but not explicitly stating (Snow, 2013).

Byom & Turkstra (2012) compared conversations between dyads which include a person with TBI and dyads that do not. They found that both dyads used more mental state terms in intimate conversations, but the person with TBI does not increase the use to the same level as their neurotypical peers. This, Byom & Turkstra (2012) attributes to a deficit in ToM.

Social inferencing

Social inferencing describes the ability to "fill in the gaps" when critical information is not explicitly provided by the conversation partner (Turkstra, 2018). Persons with TBI have been reported by their family and friends to have difficulties with online processing of contextual, verbal and non-verbal information in order to infer the speaker's intended meaning. This creates frustration, embarrassment, and confusion for persons with TBI and their communication partners (Bracy & Douglas, 1997). The loss of friendships and social contacts often follow (Douglas, 2013).

2.1.8 Impact on communication

Historically, language proficiency in persons with TBI has been assessed using aphasia batteries. However, persons with TBI often do not have major language deficits unless there is a focal lesion (Sohlberg & Mateer, 1990) or in the most severe cases of TBI (Coelho, 2007). However, word-finding difficulties (Rohrer, Knight, Warren, Rossor, & Warren 2008), reduced verbal fluency (Gruen, Frankie & Schwartz, 1990) and difficulties with reading and writing have been reported (Van Lancker, 1985).

In the absence of focal neurological deficits affecting language specifically, difficulties with language may be attributed to cognitive deficits. Popescu et al. (2017) found that word finding difficulties are correlated to cognitive deficits. Likewise reduced verbal fluency could be attributed to reduced cognition, namely in the reduced effectiveness and speed of word search strategies (Gruen, Frankie & Schwartz, 1990). Reading and writing requires an interplay of a wide range of language and cognitive abilities and are understandably impaired (Van Lanckert, 1985).

As such, communication difficulties following TBI have been termed “cognitive-communication impairments” (Marini, Zettin, & Galetto, 2014; Youse & Coelho, 2005) in view of the larger deficits in the use of language (e.g. pragmatics) than its form (e.g. phonology). These deficits are highly related to cognitive impairments such as memory deficits, attentional deficits and executive function disorders (Gauthier et al., 2018). There is a positive correlation between functional verbal reasoning skills and cognitive skills (Avramović et al., 2017).

Cognitive-communication impairments are best examined using the World Health Organisation’s International Classification of Functioning (ICF) Disability and Health framework (2013). There is a need to identify deficits in the Body Functions and Structures (e.g. impaired language) and examine how it affects Activities and Participation (e.g. difficulties putting together ideas to form a coherent and logical sentence). On top of that, identifying Barriers (e.g. reduced access to therapy services) and Facilitators (e.g. presence of communication partners that can support conversations by scaffolding) will help to ensure continued success for the person with TBI in their daily activities. Considering all aspects of the ICF framework is recommended to provide the best outcomes for the person with TBI (Larkins, 2007).

Severe cognitive-communication impairments affect a person’s ability to perform daily activities in the community (Ponsford, Olver, & Curran, 1995). Daily activities that we take for granted such as traveling on public transport requiring a change in bus, making orders in a restaurant, can all be difficult.

Cognitive-communication impairments result in psychosocial consequences not only for the person with TBI but also their family and friends. One of the main negative outcomes of having cognitive-communication impairments is the failure to return to work (Hooson, Coetzer, Stew, & Moore, 2012; Rietdijk, Simpson, Togher, Power, & Gillett, 2013). While close communication partners can scaffold persons with TBI in the home domain, workplace communication requires integration of a range of cognitive-communication abilities, especially the need to attend to multiple tasks. A simple task of writing a report for work purposes can prove to be difficult in the high cognitive-load environment at work despite persons with TBI demonstrating an ability to perform this task in isolation (Elbourn,

Togher, Kenny & Power, 2017). Another psychosocial consequence is the reduction of social networks (Shorland & Douglas, 2010). These are often linked to reduced conversational skills. Supporting such deficits may be a burden to family and close communication partners (Anderson, Parmenter & Mok, 2002).

Poor pragmatics have been reported in persons with TBI. These include reduced topic selection and maintenance, turn-taking, conciseness, affect, information-giving (McDonald, 1993; Milton, Prutting & Binder, 1984). Persons with TBI have deficits in recognising, processing and using para-linguistic information, including emotions (verbal and nonverbal). This in turn may result in what appears to be antisocial behaviour and subsequently poor interpersonal relationships (Lezak, 1978; Ylvisaker, Szekeres, Henry, Sullivan, & Wheeler, 1987). Persons with TBI find it difficult to understand prosody in speech (Joannette, Hiram, & Brownell, 1990) resulting in difficulties disambiguating utterances using such features (Marquardt, Rios- Brown, Richburg, Seibert, & Cannito, 2001).

Angeleri, et al. (2008) found that linguistic and extralinguistic comprehension is intact but not paralinguistic comprehension. In their study, the persons with TBI were still competent in understanding communication acts with good contextual cues but had difficulties grasping subtler conversational violations. Furthermore, persons with TBI had difficulties adjusting their communication according to the context that they are in. They may be too formal or too informal. Even in communicating simple and superficial topics, persons with TBI have a tendency for topic perseveration.

Conversations is a topic of great interest amongst researchers of persons with TBI because it is in conversations that one sees the great interplay between the various skills that are affected in TBI – language, cognition, pragmatics, social behaviour, etc. Conversations have been studied using various methodologies including discourse analysis (e.g., Body & Parker, 2005), exchange structure analysis (e.g., Bogart, Togher, Power & Docking, 2012), experimental design involving control groups (e.g., Behn, Togher, Power & Heard, 2012), qualitative content analysis (e.g., Brassel et al., 2016) and conversation analysis (e.g., Friedland & Miller, 1998). In the paragraphs that follow, I summarise the findings from these various methodologies except for conversation analysis. Studies employing conversation analysis methodology are described separately in section 2.4.2, to enable a more in depth understanding of how the methodology is applied and also as a way of comparison to studies involving persons with other communication deficits (e.g. aphasia and dementia).

Persons with TBI have difficulties with language processing and efficiency (Godfrey, Knight, Marsh, Moroney & Bishara, 1989). Conversations may have paucity in information or be dysfluent (Biddle, McCabe & Bliss, 1996). Furthermore, persons with TBI have demonstrated inappropriate topic switching and turn taking, difficulty with conciseness (Penn & Cleary, 1988), topic repetitiveness (Body & Parker, 2005; Perkins, Body & Parker, 1995), self-focused conversation, inappropriate humor, inappropriate levels of self-disclosure (McDonald, Flanagan, Rollins & Kinch, 2003), and word-finding difficulties. Reduced use of politeness markers has also been documented (Togher & Hand, 1998).

These affect the person with TBI's ability to establish and maintain interpersonal relationships (Ponsford, Olver, Ponsford, & Nelms, 2003). Difficulties in processing and organising language may lead to frequent misunderstandings and in socially unskilled

behaviour (Ylvisaker, Szekeres & Feeney, 2008). Despite good cognitive recovery, persons with TBI may still be disorganised or disinhibited (Ylvisaker & Feeney, 1998).

Even those with mild injury become less competent in conversations as a result of speech and/or language disturbances (Tucker & Hanlon, 1998). Communication partners have been shown to present differently in interactions with persons with TBI compared to neurotypical persons (Togher, Hand & Code, 1997; Togher, McDonald, Code & Grant, 2004), often performing repairs during social interactions with the former (Godfrey & Knight, 1991). This results in poorer satisfaction when having conversations with persons with TBI (Bond & Godfrey, 1997).

However, conversations are not a one-sided affair. Research has also shown that communication partner (the ones who are neurotypical) also contribute to some of the behaviours seen in persons with TBI when engaged in conversations. Body & Parker (2005) hypothesised that persons with TBI have difficulties registering social signals, hence in the absence of strong signals to reduce topic repetitiveness, the behaviour will persist in persons with TBI. This could be an issue of politeness on the part of the conversation partner, which in turns reinforces the socially inappropriate behaviour.

Recent publications have focused on identifying factors that positively influence the communicative performance in adults with TBI. The communication partner plays a huge role: familiar partners (family, friends) elicit better communication (turn-taking, information shared) in casual, purposeful or problem-solving conversations (Bogart, Togher, Power & Docking, 2012; Togher, Taylor, Aird & Grant, 2006; Tu, Togher & Power, 2011). Also, when the communicative partner is perceived as an equal if not inferior status as the adult with TBI, communicative performance also improved (Togher, 2000; Togher & Hand, 1999). Communication partners who are able to support the adult with TBI in conversation by asking appropriate questions, requesting information, or scaffolding the interaction also had a more positive communicative experience with adults with TBI (Togher, Hand & Code, 1997; Tu, Togher & Power, 2011).

Related to the points above is the communication context that adults with TBI find themselves in. Supportive communication contexts (Bellon & Rees, 2006; Rees & Bellon, 2002; Tu, Togher & Power, 2011), engaging in jointly-produced discourse (Jorgensen & Togher, 2009), procedural discourse (Snow, Douglas & Ponsford, 1997) and picture description (Stout, Yorkston & Pimentel, 2000) all resulted in communicative performance undifferentiated from normal controls.

Coelho, Youse & Le (2002) found that the flow of conversation between persons with TBI and their communication partners is largely maintained by the latter, for example, by introducing topics and asking more questions. When they do contribute, persons with TBI offer information that does not extend or facilitate social interaction. This is unlike conversations with the neurotypical communication parters which were characterised by a shared responsibility for sustaining the interactional flow.

Jorgensen & Togher's (2009) study showed that friends of persons with TBI facilitate competent participation in conversations and production of the narratives of the persons with TBI by scaffolding them. This is evident in better performance on a jointly-produced narrative as compared to a monologue production. These included performing better at story grammar and informational content.

Much research has gone into studying conversation partner training (CPT) to reduce breakdowns in conversation and repair them. Behn et al., (2012) randomly allocated paid carers into the CPT group, receiving 17 hours of training over 8 weeks, or a control group. They found that the trained paid carers were better at acknowledging and revealing the competence of persons with TBI. As a result, they found conversations more rewarding, interesting and appropriate. Despite improvements being confined to only structured conversations, the results were maintained for six months.

Other than training to paid carers, Togher and colleagues have conducted several studies demonstrating the positive effects of CPT conducted with close communication partners on the conversations of persons with TBI (Togher, Power, McDonald, Tate & Rietdijk, 2009; Togher, McDonald, Tate, Power, Ylvisaker & Rietdijk, 2010; Togher, Power, Rietdjik, McDonald & Tate, 2012; Togher, McDonald, Tate, Power & Rietdjik, 2013). This included a telehealth model of training (Rietdijk, Power, Brunner & Togher, 2019).

Persons with TBI are also capable of helping themselves communicate better in conversation. Penn & Cleary (1988) described various compensatory strategies for the underlying cognitive and memory deficits, employed by persons with TBI, in order to send their messages across. These include using non-verbal communication, direct speech instead of producing complex embedded sentences, utilising pronomolisation, and circumlocuting in times of word-finding difficulties. To compensate for longer processing times, persons with TBI repeat themselves to buy time to process their own utterance, and use filled pauses or placeholders.

Brassel et al. (2016) found conversations between persons with TBI and their familiar communication partners to be very predictable in terms of the topics of conversation, especially in the sub-acute stage where there is still active rehabilitation and recovery. This includes discussing the impact of injury and re-connecting as well as re-engaging with the person with TBI. These reflect participants' sub-acute rehabilitation experiences.

Other than verbal communication in conversations, non-verbal actions also matter in a conversation. Cannizaro, Allen & Prelock (2011) found that non-verbal competence such as the appropriate use of hand and arm movements correlated positively and significantly with perception of communicative competence.

As speech therapists, it is of interest to find out if conversation skills improve in persons with TBI over time. Chia et al. (2019) followed up 17 pairs of participants with TBI and their communication partners (CP). Their analyses revealed that there were no significant change in the amount of participation and support in the conversations over a three month period. However, there was better turn-taking and topic maintenance.

The studies presented in this first part of the literature review are mostly centred on monolingual populations with TBI. In this current study, it is important to explore aspects of bilingualism and how it may impact on the cognition and communication of persons with TBI. This will be presented in the next part.

2.2 TBI and bilingualism

In the second part of this literature review, I focus on what makes persons with TBI in Singapore unique compared to what is presented in the mainstream literature. As described in the introduction chapter, Singapore is a multi-ethnic and multi-lingual society. I will begin with summarising the literature on bilingualism as well as code-switching (CS) studied in neurotypical individuals, followed by a summary of the literature on bilingualism and CS in persons with TBI, Alzheimer's Dementia (AD) and aphasia.

2.2.1 Bilingualism and code-switching in neurotypical population

Code-switching is an important quality of a bilingual person. It is the ability and capacity to maintain languages separately, select the appropriate language, and to bring them together when needed depending on the communication context (Friedland & Miller, 1999).

Function of code-switching

CS is used in neurotypical bilinguals for various functions. One function is to communicate information beyond the obvious literal meaning of the words (Gardner-Chloros, 2009). CS is used as an alternative to conversational markers in monolingual speakers (e.g. for emphasis using change in tone of voice), or as an adjunct to such markers (Gardner-Chloros, Charles & Cheshire, 2000).

CS also serves a social function. The "Markedness Model" (Myers-Scotton, 1998) is a key model to explain the social motivation of CS. The choice of language to use is indexical of the rights-and-obligations sets between participants in a given interaction type. These sets are a social construct and defined in any interaction by the situation factors like seniority and exclusiveness of the group (Li, 1998).

CS is used to organise the internal structure of conversation (Su, 2009). It can be used to gain control over a situation using language of power (Bain & Yu, 2000) and conversely to dampen directness (Garder-Chloros & Finnis, 2004). In multilingual interactions, CS is also used as a model of pragmatic language use (Tare & Gelman, 2011), for example to indicate language of preference (Dolitsky, 2000), as politeness marker (Sifianou, 1992) or for humour (Gardner-Chloros & Finnis, 2004).

CS can also be used to negotiate interpersonal relationships (Su, 2009). An example of this is the use of CS to reinforce closeness to and bonding with a communication partner by referring to their common heritage when speaking not in their mother tongue language (Garder-Chloros, 2009; Gardner-Chloros & Finnis, 2004). Furthermore, CS to a common language also is also a form of expression of group identity (Gardner-Chloros, 2009).

Discourse function in monolingual vs. bilingual speakers

In bilingual conversations, code-switching is used as a paralinguistic marker over and above those existing in monolingual conversations. Gardner-Chloros, Charles and Cheshire (2000) found that asides in monolingual conversations are often marked by a lower-pitched voice. In code-switched conversations, in addition to that, code-switch to a

different language happens. Reiterations are marked by repetition of previously said utterance in monolingual conversations. However, in code-switched conversations, repetition is performed with the language switched. This also reduces the risk of appearing rude or condescending when repeating another person's utterance.

Code-switching: brain and cognition

There is evidence that the brain regions involved in monolingual language processing are rather different. This includes an increased grey matter density in the left inferior parietal cortex in bilinguals compared to monolinguals, and the increase is greater when the second language is acquired earlier and of greater proficiency (Mechelli et al., 2004). Coggins, Kennedy & Armstrong (2004) found a likewise increased in volume but this time in the corpus callosum of highly-proficient bilinguals.

Despite a substantial overlap, neuropsychological and electrocortical stimulation mapping data suggest that the brain regions serving L1 and L2 are not identical. Research has shown that the brain areas activated differ when using L1 and L2. In such cases, it is more common to see greater activation during L2 processing, suggesting that more cognitive effort is required to process the less exposed or proficient language (Kutas, Moreno & Wicha, 2009).

Research evidence shows that both languages in bilingual speakers are active even when only one is being used (Bialystok et al., 2009; Kroll, Bobb, & Wodniecka, 2006). It is thus hypothesised that alternative possible languages of expressing a message gets activated before it is being selected. Hence, the researchers hypothesise that there is an increased demand in cognitive processes in bilingual utterances compared to monolingual speakers in view of the active need for selection (Green & Abutalebi, 2013). This is because, the effective production of one language necessitates the inhibition of the other (Kutas et al., 2009). Green & Abutelabi (2013) further proposed an *adaptive control hypothesis* that necessitates language control to change according to the demands and context of interaction.

Abutalebi and Green (2007, 2008) hypothesised that the anterior cingulate cortex and left frontal cortex are responsible for monitoring and controlling the selection and switching of languages according to different contexts. This would then result in an avoidance of language conflict (Green, 2011). However, when in a community that is proficient in both languages, then the language control is different (Green, 1998), because there is no need to avoid switching. Their skill lies less in avoiding language conflict than in utilising the joint activation of both languages and adapting their utterances appropriately.

Kutas et al. (2009) concluded that effective production of one language requires inhibition of the other, though the inhibition mechanism need not be language-specific. Inhibition, of course, need not be all or none, and may be influenced by age of exposure to L2 and/or language dominance.

A bilingual advantage has been discussed (e.g. Bialystok, Crail, Fergus & Ruocco, 2006). These advantages include better visuospatial skills (Bialystok & Shapero 2005), and an improved ability to ignore less relevant information during tasks of executive functioning (Bialystok & Martin 2004). These appear to hold true even till old age (Bialystok et al., 2004, 2006; Craik & Bialystok 2006). Bialystok and colleagues (2004) hypothesised that

due to the cognitive demands of bilingualism and code-switching, bilingual speakers continually hone their executive skills.

In summary, for a bilingual to code-switch, several skills are needed. These include selection (choosing words and structures from the active language), inhibition (to ensure that the second language does not intrude when inappropriate), monitoring (maintaining the relevant word and message transmitted), pragmatic behaviour (taking into account the language preferences of communication partners), planning and strategising (deciding on which language medium best highlights a point of importance), and many more (Kutas, Moreno & Wicha, 2009). In view of deficits in these areas, it is of interest to investigate the ability of adults with TBI to maintain this complex yet automatic process.

2.2.2 Bilingualism and code-switching in TBI and other communication disorders

There are a limited number of studies looking at TBI in the bilingual population. Severe TBI was shown to result in lasting deficits in both languages of a bilingual child (Tavano et al., 2009). Eng & Obler's (2002) case study of a Cantonese-English bilingual showed equal deficits in both languages in terms of severity, but not quality, and this was attributed to differences in script. Although they did not describe in detail, it was reported that the elderly man studied adhered to the CS rules most of the time when conversing with the bilingual researcher. On a positive note, Polczynska-Fiszer (2007) showed in a group of eight adults with severe TBI that learning a second language after brain injury is still possible.

A literature search yielded no results on the phenomenon of CS in bilingual TBIs. The topic has however been studied in a group different yet similar enough to the adults with TBI – patients with Alzheimer's dementia (AD). The AD population has been described as having reduced pragmatics, cognitive deficits (poor memory, attention and orientation) and linguistic deficits characterised by semantic rather than grammatical or phonological errors. All these are arguably common grounds between the TBI and AD population.

Bilingualism in persons with Alzheimer's dementia

Bilingual adults with AD demonstrate difficulties selecting the appropriate language, and maintaining the language once chosen, even in the early stages (De Santi, Obler, Sabo-Abrahamson & Goldberger, 1990; Hyltenstam, 1995; Luderus, 1995). Language choice problems in persons with AD is a problem of attention, which in itself would be a result of the limited general cognitive processing capacity known to exist in these patients (Hytenstam, 1995). However, there is no evidence of a relationship between AD severity and amount of language mixing (De Santi et al., 1990). Studies have also shown a general lack of awareness in persons with AD when speaking an inappropriate language (Hyltenstam, 1995).

Persons with dementia who have acquired their second language in adulthood have a tendency to choose their first language or switch into their first language when they are assumed to be speaking their second language. This is thought to stem from difficulties inhibiting the dominant language (L1) when using non-dominant language (L2) (De Santi et al., 1990; Hyltenstam, 1995; Friedland & Miller, 1999; Gollan, Li, Stasenko & Salmon, 2020). These intrusions are more pronounced when the second language has not been acquired to a high level of proficiency. Despite that, CS among persons with AD was found

to generally obey structural constraints and principles that have been formulated for healthy speakers (Hyltenstam, 1995). It is important to note though, that not all adults with AD demonstrate these problems (Luderus, 1995).

Bilingualism in persons with aphasia

The literature on bilingual aphasia shows that a considerable proportion of the cases reported (up to 40%) have difficulty in making a correct language choice. The most common interpretation of this fact in neurological terms is that 'the temporarily or permanently inaccessible language is not destroyed, but inhibited' (Paradis, 1989). However, Goral, Norvik & Jensen (2019) found evidence of multilingual persons with aphasia avoiding pragmatically inappropriate language mixing.

The localisation or extension of the damage does not automatically predict which one of a bilingual's languages will be most affected, or the extent to which a particular language is affected (Hyltenstam, 1995; Goral et al., 2019). Goral et al. (2019) also found that CS occurs as a strategy to bypass instances of word-retrieval difficulties. Furthermore, Hyltenstam's (1995) re-examination of code-switched utterances by people with aphasia in the studies yielded from his systematic review found that the vast majority of such examples were structured grammatically in accordance with constraints or principles suggested for code-switching among healthy speakers.

Regardless, bilingual adults with aphasia display more CS than neurotypical adults and this is related to an increased dependence on both (impaired) languages. Interestingly, inappropriate CS (not following acceptable CS norms) typically occurs in patients with frontal lobe lesions (Ijalba, Obler & Chengappa, 2006; Munoz, Marquardt & Copeland, 1999).

In this section of the literature review, we have established that for a bilingual person to code-switch effortlessly, a myriad of skills are required: selection, inhibition, monitoring, pragmatic behaviour, planning and strategising, and others. In view of deficits in these areas, it is of interest to investigate the ability of adults with TBI to maintain this complex yet automatic process. There have been no studies directly examining code-switching in persons with TBI. However, based on studies on persons with AD and aphasia, it is likely that CS occurs appropriately in terms of grammar, but not so in terms of pragmatics (difficuties with appropriate language selection/inhibition).

2.3 Conversation Analysis

In the third part of the literature review, I summarise the background and methodology of conversation analysis (CA). CA will be the main method of analysis used in this study. I will begin with an overview of CA, its unique methodology, common themes derived from CA studies and end off with a summary of studies that apply the CA methodology in their study of bilingualism and code-switching.

2.3.1 An overview of conversation analysis

Definition

The aim of CA is to study "the order/organisation/orderliness of social action, particularly

those social actions that are located in every-day interaction, in discursive practices, in the sayings/tellings/doings of members of society" (Psathas, 1995).

Some of the key assumptions underlying CA studies are that social interaction is best studied by analysing data that are naturally-occuring, interactions are always structurally organised, and that all aspects of interaction cannot be deemed as not relevant or accidental (Heritage, 1989). CA have been used by researchers in the field of sociology, anthropology, linguistics and communication disorders (ten Have, 2011).

History of conversation analysis

CA's roots started in early 1960s California where Harvey Sacks, Emanuel Schegloff and Gail Jefferson started a particular tradition of analytic work that systematically studies conversations, which are talk-in-interaction. The development of CA was also influenced by Harold Garfinkel's "ethnomethodology" which looks at the identifying patterns in common-sense activities.

The earliest form of CA came from Sacks' analyses of tape recordings of telephone calls to the Suicide Prevention Center in Los Angeles from 1963-1964. Early themes that emerged from his exploration of these data included *categorisation* and *sequential organisation* – the idea that the sequential position of utterances in conversation determines the action that it performs.

CA as a method goes beyond then existing practices of gathering data, which were researcher-directed and unnatural. In CA, data is the natural, non-experimental action. This was made possible with the evolution of audio recording technology, and supported by a system of transcription developed by Jefferson that enabled sequential analysis of interactions.

The most distinctive aspect of CA is the fact that the researcher's task is to discover, rather than being driven by a priori questions or expectations. Instead of testing particular hypotheses through controlled experimental manipulation, close and repeated examination of natural interactive behaviours as captured in recordings and transcripts is performed. The goal of the conversation analyst is to extract information about how particular interactions are organised and about the means through which participants orient themselves to the task of achieving this organisation. As a consequence of this focus on the regularities of interactive behaviours in conversation, CA tends to emphasise the public character of talk and what is being accomplished in interaction, rather than trying to develop accounts of the mental processes of individual speakers (Horton, 2018).

Although the initial work done in CA was in an institutional setting (the aforementioned suicide calls, and subsequently tape-recorded group therapy sessions), the setting itself was never of primary concern. Subsequently, non-institutional data were collected, and these allowed for the understanding of concepts such as *turn-taking* and *opening and closing sequences*. On the topic of these two kinds of CA work (institutional and non-institutional), Heritage (2005) describes the former as the institution *of* interaction as an entity in its own right; the second studies the management of social institutions *in* interaction. ten Have (2011) labels the former as *applied CA* and the latter as *pure CA*.

The emergence of video recording technology later influenced studies in the 1980s but not

to the same extent it did with audio recording. Several conversation analysts have used video recording to study visual aspects of interaction (Goodwin, 2004; Goodwin & Goodwin, 1996; Heath, 1986; Heath & Luff, 2000). However, in most of the analyses, verbal production is of utmost importance, while selected visual details were added to make the analysis more holistic for face-to-face interaction. Some of the themes studied include *eye gaze* and *marked gestures*. The general focus on audio data as primary data and video data as secondary is also due to the fact that unlike a standardized system of transcription for audio data, there is no equivalent system for non-verbal data.

What CA is not

Various approaches of studying conversations exist. These include ethnomethodology (which CA can be argued to be part of and have emerged out of; see Francis & Hester, 2004 for a comprehensive coverage), and discourse analysis (see Potter & Edwards, 1990 for a summary; and Schiffrin, Tannen & Hamilton, 2001 for a comprehensive coverage). Other types of analyses include studies looking at language processing in task-based conversation (see Brown-Schmidt, 2018 for a summary), big data approaches (see Jones & Dye, 2018 for a summary) and neuroscientific approaches, including ERP and EEG studies (see Kurby, 2018 for a summary).

ten Have (2011) summarises the major differences between CA and other approaches. Firstly, through detailed transcriptions of audio and/or video recordings, the subtleties of human interaction are not lost to the analyses, unlike summarised representations used by other approaches. Secondly, data which are naturally-occuring ensures authenticity and are not influenced by the experiement or researcher. Thirdly, CA is directed towards understanding not why people do what they do, but how they do it, reducing the biasness of researchers' perception and interpretation.

2.3.2 Conversation analysis methodology

Much of the methodology employed in this current study is influenced by two resources detailing CA methodology (ten Have, 2011; Sidnell & Stivers, 2013). In this section, I summarise the key methodology of conversation analysis. The general outline of the research journey in CA can be summarised in four steps: obtaining recordings of natural interactions, transcription of audio data, analysing selected parts of the data and reporting the research (ten Have, 2011).

Capturing natural interactions

According to CA methodology, data should occur in natural settings and not be a result of an experimental set up, nor elicited by the researcher. Audio recordings were the main source of data in the early days of CA. These were collected either through telephone conversations or of face-to-face interactions. What was missing in the analysis of face-to-face conversations were the non-verbal acts accompanying the talk. Although these did not particularly hinder the growth of knowledge that CA brought, it was later researchers, using video recording that supplemented the insights from audio recordings with visual aspects of the verbal interaction. Of note is the study of gaze, as well as a physical manipulation or manifestation occurs (e.g. use of objects, the study of body language). The downside of this is that visual conduct often does not have a neat turn-by-turn organisation that we see in audio stimuli.

Despite the insistence of using naturally occurring interaction as primary source of data, there are some instances where other data need to be collected. The most common is interview data – gathering information from participants of the recorded data, about the context and content that was not witnessed by the researcher. Researchers however need to use these data with caution because it may be very hard for participants to recall each moment accurately, completely or objectively (see Pomerantz, 2005 for a more detailed discussion of this issue).

Another important aspect to discuss about gathering data is obtaining consent from participants: to be recorded, for the recording to be used in research and for it to be published in a form or other. In order to do all of the above, anonymising participant information in the transcript is essential.

For data captured to be as naturalistic as possible, the best option of collecting the data is to ask the participant to do it, thus eliminating the possible influence of a non-member of that conversation affecting the talk recorded. Although this eliminates that, one cannot be absolutely certain that there is a form of bias as to what gets recorded by the participants. Participants may omit to record what they think is "mundane" and jump into recording action when they think what is about to unfold is "interesting". Regardless, the instructions to the participants are paramount, to reduce pre-selection or staging of data.

Transcription

Transcripts enable the audio data captured for CA to be presented in visual form. In order for analyses to be done, transcripts should include what has been said as well as how it was said. This would allow the researcher to observe, discover and focus their attention on analysing particular events (Heath & Luff, 1993). As previously mentioned, the transcription convention used by CA researches originated from Gail Jefferson's work for Harvey Sacks and later her own research.

ten Have (2011) lists out details that should be present in a transcript: (1) temporal and location details; (2) who were present; (3) the words as they are spoken; (4) the sounds as they are uttered (including laughter and fillers like um); (5) inaudible sounds or words; (6) silences; (7) overlapping talk; and (8) processes other than the content of the talk (e.g., latching, cut-offs, stretching, stress, volume, intonation. For details of such transcription methods, refer to ten Have (2011) and Sidnell & Stivers (2013).

In addition to the verbal data, non-verbal data obtained through video-recordings need to be transcribed. One way this can be done is by a description of the non-verbal activities such as eye gaze, hand actions or gestures. These are usually added a line below or above the co-inciding transcribed verbal data. A second way is to provide a screen capture of a particularly relevant non-verbal action. If the non-verbal data is obtained through secondary data such as interviews, then the corresponding comments by the person transcribing will be done within double parantheses.

Transcripts are often arranged in a typical Jeffersonian vertical arrangement, where utterances by different speakers are presented one below the other in the order it was spoken. How to break these utterances is often a debate. Psathas & Anderson (2005) suggested several ways of doing so: according to (1) 'breath units'; (2) phrasal or clausal

units; or (3) turn constructional units (TCUs).

For multilingual data, two ways of transcription is commonly used. The first is a two-line approach where the first line contains the words transcribed in the original language as it unfolds and the second line the translation of that utterance into the syntax and language the research is to be published in. This is often used when the language that requires translation mirrors the word order and syntax structure of the language it is translated into (Sidnell & Stivers, 2013).

The second approach is a three-line one, with the first containing the words transcribed in the original language as it unfolds, the second line a word for word translation presented in the same order as the first line, and the third, a general translation of that utterance in the syntax of the language of publication. This is often used when the word and sytax structure does not mirror that of the language of publication and is advantageous because it allows the reader to understand the talk as it unfolds (Sidnell & Stivers, 2013).

ten Have (2011) advises that the decision of how much and to what detail the data is to be transcribed depends on the research aims and interests. If a researcher is interested in a particular phenomemon, then he or she could transcribe only those relevant episodes, especially in the context of a large corpus of data. If the overall structure of interactions is of interest, then a complete set of transcription is required.

Analyses

The common starting point of analysing transcribed data is by what Psathas (1995) labeled as “unmotivated looking”. This implies that a researcher should not set out to look for pre-identified phenomena, but instead comb through the data with an open mind to discover what phenomena is present in the data. Schegloff (1996) suggested to begin by noticing an action being done and then identifying what about the behaviour (verbal/non-verbal) serves to produce that action.

Although “unmotivated looking” can be daunting for beginner CA researchers, one can start by paying attention to four of the key types of interactional organisation within CA (“*organisations of practice*”). These include *turn-taking; sequence organisation; repair; and turn-design.* These will be described in much more detail in the next subsection.

For each of these themes, it is useful to gather *evidence* and *counter-evidence* (Sidnell & Stivers, 2013). *Evidence* comes in the form of the action produced by a participant in their turn, while *counter-evidence* comes in the form of absence of a response that would have otherwise been expected during a participant’s turn. What is most important is that these turns are not the only form of evidence. The next turn produced by the recipient of the previous turn serves as a *next-turn proof procedure.*

In the case of an *evidence*, we can use the example of repair. For example, if a participant’s utterance is identified as a problem source, then the reaction by the recipient of the utterance in the form of an *other-initiated* request for repair becomes evidence that the problem source was identified by the recipient.

In the case of a *counter-evidence*, the *next-turn proof* still exists. This comes in the form of a reaction by the recipient or the person transmitting the message. We can use the

example of a question-answer sequence. When a question is not answered the *next-turn proof* can come from the recipient or the questioner. The recipient may provide: (1) an apology for not answering; (2) an account for not answering; or (3) an explanation for not knowing the. Alternatively, the *next-turn proof* may come from the questioner himself in the form of answer: (1) asking a follow-up question; (2) commenting on the absence of an answer; or (3) inferring why the answer was not provided.

Another useful practice amongst CA researchers is having *data sessions*. ten Have (2011) describes how a data session works. Data sessions are an informal get-together of CA researchers (often studying related population or topics) to discuss some 'data' (recordings and/or transcripts). Data sessions involve playing or reading (a part of) audio recordings or transcripts respectively, with some background information provided by the person sharing the data. The group then selects a section that is interesting to them and makes observations about the actions or phenomenon observed. Alternatives and doubts to the initial observations are encouraged, so as to ensure the robustness and groundedness of their observation, especially finding links to what has already been described in CA literature.

After gathering evidence of some phenomena or theme, the next step will then be to form a collection of this phenomena or theme. This is when the researcher, upon identifying a few instances of "test questions", proceeds to search the rest of the data for more examples of these. Where a substantial amount of evidence exists for a phenomena or theme, then the case of it is strengthened.

In the next sub-section, we will address some of the common themes and phenomenon derived from CA.

2.3.3 Organisations of practice in conversation analysis

Four key types of interactional organisation within CA ("*organisations of practice*") include *turn-taking; sequence organisation; repair; and turn-design.*

Turn-taking

Turn-taking as an organised activity is one of the key ideas in CA. Turn-taking is organised because there is usually one person speaking at any one time and the switch between speakers is very quick and with minimal overlap. When overlaps happen, it is often because the person's turn appears to have been a complete 'turn constructional unit' (TCU). As such, that signals a 'transition relevance place' (TRP) and another speaker can have his or her turn (ten Have, 2011).

In conversational contexts, a turn can be thought of as a single, distinct contribution to the discourse from a single speaker. Although one might be tempted to equate a turn with a complete sentence, in practice a meaningful turn can consist of as little as a simple shake of the head or backchannel response ("mhm" or "oh?"; Yngve, 1970), or as much as an uninterrupted minutes-long narrative. Moreover, a complete turn does not necessarily have to be syntactically well-formed, or may even be purely visual or gestural (Horton, 2018).

There are several ways in which the next speaker can claim his or her turn. Firstly, the

next speaker can be selected by the previous one. This is often seen in multi-party conversations. Secondly, a speaker can self-initiate. Thirdly, the current speaker can choose to continue speaking. These appear to be in a hierarchy of preference, in the same order as presented above (Sacks, 2004).

Sequence organisation

Within CA, the basic conversational unit is not the individual utterance but the adjacency pair (Schegloff, 1968; Schegloff & Sacks, 1973). Adjacency pairs consist of two utterances, spoken by different participants, organised such that when one speaker produces the first pair part (FPP), the other speaker subsequently completes the sequence through production of the second part of the pair (SPP).

The most familiar type of adjacency pair is the question-answer sequence. Other types of adjacency pairs are offer-acceptance, greeting-greeting, invitation-acceptance, inform-acknowledge, and even blame-denial (Stivers, 2013). By treating the adjacency pair as a central unit of analysis, CA further emphasiss the fact that contributions from individual speakers do not stand alone; utterances are generally produced in response to other utterances, often with the effect of eliciting particular utterances in response. However, a full sequence can sometimes consist of more than just two pair-parts, especially when an appropriate SPP is not produced, resulting in an extended sequence (ten Have, 2011).

The first part of the adjacency pair leads to the strong expectation that the second speaker will complete the pair by producing an appropriate response, known as a preferred second (Levinson, 1983,). If the second speaker responds in a different way (e.g., by refusing an invitation), the production of such dispreferred seconds is often accompanied by additional signals of conversational effort, such as a delay before responding (Kendrick & Torreira, 2015), discourse markers such as “well” or “oh” (Schegloff & Lerner, 2009) or hedging or forms of self-explanation (Holtgraves, 1997).

Pre-sequences can accompany the main adjacency pair. It is often used to encourage cooperation from the conversation partner. These include those accompanying invitations (e.g. “are you free tonight?”), announcements (e.g “have you heard about Dave?”), requests (e.g. “can I ask for a favour?”) and narratives (e.g. “did mom tell you what happened?”). Pre-sequences are considered an appropriate way of introducing what the person wants to talk about, and for the conversation partner to express willingness to participate in the exchange (Horton, 2018).

While pre-expansions occur before the main adjacency pair, post-expansions occur after the main sequence is completed. It often appears in the form of a third-position acknowledgement, repairs or arguments (Schegloff, 2007; ten Have, 2011).

After the core sequence is completed, there could be post expansions in the form of an acknowledgement or assessment (Schegloff, 2007). More extensive expansions such as repairs, arguments, defences can also follow the core sequence (ten Have, 2011).

From the perspective of CA, by observing the patterns that participants follow as they work through particular conversational activities, and by collecting together numerous instances of such observations across multiple contexts, the analyst is able to provide a characterization of how such activities are organised and strung together in sequences in

response to these and other interactive demands (Horton, 2018).

Repair

Schegloff, Jefferson & Sacks (1977) first defined repair as a group of actions performed to interrupt a talk because of difficulties with hearing or understanding the talk. The reason why the conversation partner has difficulties hearing or understanding is called a 'trouble source', and the action performed to make up for the difficulties hearing or understanding is called a 'repair'.

The person identifying the trouble source can be the conversation partner and hence the action is called 'other-initiation of repair' (OIR), or it could be identified by the speaker himself, and this is called "self-initiation of repair' (SIR). Likewise, the person performing the repair can be the person whose trouble source originated from, hence called 'self-repair' or it can be done by the person who has difficulties hearing and understanding, hence called 'other repair'. The OIR, SIR, self- and other-repair can occur within the turn itself, or at the transition relevance place (TRP).

Turn-design

When a speaker takes his turn, it is specifically designed to perform an action such that it is understable by the recipient. What a person does in his turn affects what another person does in the next turn. Hence, in order to achieve what one sets out to do, the turn has to be properly designed. Three themes that affect turn design has been widely studied in CA literature. These include preference organisation, recipient design and self-repairs.

Preference organisation refers to the organised manner in which preferred and dispreferred responses takes place in a conversation. The rule is, where possible, the preferred response is more acceptable. ten Have (2011) describes how this is demonstrated in invitations. A preferred response, meaning acceptance of the invitation, often occurs promptly and directly. A dispreferred response, meaning a rejection of the invitation, is often delayed and indirect, including a reason for rejection before stating the rejection.

Recipient design refers to a person chooses what topic, word and manner of performing an action in a conversation depending on the person it is intended for (Sacks, 1988). It includes the need to ensure that the recipient has sufficient background knowledge to understand what is being said to them (ten Have, 2011).

Self-initiated self-repairs refer to the phenomenon where the speaker identifies the problem source and proceeds to repair it himself. This often occurs in the middle of the TCU, halting the progressivity of that turn, instead of waiting for the turn to complete before initiating the repair. These demonstrate the self-awareness of the need to make adjustments in one's talk to ensure that the message a person wants to convey is done so successfully (Drew, 2013).

In this section, I have summarised some of CA's key themes or *organisations of practice,* namely *turn-taking, sequence organisation, repair, and turn-design.* In the next section, I summarise the application of CA in bilingual and code-switching research.

2.3.4 Applications of conversation analysis in bilingual and code-switching research

Background of the emergence of CA in CS research

Researchers in the field of CS have developed several models to explain CS behaviour. The "Markedness Model" (Myers-Scotton, 1998) posits that a person chooses to code-switch where it is not expected to happen to serve a particular reason. This is closely based on the "Rational Choice Theory" (Elster, 1983). In order to understand the use of CS without referencing to an external set of pre-determined norms, Auer (1998, 2005) and Li (2005) proposed using the CA approach.

Auer (1998) proposed three levels in which CS can be studied in CA. The first level is the main language selected for the whole conversation. At the intermediate level, participants may choose to select a different language for a few turns. At the lowest level, the speaker may choose to select a different language within that turn.

An example of how CA can help explain the meaning of CS in conversations is through preference organisation. This is when a person selects or avoids the language choice of their conversation partner according to the action they would like to achieve (convergence or divergence with the conversation partner) and can sometimes both occur in the same conversation (Gardner-Chloros, 2009). This is code-switching at the intermediate level as described by Auer (1998) above.

Application of CA in CS research

In this section, we demonstrate how some studies demonstrate the use of CA in CS research. These include preference organisation, sequence organisation and repair (Gafaranga, 2009).

Li (1994) demonstrates *preference organisation* in his paper through an exchange between a mother and her daughter. In his data, Li demonstrates that an utterance in a dis-preferred language is often met with a non-response, or a *potential rejection* (Davidson, 1990). These *potential rejections* are often followed by *second versions.* The code-switching from a dis-preferred to a preferred language is what Li (1994) describes as *preference organisation.*

Auer (1998) re-interpreted a conversation in Myers-Scotton's (1993) paper on markedness theory by examining the *sequential organisation* in a conversation where a farmer is asking money from a plant worker. Mother tongue (Lwidakho) was used throughout the conversation as a form of convergence, except in the instances where the plant worker has to reject the farmer's request – done in English. This code-switch is a signal of divergence in the conversation. After the rejection is performed, the conversation continues in Lwidakho, marking a return to convergence.

Indeed, failure to demonstrate this convergence may result in a communicative breakdown. Li (1998) demonstrated that CS can result in a need for repair through a conversation between an eight-year-old girl, her mother and her fifteen-year-old brother. The girl's request for assistance in English (dis-preferred language) results again in a *potential rejection*. Although the girl persists in repeating her request in English, her mother responds with an OIR in Cantonese, which enabled the girl to understand the

problem – that she is not using the preferred language. The girl's subsequent self-repair by code-switching to Cantonese when repeat her request was met with success.

Other CA studies looking at the bilingual population comes in the form institutional and interpreter studies within the medical setting. Friedland & Miller (2013) found that code-switching is a facilitator in conversations between patients and medical practitioners. Raymond (2014) found that interpreters for Spanish-speaking families accessing English-speaking healthcare facilities use code-switching to ensure that information is transferred successfully employing principles of recipient design and repair. This also ensured good relationships between patient and practitioners.

Researchers have also used CA methodology to study disordered bilingual populations. An area relevant to this study is CA studies in CS involving persons with dementia, who like persons with TBI have both language and cognitive deficits. Svennevig, Hansen, Simonsen & Landmark (2019) studied multilingual persons with dementia. Their participants were analysed in spontaneous conversation. CS was used to compensate for word finding difficulties and to convey meta-communicative parentheses – commenting or expression of frustration. The CS observed were largely appropriate. Few instances of inappropriate CS include using a language not understood by the conversation partner or not adapting to the language of choice in the conversation. These are attributed to the typical symptoms of cognitive decline associated with dementia.

In this section, I have summarised the history and aims of conversation analysis, its unique methodology and its application to the study of communication in neurotypical ('normal') conversations, particularly in the areas of bilingualism and code-switching, ending with recent studies looking at bilinguals from a disordered population (autism spectrum disorder, dementia). In the next part of the literature review, I will summarise the history of CA applied to communication disorders before describing the findings from other studies looking at communication disorders such as aphasia, dementia and TBI, using CA as its main methodology.

2.4 Conversation analysis in the study of communication disorders

"Atypical interaction" refers to social interactions in the presence of one or more participants who have a communicative impairment. The underlying reason for the communicative impairment may be long term and chronic conditions such as autism, hearing impairment, aphasia and dementia. Hence, the problems faced in such interactions are unique and different compared to interactions with neurotypical participants (Wilkinson, 2019).

2.4.1 History of CA applied to communication disorders

CA in communication disorders began in the late 1970s and through the 1980s. In this first stage of development of CA in communication disorders, researchers often combined analytical tools from CA and other traditions (e.g., speech act theory, discourse analyses). The commonly studied population were those with learning disability (e.g., Price-Williams & Sabsay, 1979), aphasia (e.g., Lubinski, Duchan & Weitzner-Lin, 1980 – breakdowns and repairs) and only later on Alzheimer's Disease (e.g., Hamilton, 1994).

The next stage of the development of CA in communication disorders was in mid-1990s. In this stage, most publications appear to conform to the conversation analytic tradition with the use of naturalistic data, and transcriptions following the Jeffersonian system. The studies in the mid-1990s drew on findings from CA studies of *typical interaction,* to discover how conversations in communication disorders were *atypical* (or not). The focus remains on people with aphasia (Goodwin, 1995; Wilkinson, 1995) but there emerged studies in other areas such as autism (Loca & Wootton, 1995) and people with hearing impairment using sign language (McIlvenny, 1995). Over the next 25 years, the field expanded to include persons with dementia (Mates, Mikesell, & Smith, 2010; Plejert, Lindholm, & Schrauf, 2017), and dysarthria (Wilkinson, 2013).

The recent decade saw a third stage develop, where researchers began studying across different communication disorders, discussing the similarities and differences on how the disorders impact on interaction. Literature reviews (Wilkinson, 2008, 2013; Garcia, 2012; Antaki & Wilkinson, 2013) and empirical studies (Bloch & Beeke, 2008; Wilkinson, Bloch & Clarke, 2011) have been conducted.

Wilkinson (2019) proposed a method of categorizing the communication disorders: (1) speech disorders (e.g., dysarthria and other motor speech disorders); (2) hearing disorders (e.g., amongst persons with hearing impairment using sign language); (3) language disorders (e.g., aphasia); and (4) cognitive disorders (e.g., dementia, traumatic brain injury). Three main ways these atypical interactions (across communication disorders) differ from typical interactions are: (1) atypical forms of delay in TCU progressivity; (2) atypical problems of understandability, intelligibility and hearing; and (3) the production of atypical actions (Wilkinson, 2019).

Significant delays in TCU progressivity are seen when there are problems with self-repair, as seen in persons with aphasia (PWA) (Wilkinson, Gower, Beeke & Maxim, 2007) as well as persons who stutter (PWS) (Morris, 2015). Problems with understandability, intelligibility and hearing are often indicated in the form of an OIR in “second position” (Wilkinson, 2019). These are seen in PWAs with agrammatism (Beeke, Wilkinson, & Maxim, 2007; Heeschen & Schegloff, 1999; Laakso & Godt, 2016) and anomia (Griffiths, Barnes, Britten, & Wilkinson, 2015), and persons with dysarthria (Bloch & Wilkinson, 2009). Atypical actions on the other hand are often seen in persons with cognitive disorders – usually in the form of poor recipient design. These are observed in the perseveration of persons with TBI (Frankel & Penn, 2007), repetitiveness in persons with Alzheimer’s Dementia (Wilkinson, 2019), and delusional talk in persons with schizophrenia (Palmer, 2000).

2.4.2 Significant findings from CA work in individual communication disorders

In all studies using CA on communication disorders, the focus of examination is often either on the person with the communication disorder him/herself, or on the conversation partners of the interaction. The interaction between the two is nevertheless important, but we can summarise findings using these two categories.

CA applied to aphasia

The person with aphasia

CA has been helpful in illustrating how persons with mild aphasia can face significant

issues in daily communication. Armstrong, Fox & Wilkinson (2013) demonstrated that despite having only a mild aphasia, their participant was cognizant that problems with conversations were further reaching. Using CA, they identified that the issue includes using nonspecific and simplified language, resulting in difficulties developing a logical argument in response to the conversation partner's line of argument. The language difficulties of the person with aphasia (PWA) also resulted in more intrusions by the conversation partner in the form of other-initiated repair, which occur not at the end of the PWA's TCU but midway. This is with the intention to assist the PWA in formulating a better argument, but adds to the perceived communicative failure on the part of the PWA.

Furthermore, studies such as Laakso & Klippi (1999), Laakso & Godt (2016), and Lindsay & Wilkinson (1999) identified that in conversations involving PWAs, long negotiation (e.g. hint and guess sequences) and repair sequences are necessary before the establishment of shared understanding between PWAs and their conversation partners. This results in issues with understandability and sequence progressivity.

Topic initiations produced by PWAs are often sequentially and referentially problematic, leading to communication breakdown. Dispreferred responses secondary to the failure of the communication partner to identify that a topic shift has occurred, as well as extended attempts to establish what the person with aphasia was referring to typically follows topic initiation breakdowns (Laakso & Klippi, 1999; Barnes & Ferguson, 2012).

Naturally occurring solutions seen in some PWAs include using prosody to indicate topic shift/initiation. Beeke, Wilkinson & Maxim (2009) identified prominent pitch excursions in final words as a signal of turn completion. Another strategy is the use of turn prefaces such as "by the way", "anyway" (Wilkinson, Lock, Bryan & Sage, 2011), "oh-" (Beeke, Maxim, Best & Cooper, 2011), and "and-" (Barnes, Candlin & Feguson, 2013) prefaces. Other turn prefaces such as "I suppose" (Beeke, 2003) have been identified, though its use is not for the sole purpose of topic shift/initiation but general turn construction strategies.

Following the adaptation theory (Kolk & Heeschen, 1990), Heeschen & Schegloff (1999) describes how telegrammatic speech in their participant who is a PWA was a form of adaptation that 1) enabled his message to be understood by the conversation partner, and 2) elicited help from the conversation partner – providing enhanced sentence forms as indirect form of teaching/repair.

The conversation partners

Conversation partners play a crucial role as a facilitator assisting PWAs get their meaning across. Some of these actions displayed by conversation partners include the use of guesses, and interpretations. However, conversation partners may also unintentionally demonstrate non-facilitatory behaviours such as restricting PWAs' ability to make optimum use of their residual linguistic and communicative resources or focusing attention on the PWAs' impairments leading to negative emotions such as frustration for the PWA (Wilkinson & Wieleart, 2012).

One debatable action displayed by conversation partners of PWA is the use of 'test questions', referring to questions asked to the PWA, whose answer is already known to the conversation partner. This phenomena has been studied by various researchers. Some propose that they are not helpful – resulting in negative emotions and interactive

pressure (Burch, Wilkinson, & Lock, 2002; Lock, Wilkinson, & Bryan, 2001). Beeke et al. (2013) recognises that test questions are a double-edged sword in that although it removes the potential difficulty of the conversation partner understanding the PWA, it also reduces the content and structure of the turns of the PWA.

Problems with intersubjectivity, or mutual understanding, are common in conversations involving PWA. Persons with aphasia have been shown to have difficulties with self-repair. Hence, the responses of their conversation partners are crucial – these can bring about positive or negative effects on the conversation. Barnes & Ferguson (2015) identified repair initiation, repair completion and repair pursuance as positive-yielding responses to problems with intersubjectivity in place of the commonly observed negative-yielding responses such as receipting responses (e.g. “mm”, “yeah”), accounting responses and non-serious responses.

Co-construction of talk shows that conversation partners can adapt to make conversations with PWAs successful and ‘normal’. Examples from Bloch & Beeke’s (2008) study demonstrate this – conversation partners, especially in a multi-party conversation involving a non-familiar partner may become the spokesperson for the PWA, not in expressing the communication intent for them, but in repeating it, rephrasing it, and electing the PWA as the next-turn speaker. They may also bring up common knowledge between the two to provide context to the conversation. Plejert, Samuelsson & Anward (2016) identified collaborative telling, formulations, yes/no questions, declaratives and hint and guess strategies as helpful examples of how PWA and their conversation partners co-construct their talk.

Implications for aphasia intervention

Studies employing CA methodology have shed light on how to better approach intervention for persons with aphasia (See Wilkinson, 2014; 2015 for a summary). Home practice is one of the common methods of service delivery employed by clinicians, to increase the frequency of therapeutic activities as well as empower the family to take on the therapeutic role in the recovery from aphasia. However, other-initiated therapeutic activities can be face-threatening thereby reducing the motivation and receptivity by PWAs. Bauer & Kulke (2004) identified a few naturally-occuring behaviours that might circumvent this problem. These include using games, rather than didactic therapeutic exercises, and embedding the teaching sequences within repair sequences self-initiated by the PWAs.

Although language-based therapies are successful in improving impaired skills in aphasia (e.g. word-finding deficits), and can be generalised to everyday life (Best et al., 2011), persons with aphasia still need direct support to utilise learned strategies in conversations. This takes the form of interaction-focused intervention (Wilkinson & Wielaert, 2012). In order to assist clinicians to work with PWAs and their conversation partners more systematically, resources such as ‘Supporting partners of people with aphasia in relationships and conversation’ (SPPARC; Lock et al. 2001) have been developed.

In their review of conversation partner training for PWA, Wilkinson & Wieleart (2012) found that teaching conversation repair strategies (see Booth & Perkins, Lock et al., & Lesser & Algar) and questioning methods (see Wilkinson, Bryan, Lock & Sage, 2010) to conversation partners of PWA as well as topic initiation strategies (see Wilkinson, Lock,

Bryan & Sage, 2011) were successful in improving conversations involving PWA. The key point is that there is no one strategy that fits all. Studies have shown that using CA to examine barriers and facilitators to conversations of each individual PWA-communication partner dyad is essential in identifying the key strategies that are required to enhance their conversations, and the decision of what is appropriate and what is not is up to the dyad to decide (Wilkinson et al., 1998; Booth & Perkins, 1999; Beeke et al., 2015).

One formal resource for communication partner training involving both the PWA and their conversation partners is 'Better Conversations with Aphasia' (BCA; Beeke et al. 2013). Using video feedback exercises, good conversation facilitators and barriers to conversation are identified. Goals are then decided by the dyad, in terms of which strategies they wanted to practice and what personalised goals they want to target. BCA has been found to reduce barriers to multiparty conversation and a significant increase in facilitatory conversation behaviours (Best et al. 2016).

CA applied to dementia

The person with dementia

In the early stages of dementia, conversation skills can be intact (Kitzinger & Jones, 2007). However, in the later stages language and memory impairments start to affect conversations, especially when word-finding difficulties, tendency to repeat themselves and tangency of responses begin to appear (Bayles and Tomoeda 2014; Djikstra et al., 2004). When the same participant was examined by Jones (2015) her episodic memory problems led to particular difficulties providing information in conversation despite the ability to take her turns unproblematically. Persons with dementia (PWDs) also display comprehension deficits (Lindholm, 2014), word-finding deficits (Lindholm, 2008), confabulation and false beliefs (Lindholm, 2015).

The use of laughter to deal with communication difficulties was studied by several researchers. Lindholm's (2008) study showed that laughter indicates awareness of problems in conversation. Likewise, Wilson, Muller & Damico (2007) found laughter being used in response to trouble in conversation and as a marker of stress – labelling that part of talk as important. Laughter can also be used to actively participate in conversations, such as to direct attention to self, to demonstrate active listener participation and as an act of affiliation.

Kindell, Sage, Keady & Wilkinson (2013) described other more constructive ways to deal with difficulties in conversation including using enactment, variations of paralinguistic features (such as pitch and loudness) and non-verbal communication (such as body posture, pointing and facial expression).

The conversation partner

The talk of conversation partners can sometimes inadvertently cause difficulties for persons with dementia. Allwood et al. (2017) found that healthcare professionals contribute to problems communicating with PWDs in the hospital setting. These include behaviours that may in other settings be considered typical and non-problematic such as 'open-ended pre-closings' (e.g. "can I do anything for you?"), 'mixed messages' (e.g. turning away from patient and then facing patient again to ask what else before leaving),

and using ‘non specific and indeterminate terms’ (e.g. “I’ll be around” and “see you soon”). However, these turn out to be confusing for PWDs and delay the closure of the encounter/conversation.

In other institutional-based studies, Jansson and Plejert (2014) demonstrated the positive aspects of health care workers’ interaction with PWDs. A stressful event such as having the PWD’s hair washed was dealt with by breaking down the task into steps, engaging in negotiation, taking account of the resident’s wishes and discomfort. Praise was also identified as a useful strategy to encourage participation in daily care activities (Jansson, 2016).

Studies in non-institutional settings have demonstrated conversation partners’ facilitative role in helping PWDs manage their conversations. In their examination of overlapping talk, Young, Lind & van Steenbrugge (2016) found that conversation partners re-oriented PWDs to the conversational topic by overlapping in order to achieve topic development in goal-oriented talk. Mikesell (2009) found that conversation partners facilitated topic development in conversations with persons with frontotemporal dementia by supplementing open-ended questions with “yes/no” and test questions. This reduced significantly the number of “I don’t know” responses. Hall, Lind, Young, Okell & van Steenbrugge (2018) demonstrated that conversation partners facilitated conversations by performing repair when specifically requested by the PWD.

Conversation partners’ contributions to PWDs are not only restricted to conversations but also daily activities. It is known that dementia progression results in the loss of independence in performing basic and instrumental activities of daily living. In Majlesi & Ekstrom’s (2016) study, they described a series of directive sequences that demonstrated the utility of sequential organisation of actions in the accomplishment of a joint multi-task activity such as baking.

Implications for management of dementia

CA has better enabled clinicians to differentiate between memory complaints from patients with functional memory difficulties (FMD) and those from a neurological basis (ND). Differences between the two groups include the presence of corroborative instances of memory difficulties by conversation partners, difficulties recalling examples of memory failure, difficulties answering complex questions, and prevalence of “I don’t know” answers in the ND group compared to the FMD group (Elsey et al. 2017). These are in addition to an earlier study by the same group (Jones et al., 2016) which identified difficulties answering questions about personal information, difficulties with working memory in conversation, and an increased time taken to answer questions as difficulties specific to the ND group.

Harwood et al. (2018) published a literature review of 26 studies looking at communication strategies for communicating with PWDs in an institutional setting. The key problems identified include getting a preferred response when giving requests (with frequent refusals) and in performing appropriate closings. To increase the likelihood of achieving a preferred response, requests should be direct, sound authoritative and by breaking it down and presenting it such that it appears not too difficult for the PWD. To improve on closings exchanges, the strategies were to be explicit about when the next encounter would be, body language matching talk, and using ‘closing idioms’.

CA applied to traumatic brain injury

Next, we explore the emerging literature utilizing CA to understand the talk of persons with TBI. Two themes emerge from the studies: firstly, the examination of typical and atypical aspects of persons with TBI in conversation, and secondly, the examination of the actions in response and adaptive role of the conversation partners in these interactions, to help persons with TBI in their conversations.

The person with TBI

One of the earliest works using CA to study persons with TBI was Friedland & Miller's (1998) single case study of participant CH who had moderate TBI. Conversations between CH and his mother, wife and the researchers were tape-recorded and analyzed for (1) repair; (2) turn-taking; and (3) topic management.

They reported that CH engaged in self-initiated self-repairs 80% of the time, which is higher than expected. Upon closer examination of these self-repairs, it was found that they were mostly word replacements and abandoning the main clause. Hence, even though CH engaged in SISR more often than expected of persons with a communication deficit (see above), the nature of the self-repairs appear to be word-searches and reformulation of ideas/thoughts to be expressed in that turn and most were unsuccessful.

The next key finding was that 72% of CH's turn when selected as a next speaker was met with a silence. Most of these were responded to with a follow-up question by his conversation partners in order to re-invite CH's participation in the conversation. Furthermore, when CH does take up his turns, these are often minimal turns such as saying "mm", "yeah" and hence did not contribute to the development of the topic at hand nor allowed for sequence progressivity.

The last key findings are in relation to topics. CH was able to maintain a topic appropriately over many turns and he was able to initiate topics well. Although his ability to initiate topics seem positive, there is an evident topic bias, in that he often chose to talk about things relating to his discharge from the hospital. His topic shifts however, seem to be appropriate, but this appeared to be true only with familiar partners (wife and mother), but not with the researcher.

Overall, Friedland & Miller's (1998) findings shows that although the conversation of their participant with TBI followed conventional norms in some areas, upon deeper investigation, we see how it deviates from typical interaction patterns (e.g., minimal turns, silences, unsuccessful repairs and topic bias).

Frankel & Penn's (2007) study focused on perseveration. Citing McNamara & Albert (2004)'s theory that perseveration is due to impaired inhibitory control, Frankel & Penn (2007) designed a study to test the effects of pharmacotherapy (Ritalin vs. placebo) on perseveration in conversations. Conversational data was collected at the baseline, active vs. placebo and withdrawal phases.

Perseveration was observed in topic initiation where there was a bias towards a certain topic with participants showing difficulties maintaining and shifting topics. Some level of

awareness is inferred from the participants' self-repair attempts, albeit some were not effective.

The amount of perseveration was correlated to their measures of behavioural inhibition and working memory. During active drug phases, improvements were noted in behavioural inhibition, working memory as well as in the ability to perform topic shifts. The study also identified several conversational strategies that may be helpful in managing perseveration in conversation. These included "ignoring the perseverative utterances, reorientating to the current topic, the conversation partner taking responsibility for the introduction of new topics to the interaction and making gradual topic shifts" (Frankel & Penn, 2007).

While the studies above focused on the cognitive and linguistic aspect of TBI, two other studies focused on the impaired actions demonstrated by the participants with TBI. The first is an atypical non-verbal action (touching; Denman & Wilkinson, 2011), and the second is a verbal action (singing; Azios & Archer, 2017).

Denman & Wilkinson's (2011) study analysed touching behaviour, which is common especially amongst males with TBI. Their participant was diagnosed with high-level pragmatic language difficulties and cognitive-communication disorder. He had been noted to regularly touch women inappropriately. In this study, the touching behaviours were not linked to physical opportunities. Instead, these were in response to when the person with TBI had difficulties responding to questions.

Azios & Archer's (2017) study focused on analyzing the singing behaviour of their 23-year-old male participant who was diagnosed with moderate cognitive deficits and severe mixed spastic-flaccid dysarthria. The conversation recorded was between Tim and his therapists. The researchers reported four sequences of Tim singing, one "normal" sequence typical of neurotypical persons, and three others that demonstrated unusual instances of singing. The three unusual instances had a specific purpose in the sequence – to demonstrate disalignment, nominate new topics, and close topics in conversation.

The normative sequence where Tim's inserted sing along to lyrics of the song that was played deemed typical behaviour because the song was playing and it was preceded by a discussion about the musician who sang the song. Aside from the appropriate inserted singing, Tim also established eye gaze with his conversation partners prior to the singing, an indication that he was signaling his claim to the next turn.

The first of three unusual sequences was of Tim abruptly breaking into song (unrelated to the current topic) and asking if his conversation partners knew the song, after being minimally involved in previous turns. His singing signaled a change in topic and was met with an open class repair by one of his conversation partners. Tim's intention to pursue the new topic was evident when he repeats his question. His conversation partners showed their alignment by singing along the same lines and continuing the conversation along the topic of that song.

In the second unusual sequence, Tim used singing to express disalignment with the topic of choice by his conversation partners (his therapist and his father). They had chosen to speak about goals for his therapy, and the last turn prior to the singing was the therapist's question about whether there was anything else Tim wanted to do other than being able to visit Walmart. The disalignment was evident as a dispreferred response to the preceding

question as it began with a hesitation (preferred responses tend to be prompt).

Furthermore, Tim's choice of song lyrics to sing aloud was a partial demonstration of agreement/disagreement to the question. The lyrics were: "As soon as that ends I went skydiving. I went Rocky Mountain climbing." It was not a relevant answer to the question as expected by the therapist but it is potentially a valid answer to what he would like to do. Again, his conversation partners, led by the dad, chose to align with him and produce an affiliative response to that turn.

While the two unusual instances of singing did not follow conventional norms of conversation, they clearly served a purpose for Tim and helped him continue participating in the conversation without disrupting the sequence progression. Tim's conversation partners' reaction to his actions also sheds light on the importance of looking at the conversation partners' behaviour in aiding progressivity of sequences and participation by persons with TBI.

The interaction between the actions of the person with TBI and their conversation partners is demonstrated in the next study by Body, Muskett, Perkins & Parker (2013). In this institutional based study in a healthcare setting, Body and colleagues looked at how differences in perception of the injury led to the person with TBI and the healthcare provider talking at "cross purposes". In this study, they demonstrated that despite both participants speaking about the same topic, the disalignment between them are evident in the following ways: 1) vocab choice (person with TBI choses to use the word "accident" whereas the healthcare provider choses a more formal term "brain injury" to refer to the injury); and 2) attribution of agency (the healthcare provider often assigns thematic agency to the event, calling it "your brain injury", whereas the person with TBI chooses to leave it unidentified "the car accident").

It is thus interesting to further examine the actions in response and adaptive role of the conversation partners in these conversations, presumably to help persons with TBI achieve more success in their conversations.

The conversation partners

Although a large part of the discussion above talks about the deficits faced by persons with communication disorders, the focus of attention is sometimes shifted to the conversation partners, understanding their role in these atypical interactions. One key finding is the *adaptation* by conversation partners in these interactions. This change in manner of talking or behaviour to deal with the difficulties observed in interactions as a result of the communication impairment, is often called a "mutual phenomenon" (Heeschen & Schegloff, 2003).

When one party engages in it, it affects the way the other person talks or behaves. This can also be seen in dysarthric conversations, in the form of a distinct turn co-construction where a person with dysarthria's incomplete or unintelligible production, gets re-produced by the conversation partner (often in the form of a repeat) (Bloch, 2005). Another example of adapted talk is the use of known-answer questions (Schegloff, 2007) in conversations with persons with learning disability (Antaki, 2013) and dementia (Joaquin, 2010).

Adaptation to the communication partner with TBI was also demonstrated in the two

examples of unusual singing in Azios & Archer's (2017) study. Tim's conversation partners demonstrated their adaptation, to Tim's action, leading to progressivity of the sequence. In the first example, Tim's singing indicated a preference to change topics, which after being met by an initial open class repair was taken up when he pursued the change. In the second example, Tim's singing indicated disalignment to the current topic, and again was accepted by his conversation partners in the form of affiliative responses. Both these instances allowed Tim to continue participating in the conversation and ensured sequence progressivity.

Krummheuer (2016) examined the interaction between a physiotherapist and a client with brain injury using a combination of CA and embodied interaction analysis. In this study she describes the embodied practices of scaffolding where both parties co-construct the client as both a competent, collaborative participant and an active agent. Krummheuer (2016) describes how the physical orientation of both the physiotherapist and client, the waiting and encouragement provided by the physiotherapist, all combined to assist the client to participate in their physical activity of sitting from lying position.

Davis, Spencer & Ferguson (2011) focused on adolescents with TBI, with specific interest in their social communication. In their study, it was found that peer interactions included equal, shared contribution to the conversation. They also found that the adolescents often used backchannels instead of usual repair (request for clarification) sequences in casual conversations. In comparison, when conversations were with a non-peer, in this case a teacher, the contribution was unequal. Interactions with teachers have been shown to be teacher-dominant even in non-impaired classroom discourse (Christie, 2002). In this study, Davis et al. (2011) found the same and the behaviours include high control of topics discussed, large number of turns and interruption of the students with TBI.

Barnes (2012) specifically examined the types of questions asked by the conversation partner of a person with TBI when engaged in 'planning' talk. Here, there is a clear goal in the talk (to plan a trip), and like the teacher described above, the conversation partner took on the role of the superior/teacher. Barnes (2012) found that there was a high use of test questions, although found to be done with good intentions, resulted in a restrictive possible set of responses the TBI person can give in their next turn. The use of direct and close-ended questions to address matters germane to planning also restricted the TBI person's responses. The use of directives, rather than proposals, by the conversation partner during planning ensured that the goal is met in the most efficient manner by denying the person with TBI of the option to align/disalign. Although the person with TBI produced transformative answers to contest the agendas, the conversation partner ensured the continued progression of planning activities by pursuing direct answers from the person with TBI via the use of reformulated questions.

Implications for management of TBI

Unlike in CA studies involving persons with aphasia and dementia, the literature for intervention studies based on CA approach is scarce. In a most recent systematic review on communication partner training programmes for persons with TBI (Behn, Francis, Togher, Hatch, Moss & Hilari, 2021), none of the eight studies reported were based on CA approach. This indicates a significant gap in knowledge for CA in persons with TBI. However, it is understandable as CA studies in the analysis of conversation in persons with TBI has only recently emerged. The only study using CA approach for the

development of an intervention programme is by Mann, Power, Barnes & Togher (2015).

Mann et al. (2015) examined the impact of a communication partner training programme called “TBI Express” on the type of questions asked in conversations between persons with TBI and their close communication partner. The training focused on collaboration strategies such as scaffolding: instead of asking test questions, ask questions that seek information, model appropriate turn-taking, elaborate or assist the person with TBI to elaborate on conversational topics, and for more severe persons with TBI, to ask close-ended questions instead of open-ended questions. Post-training, Mann et al. (2015) found that changes in the communication partners’ way of asking questions enabled the person with TBI to select topics and develop their talk better than prior to the training.

In the study of conversations involving persons with TBI, it is thus interesting not only to examine what the person with communication impairment does, but also their conversation partners.

2.5 Aims and contributions

Having summarised the relevant literature, in the last section of this chapter, I will describe the aims of this study and its potential contribution to knowledge in the field.

2.5.1 Aims

Based on the literature review above, we can see that having a TBI will impact on the quality of the interactions people have with their conversation partners. TBI research has focused largely on the behaviour/actions of the person with TBI, but there are some papers looking at what the conversation partners do in these conversations to adapt to or scaffold the talk of their conversation partners with TBI. There has been no research on bilingual persons with TBI, especially looking at their patterns of code-switching, which may be impacted by the presence of cognitive deficits secondary to TBI. Hence, the aims of this study are as follows:

1. To understand the problems in conversations involving persons with TBI

   This study seeks to identify the interactional problems faced by the person with TBI as well as their conversation partners in conversations. These will mostly focus on where the person with TBI or the conversation partner uses repair in order to deal with a trouble source which appears related to the cognitive or linguistic impairments associated with TBI. It will also focus on atypical actions (Wilkinson, 2019) where the action may be well-formed but is inapposite or inappropriate in some way.

2. To understand how conversation partners adapt to conversations involving persons with TBI

   Conversation partner training research as well as research looking at adaptation of conversation partners demonstrated that the actions of the conversation partners (e.g. type of questions asked, scaffolding used) are capable of helping or hindering the talk with persons with TBI. Hence, it is useful to identify these adaptive behaviours and evaluate the usefulness of such behaviours in facilitating talk

involving persons with TBI.

3. To explore code-switching behaviour in persons with TBI

   As discussed earlier in the literature review, code-switching behaviour in persons with TBI has not been previously studied. Drawing from studies from persons with dementia and aphasia, there is a possibility that code-switching behaviour deviates from normal patterns in persons with TBI secondary to language or cognitive deficits. Hence, it will be beneficial to use this opportunity where bilinguals with TBI are being studied in detail, to discover these patterns.

2.5.2 Potential contributions

Key contributions from this study would be two-fold. Firstly, this study will add to the growing literature on CA studies in persons with TBI. Secondly, it hopes to inspire further research exploring code-switching behaviour in bilinguals with TBI.

As can be seen in CA studies with persons with aphasia, these early explorations will also pave the way for future studies looking at using CA methodology to develop assessment and intervention approaches for persons with TBI, beyond the formal impairment level type of assessments, and impairment level intervention for deficits such as cognition and pragmatics.

In the next chapter, I will describe the methods employed in this study in order to achieve the aims set out above.

3 METHODS

In this chapter, the details of the design of the study as well as the ethical approval process are outlined first. Next, a detailed description of the participants of this study is provided. This will be followed by a description of the data collection process as well as the transcription and analytic procedure. This chapter will provide a context and background to the data which are analysed in the next three results chapters.

3.1 Study design and ethics approval process

At the beginning of this PhD process, an exploration of conversations between Malay-English bilinguals with and without TBI was broadly envisioned. A pilot study was carried out to achieve the following aims: 1) feasibility of executing and applying the CA methodology to local TBI participants and their conversation partners, 2) to glean broad themes that would arise from the TBI population, and lastly, by including participants who are neurotypical, 3) to obtain information on key differences in themes that arise from conversations with and without persons with TBI.

Ethics approval was sought from the SingHealth Centralised Institutional Review Board (SingHealth CIRB), as the participants were recruited from an acute hospital under this health cluster. Approval was obtained on 27 September 2012 [CIRB Ref: 2012/843/D]. The SingHealth CIRB requires renewal of the study on an annual basis and it was renewed again on 26 September 2013. In this study, approval was obtained to collect conversations between dyads who are neurotypical, as well as those that include a person with TBI. Consent was taken from all participants who contributed their data. For the persons with TBI, the study was explained to them in a simplified but complete manner to circumvent their cognitive and language deficits, but their legal representative was the one who signed the consent form (see Appendix A for a sample of the consent form for the pilot study). At this stage, two neurotypical dyads as well as two dyads consisting of a person with TBI and their close conversation partner were recruited.

An evaluation of the study aims showed that 1) CA methodology is applicable and feasible in the local context, but there was resistance to the use of video recording. This was particularly evident from the dyads with a person with TBI. As such, the decision was made to exclude video recording from the consent taking in the next phase of the study. One key theme that arose from the early data collection was the difference in code-switching patterns between persons who were neurotypical from that displayed by the participants with TBI. As such, this became a focus of the next part of the study. However, there was no need to change the methodology adopted and hence no change was made to that when applying for approval for the main phase of data collection for the PhD.

On 25 September 2014, approval for data collection for the main phase of the PhD was obtained from SingHealth CIRB [CIRB Ref: 2014/750/F]. The key aim for this approval was to obtain more data from the two dyads consisting of a person with TBI, and to recruit more participants with TBI. Unfortunately, although about three other participants were identified, only one more was eventually recruited into the study (see Appendix B for a sample of the consent form for the main study). In all, this study recruited two dyads who are neurotypical and three persons with TBI as well as their close conversation partners. This study was renewed yearly as per SingHealth CIRB requirements, until data collection was completed.

3.2 Participants

A detailed description of each of the three participants with TBI follows Table 1 which is a summary of their social history, language and education background, history of injury and ST diagnosis. For each participant with TBI, there will be a brief description of the conversation partners that they have been recorded to have conversations with. This will include their relationship to the participant with TBI. In the second part of this section, a brief description of the four neurotypical participants will be included.

3.2.1 Participants with TBI

Table 1: Summary of participants with TBI

Participants	**AB**	**SS**	**FZ**
Social history	45 year old male Lives with wife of 20 years (RS) Crane operator	29 year old male Lives with mother and elder sister Customer service officer	23 year old male Lives with mother, father and younger brother Police officer
Language and education background	Malay as first language SCE as second language 'O' Levels	Malay as first language SSE as second language 'O' Levels	Malay as first language SCE as second language 'O' Levels
History of injury	Head injury in 2013 (industrial accident) MRI: focal lesions to frontotemporal region and subdural hematoma GCS 13 on admission PTA duration – 2 days Diagnosis: Traumatic brain injury with subdural haemorrhage and hematoma at the frontotemporal area	Head injury in 2013 (car accident) MRI: right subdural hemorrhage GCS 13 upon admission PTA duration – 4 days Diagnosis: Traumatic brain injury with right subdural haemorrhage	Head injury in 2014 (motorcycle accident) MRI: subdural and epidural haemorrhage. GCS 5 upon admission PTA duration – more than a year Traumatic subdural and epidural haemorrhage status post decompressive craniectomy and complicated by post op hydrocephalus status post VP shunt 2014

ST diagnosis	Mild-moderate expressive aphasia with word retrieval deficits characterised by phonemic and semantic paraphasias in connected speech Moderate cognitive-communication deficits (reduced memory and problem solving skills).	Mild expressive aphasia characterised by word retrieval deficits in conversation Mild cognitive communication deficits characterised by reduced memory for new information, organization skills as well as inferential and reasoning skills.	Moderate cognitive-communication deficits characterised by reduced short term memory affecting ability to retain prospective memory, reduced pragmatics, reduced reasoning and problem solving skills. Moderate expressive > receptive aphasia with word finding difficulties, difficulties comprehending complex or abstract verbal and written information.

AB

AB is a Malay gentleman who was involved in an industrial accident. AB was 45 years of age at point of recruitment in 2013. AB has "O" Level qualification and is bilingual as well as literate in Malay (first language; L1) and English (second language; L2). He worked as a crane operator. AB fell at his workplace and hit his head in February 2013. His MRI showed both focal lesions to the frontotemporal area as well as a subdural hematoma. AB's Glasgow Coma Scale (GCS) was 13 upon admission into the hospital but returned to 15 two days after. His post-traumatic amnesia (PTA) duration was two days.

AB was referred to the Speech Therapist (ST) when he regained full scores on GCS and came out of PTA. During the initial assessment sessions, AB was alert, cooperative and conversing in full sentences but had word finding difficulties and reduced memory for verbal information told to him. For example, he would forget information told to him by the ST at the beginning of the conversation and had to ask for clarification later. He also could not remember what he did on previous days, and recollected briefly what he did earlier in the day.

AB was always accompanied by his wife, the then 42-year-old RS during the inpatient stay as well as when he attended outpatient therapy sessions. She is a housewife who tutors children at her home to earn extra income for the couple. They have no children of their own, and live in a 3 room HDB apartment. RS, like AB has "O" level qualification and is literate in Malay (L1) and English (2).

The couple have a very close relationship, and RS commented that she was lucky AB's personality did not change, otherwise it would have been like living with a stranger and she would have missed the RS she was married to for 20 years. This was in response to what she was told about some patients with TBI who suffered a change in personality as a result of the brain injury. In the initial stages, AB often relied on his wife when he could not recall information or had difficulties finding the right words to say. Even when he became more independent in conversational settings, his wife would usually help to correct him

when he makes mistakes, or give him clues when he has word finding difficulties or memory lapses. The couple find joy in teasing each other and are always cheerful.

After the initial round of language and cognitive communication assessment, the ST diagnosed AB as having a mild-moderate expressive aphasia with word retrieval deficits characterised by phonemic and semantic paraphasias in connected speech, as well as moderate cognitive communication deficits characterized by reduced memory, inferential and reasoning skills. Below is a summary of his performance on various tests of language and cognition.

Receptive language

AB was tested using a locally developed and normed assessment battery in Malay (*Malay Semantic Assessment Battery*; Jalil, Rickard Liow & Tng, 2011) and English (*English Semantic Assessment Battery*; Wong, 2012). AB performed at 100% accuracy for single word comprehension in both Malay and English.

AB was also tested using a locally developed and normed sentence comprehension test in English (*Singapore Reception of Grammar Test* – SRGT; Lim, 2012) and Malay (through an informally translated Malay version of the same test). He scored 80% accuracy on this test, having difficulties with the items involving coordinated sentences (e.g. Not only the flower but also the pen is on the table), subject relative sentences (e.g. The old lady who is crying hugs the girl) and object relative sentences (e.g. The old man chases the boy who is laughing). It is to be noted that these sentences are not commonly used in AB's everyday conversation. Furthermore, these sentences contain multiple pieces of information and AB's performance could be impeded by his reduced short-term memory (reported below).

Informally, AB's comprehension of written and spoken narratives was done using PSLE level (6^{th} grade equivalent) comprehension passages with multiple choice questions (MCQs) and open-ended questions in both English and Malay. AB performed better in the written modality versus the spoken modality, and was better at answering the MCQs (90% accuracy) compared to the open-ended questions (70% accuracy) especially for questions that require inferencing from the passage.

In conversation, AB is able to understand basic "Wh" and "How" questions but his answers may be inaccurate in content, grammar or accuracy of information secondary to his reduced memory.

Expressive language

AB performed at 80% accuracy on the single word verbal naming task from the *Malay and English Semantic Assessment Batteries*. AB performed below norms for his age group. His errors were both semantic (e.g. cigarette → cigar) and phonemic (e.g. marching → mashing) in both languages.

AB was also tested informally on a sentence production task using picture scenes from the SRGT. In this task, he was able to form accurate sentences for 70% of the stimuli in English, and 80% in Malay. He made mistakes in content for both languages (phonemic or semantic paraphasias for nouns and verbs) but also made grammatical errors in English

(e.g. the boys is looking at the mirror).

An informal observation of his conversation with his conversation partners demonstrated the same issues with words – word finding difficulties or semantic and phonemic paraphasias, as well as grammatical errors in sentence production but accurate syntax in general. Despite his errors, AB does not appear to be frustrated. He would often ask his wife what the word was and did not seem to realize he has made grammatical errors.

Semantics

AB was tested using the semantic matching tasks in the *Malay and English Semantic Assessment Batteries* and he performed at 100% accuracy on these.

Cognition

AB was tested on the Singapore English version of the *Montreal Cognitive Assessment* (MOCA; Nasreddine et al., 2005). He scored 21/30. AB lost points in the trail making task, naming, forward digit recall, recalling sentences, verbal abstraction, and delayed word list recall. AB had chosen to do the test in English because he felt that he is more comfortable using English in a formal setting. However, because the scores for the Malay version has been shown to be lower for the same age and education group, AB was re-tested a month later in Malay. His performance was almost equal, at 22/30. He was able to name “lion” accurately in Malay unlike in the English version, but made the same mistakes as per the assessment in English. Hence, it was concluded that AB’s performance is affected by his cognition and not the language medium it was presented in.

AB was tested informally on digit span (forward span of 4, backward span of 3), immediate and delayed recall of verbal information (6/10 and 5/10 information units respectively), immediate and delayed recall of visual information (9/10 and 8/10 information units respectively). He benefits from semantic and also binary choice cues, indicating that there was encoding of information but difficulties recalling them off hand.

AB was also tested more formally on the *Scales of Traumatic Brain Injury* (SCATBI; Adamovic & Henderson, 1992). AB scored 17/20 on the Orientation scale, 38/52 on the Recall scale and 42/55 on the Reasoning scale. Althought the test was not normed on the Singapore local population, the interpretation was made qualitatively. The areas which AB had difficulties with was identified, taking into account the cultural relevance as well as whether AB’s educational background expects that level of performance. Overall, his key areas of difficulties appear to be in the recall of new information, recall of words in discourse, recall of information presented in paragraphs, inductive reasoning and multiprocess reasoning. These findings mirror the informal tests reported in the previous paragraph as well as the difficulties he faces in daily communication setting.

Goal setting

Although goal setting and treatment is not part of the study, a description of this process and the decisions made as well as progress are highlighted in this section, because treatment was ongoing throughout the duration of the study. This was done because it would otherwise be unethical to withold treatment from the study participants.

After the assessments were completed, goal setting was carried out with AB and his wife. They were keen to improve on his word retrieval deficits, they did not mind the grammatical errors made in sentences because he still sounds “Singaporean”, in reference to the Singapore Colloquial English which is a simplified version of the Standard English. AB and his wife were also keen to work on his auditory comprehension and memory as well as his ability to retain new information and form new memories.

Treatment was targetted at his word retrieval deficits and AB benefitted most from phonemic and part word cues. Strategies for improving the encoding of auditory information in conversation, using memory devices such as his handphone calendar as well as memo function to take down important information that he wants to remember. Although she was not taught to do so, RS often gets AB to retell the activities they did on previous days, to help him practice recalling information and details.

AB’s employment was terminated at the end of his hospitalisation leave, as the employer thought that it was dangerous for him to operate heavy machinery. RS decided that she could support the household with her income as a part time tutor, and AB subsequently did not return to work. RS also took charge of managing the household including payment of bills, troubleshooting when there are issues with plumbing, electrical appliances and so forth. Despite all that, she always remained respectful of AB’s position as the head of the household (culturally and religiously so for Malay-Muslims). She is often heard discussing the plans with AB, seeking his approval for the decisions she makes. AB on his part seems happy to just say yes to most of the things that RS suggests. The couple reports that they are satisfied with their life after AB’s injury and it is evident from the joy in their conversations, their positive demeanour and how organised their lives are around AB’s treatment, their social activities and their quiet lives at home.

During the time of data collection, AB and RS were still attending outpatient appointments with the Speech Therapy department. Some of their recordings were done in the clinic and others were in their own home. In fact, one of the recordings featured one of the STs who attended to AB during his inpatient stay – GW. GW was 35 years old at point of recruitment. She is a Chinese lady who is bilingual in English (L1) and Mandarin (L2). They had met along the corridor while the couple came for AB’s speech therapy session, and decided they will do a recording with GW in the conversation.

After the initial year of being in contact with the ST and study team, RS came down with a medical problem, and they were unable to provide more data to the study. However, they consented to the data that was already recorded to be used for the analyses of this study.

SS

SS was 29 years of age when he was involved in a road traffic accident in January 2013. SS has “O” Level qualification and is bilingual as well as literate in Malay (L1) and English (L2). He works as a customer sevice officer at a telecommunication company. SS was in a taxi at the passenger back seat on his way to work when the vehicle crashed into a lorry whose driver had jam braked to avoid a motorcyclist on the expressway. SS’s MRI showed a right subdural haemorrhage. His GCS score was 13 upon admission into the hospital and obtained full scores of 15 three days after. His PTA duration was four days.

SS was referred to the ST when he regained full scores on GCS and came out of PTA.

During the initial assessment sessions, SS was alert, cooperative and conversing in full sentences. SS's referral was intially for his "expressive aphasia" – nurses and doctors found that he had word finding difficulties when conversing with them. None of them had the impression that SS had cognitive issues other than the PTA state he was in for the first few days.

Unlike AB, SS is an independent single man and did not have many visitors while warded in the hospital. SS's mother was 68 years of age when the accident happened. Although she was still community ambulant then, she tires easily, hence did not visit the hospital often. SS's key visitor was his elder sister, but the STs never met her as she visited after work hours late in the evening. SS spent most of his time in the hospital talking to his friends on the phone. When SS's mother was asked about SS's language, cognitive skills and hobbies, she asked for us to call his best friend, who is featured in one of the clips that SS self-recorded.

H, SS's best friend is his secondary school classmate and works as a lorry driver. Like SS, H is also bilingual in Malay (L1) and English (L2). It was H who gave us an insight into the changes in SS's communication other than his word retrieval deficits. H informed us that SS spoke mainly in Malay to his friends and family. He mainly used English for work at the telco call centre. However, after the accident, SS used, in H's words, "a lot of broken English". H added that it was "as though he (SS) was trying hard to speak English when he doesn't know how to". Their friends found this odd, but other than that did not find any difference in the way he conducted himself or talked about things. Although he did admit that SS appeared more "needy", calling them more often than usual talking about the same thing. H and their friends concluded that it was likely because he felt lonely in the hospital and at home while recovering.

After the initial round of language and cognitive communication assessment, the ST diagnosed SS as having a mild expressive aphasia characterized by word retrieval deficits in conversation, as well as mild cognitive communication deficits characterized by reduced memory for new information, organization skills as well as inferential and reasoning skills. Below is a summary of his performance on various tests of language and cognition.

Receptive language

SS underwent the same testing as AB. On the *Malay and English Semantic Assessment Batteries*, AB performed 100% at single word comprehension in both Malay and English. On the English SRGT and informal Malay translation of it, he scored 90% accuracy, dropping marks on items involving temporal concept (e.g. Before the man swept the floor, he danced), and coordinated sentences (e.g. The man eats the fish but not the vegetables). Unlike AB, SS's difficulties with these sentences were not only due to his memory issues (discussed below) but also his poor inferencing abilities. For example, the options for the sentence "Before the man swept the floor, he danced" were pictures of a floor which is dirty and a man dancing (target picture), another was of a picture of a clean floor with a broom and dustpan at the side and a man singing (distractor) as well as a picture of a man holding a broom and a microphone at the same time (distractor). Hence, one would need to infer that the dirty floor meant that the floor was not yet swept when the man started singing.

Informally, SS's comprehension of written and spoken narratives was done using PSLE level (equivalent to 6th grade) comprehension passages with multiple choice questions (MCQs) and open-ended questions in both English and Malay. AB performed better in the written modality versus the spoken modality, and was better at answering the MCQs (100% accuracy) compared to the open-ended questions (80% accuracy) especially for questions that require inferencing from the passage.

In conversation, SS was able to understand concrete "Wh" and "How" questions as well as more abstract questions discussing health, politics and religion. However, his responses were filled with grammatical and syntactic errors (e.g. "Once I giddy right, what I did is actually to focus at less than traffic" [The moment I feel giddy, I look away from the traffic]).

Expressive language

SS performed at 90% accuracy on the single word verbal naming task from the *Malay and English Semantic Assessment Batteries*. SS performed at the lower end of the normal range his age group. His errors were mostly tip of the tongue in nature and he benefitted from being given more time (more than 5 seconds) or given a phonemic or part word cue.

SS was also tested informally on a sentence production task using picture scenes from the SRGT. In this task, he was able to form accurate sentences for 60% of the stimuli in English, and 100% in Malay. He made grammatical and syntactic errors in English (e.g. "The book and plate is on top" [The plate is on the book]). Although his Malay sentences were accurate, they may not be the most efficient (e.g. "Ada kerusi yang warna dia hijau tau dengan meja warna wood, satu besar satu kecik" [There is a chair which is green and a table which is wood color, one is big, one is small]).

An informal observation of his conversation with his conversation partners demonstrated the same issues with words – word finding difficulties, as well as grammatical and syntactic errors in sentence production. SS does not appear to be aware of his mistakes. His friends too do not correct him as they did not want to offend him, and they were still able to understand the gist of what he is saying.

Semantics

SS was tested using the semantic matching tasks in the *Malay and English Semantic Assessment Batteries* and he performed at 100% accuracy on these.

Cognition

SS was tested on the Singapore English and Malay versions of the MOCA. He scored 27/30 on both, losing points for verbal abstraction, and delayed word list recall. Similar to AB, SS's difficulties were not language specific but cognition specific.

SS was tested informally on digit span (forward span of 6, backward span of 4), immediate and delayed recall of verbal information (7/10 and 6/10 information units respectively), and immediate and delayed recall of visual information (9/10 and 8/10 information units respectively). He benefit from semantic and also binary choice cues, indicating that there was encoding of information but difficulties recalling them off hand.

SS was also tested more formally on the SCATBI. SS scored 44/52 on the Recall scale and 44/55 on the Reasoning scale. Althought the test was not normed on the Singapore local population, the interpretation was made qualitatively. The areas which SS had difficulties with was identified, taking into account the cultural relevance as well as whether SS's educational background expects that level of performance. Overall, his key areas of difficulties appear to be in the recall of new information, recall of information presented in paragraphs, inductive reasoning and multiprocess reasoning. These findings mirror the informal tests reported in the previous paragraph as well as the difficulties he faced in daily communication setting.

Goal setting

After the assessments were completed, goal setting was carried out with SS. He was keen to improve on his word retrieval deficits, but was not concerned about his grammatical and syntactical issues in connected speech or his memory deficits. When asked why he used English instead of Malay, he denied that he used to be more proficient and fluent in Malay and denied that his English was a source of problem in conversations with his friends. At that time, he had yet to return to work and hence we could not examine the impact his English syntax and grammar has on his job as a customer service officer.

Treatment was targetted at his word retrieval deficits and SS benefitted most from phonemic and part word cues, achieving 100% accuracy at single word production and producing less than 5% errors in conversation after about 1 month of outpatient speech therapy services. SS started to share the some of the difficulties he faced was the sensitivity to environmental stimuli, for example excessive noise or movement in crowded places. This became more apparent when he started leaving home and going out to the community, for example, when visiting shopping malls. In fact, because his sister was busy at work, he had to ask his mother to accompany him, something that he shared during one of the conversations recorded for this study (in which his mother and myself was in the session). The matter was brought forth to his neurologist, who made a referral to the neuropsychologist for further testing. After his last session with the ST which he recorded the conversation with myself and his mother, SS went back to work in the same job he held previously.

SS managed to provide two more recorded telephone conversation with his friends, H and another friend L, who was also his secondary school classmate. L works as a hotel manager and is equally fluent in Malay and English. Subsequently, SS became busy with work and could not find time to record further conversations for the study. In a conversation with him over the telephone, SS appeared to have less errors in English grammar and syntax, and reported that he had no significant issues at work. SS consented to the use of the conversations already recorded for the analyses of this study.

FZ

FZ was 23 years of age when he was involved in a road traffic accident in March 2014. FZ has "O" Level qualification and is bilingual as well as literate in Malay (L1) and English (L2). After completing his national service, FZ signed on to become a police officer and was posted to the coast guard unit. FZ was riding a motorcycle when he was hit by a car while switching lanes on the expressway. FZ's MRI showed a traumatic subdural and epidural haemorrhage. His GCS score was 5 upon admission into the hospital. Amongst

the three participants, FZ was the most severely injured. His GCS remained at about 8 to 9 throughout his six months stay in the acute hospital. During that time, he had multiple procedures done to the brain including a decompressive craniectomy, and developed hydrocephalus post his first VP shunt insertion.

In the first six months of injury, FZ had global aphasia and severe cognitive communication deficits. Even eye contact and joint attention was absent. He also had no feeding response and remained on nasogastric tube feeding. Speech Therapy sessions were targetted at a very basic level, to increase his awareness of environmental stimuli and feeding.

Throughout the journey, FZ's mother never left his side. She was in the hospital for as long as the hospital permitted her stay. FZ's mom worked on his swallow stimulation tirelessly, played him songs he enjoyed, told him stories, introduced all the visitors that came to see him, played religious hymns and songs and never once gave up on a miracle of seeing him talk and eat again. This was despite the fact that she did not receive any verbal nor nonverbal response from her son.

FZ's mother was 55 years of age when FZ met with the accident. She was a housewife. The family consisted of herself, FZ, FZ's father, his younger brother and older sister. The family is close knit, but FZ was always closest to his mother. FZ's mother attended secondary school but did not complete the "O" level qualification. Her dominant language is Malay, but she is able to speak simple English. The family enjoys food and travel the most. FZ's mother ensured that all the staff who cared for FZ knew who he was prior to the accident. She would show us old pictures of FZ and told us his likes and dislikes.

After six months in the acute setting, FZ transferred to a community hospital for slow stream rehabilitation. After a few months there, FZ's mom resolved to bring him home and care for him in a familiar environment. It was a memorable day for her a year after his injury when FZ kicked his leg in the air while on the bed (he had been bed or chair bound mostly). From that first moment, FZ's recovery came very quickly. He soon started talking and eating. It was about 15 months after his accident that he came to see the ST at the outpatient setting for further language and cognitive rehabilitation.

At the outpatient setting, FZ was diagnosed to have moderate cognitive-communication deficits characterised by reduced short term memory affecting ability to retain prospective memory, reduced pragmatics, reduced reasoning and problem solving skills. He also presented with moderate expressive > receptive aphasia with word finding difficulties, difficulties comprehending complex or abstract verbal and written information. The following are details of his assessment.

Receptive language

Due to the severity of FZ's language and cognitive abilities, he was unable to undergo as many detailed assessments as AB and SS. FZ was tested on the Malay and English Semantic Assessment Batteries. FZ needed multiple repetition of instructions and demonstration of task requirement when undergoing testing. Each testing session was laborious. FZ was mostly uncertain of his answers, and often said "eh *salah salah salah*" [wrong, wrong, wrong] even when the answers were correct.

FZ scored 70% for single word comprehension in both Malay and English. On the English SRGT and informal Malay translation of it, he scored only 20-30% accuracy, dropping marks on almost all types of sentences tested. FZ had difficulties retaining the sentences whether it was presented verbally or in writing (reading aloud was about 100% accurate – FZ was able to decode written text).

Informally, FZ's comprehension of written and spoken narratives was done using the Primary One level comprehension passages with multiple choice questions (MCQs) and in both English and Malay. FZ performed equally badly in the written and spoken modality, and could hardly get more than 20% accuracy on the various passages trialled. Often, he would lose concentration while doing the tasks and started talking to his mother instead. He often had to read and re-read passages and asked the ST to repeat multiple times.

In conversation, FZ was initially a passive communicator. When asked, FZ often replies with "*apa dia*" [what is it?]. Although he was able to understand concrete "WH" questions, he requires much scaffolding with his mother often needing to explain the background of the question and the context in which it was being asked. FZ's reduced memory and orientation often lead to the questioner elaborating on the question rather than getting an answer from him.

Expressive language

FZ performed at less than 20% accuracy on the single word verbal naming task from the *Malay and English Semantic Assessment Batteries*. This performance was within the 10th centile of his age group. FZ's errors were mostly semantic paraphasias (e.g. lion → tiger) or nil response at all.

An informal test of sentence production using picture scenes from the SRGT was trialled. FZ would often label a noun or verb in the picture and then proceed to talk about something off topic. Although he could be redirected to the task, it was not possible to get him to produce complete sentences in response to the activity.

Informal observations of his conversation with conversation partners demonstrated the same issues – difficulties understanding what was asked of him, word finding difficulties, as well as grammatical and syntactic errors in sentence production. FZ did not appear to be aware of his mistakes in conversations, unlike his default apologetic responses in structured tasks.

Semantics

FZ was tested using the semantic matching tasks in the *Malay and English Semantic Assessment Batteries* and he performed below the 10th centile with 70% accuracy on these.

Cognition

FZ was tested on the Singapore Malay version of the MOCA. The Malay version was chosen in view of his difficulties in the language tests earlier conducted. Although performance on both English and Malay tests were fairly equal in the language assessments, FZ's default language of interaction was observed to be Malay. Hence, the

decision was to test him in his dominant language. FZ scored 5/30. His strength was in the visuospatial tasks. He scored marks for figure copying, drawing the contour of the clock, naming the elephant, and being oriented to place of testing and country. Unlike AB and SS, whose difficulties on the same test were largely due to their cognitive deficits, FZ's difficulties was with understanding the instructions, despite multiple attempts by the ST to simplify the instructions. Here, his performance was affected by both language and cognitive deficits.

FZ was tested informally on digit span (forward span of 3, backward span of 2), immediate and delayed recall of verbal information (2/10 and 0/10 information units respectively), and immediate and delayed recall of visual information (3/10 and 1/10 information units respectively). He did not always benefit from semantic or binary choice cues, indicating that there could have been difficulties even with encoding the information. In view of the difficulties met above, FZ was not tested on the SCATBI.

Goal setting

After the assessments were completed, goal setting was carried out with FZ's mother in the presence of FZ. When he was asked what his goals are, FZ's response was "*tak tahu*" [I don't know]. FZ's mother's main goal was to help him return to work. She was of the opinion that working on the language skills was top most priority – his memory and pragmatic issues can be worked on later.

Treatment was initially targetted at single word and sentence comprehension and naming in structured tasks, as FZ was least disctractible during such tasks. FZ's mother bought him primary school assessment books to practice vocabulary, grammar and comprehension using MCQ stimuli. FZ's mother practiced with him daily at home. Two months after, FZ improved and reached comprehension levels of 100% for word stimuli and about 80% for sentence stimuli. The focus was then shifted to his ability to participate in conversation.

It was about this time that FZ was recruited into the study and their first conversation recorded – it was recorded in the clinic, with both of them given the instruction to carry on with their conversation while the ST stepped out to attend to something else.

Attempts were made to teach FZ strategies to focus on the conversation partner so that he would be able to understand better and remember the content of the conversation. However, these metacognitive skills appeared too difficult for FZ to comprehend. It was also at this time that FZ's superiors enquired about FZ returning to work. After they were made aware of his language and cognitive skills, they were keen to have him back at work with a largely modified role. After much discussion with the superiors, FZ's parents, his rehab physician, neurologist and neurosurgeon, FZ returned to work. In the first six months of his return, FZ was tasked to patrol and ensure all staff were doing their work. According to his colleagues, FZ took this role very seriously and often chided them for even talking while on duty.

Despite the pragmatic issues and his difficulties following abstract and long instructions, FZ gradually picked up these language skills. A year after he started working, his language skills were fairly functional, albeit grammatical and syntactical errors that were acceptable within the Singapore Colloquial or Standard English norms. Interestingly, just like SS, FZ

became dominant in English after his language function returned.

FZ continued to contribute to data for the next four years and his conversations form the bulk of the analyses in this thesis. FZ was admitted twice because of seizures during the study period. However, these did not have much impact on his language and cognition beyond the chronic deficits. FZ's mother was in charge of recording his conversations, mostly using her handphone while the pair goes about with their daily activities.

In FZ's recordings, his mother was the main conversation partner but there were others who featured in them as well. Below is a brief description of these participants.

R1 and R2 were FZ's cousins (a married couple). They had visited FZ at home after his mother informed the relatives that FZ was making progress with his language skills. It was R1 and R2's first time visiting FZ after the accident. According to his mother, FZ did not recognize who they were, but was very comfortable speaking to them. Both R1 and R2 were English-Malay bilinguals and had tertiary education.

BS was a 42 year old domestic helper at point of recruitment. She was employed to help FZ's mother care for FZ and perform household duties after he was discharged from the community hospital. BS often accompanied FZ to his sessions with the ST. Other than FZ's mother, she spent the most time with FZ in his recovery stages. BS is from Indonesia and speaks Bahasa Indonesia. She knows very basic English. BS is a shy lady and barely says much. BS features in a conversation where FZ was thanking her at the end of prayers held in their home.

MB and FB were relatives whom FZ and his mother visited while on holiday in Batam (Indonesia) together with FZ's mother's friends. MB is FZ's distant uncle and FB his distant cousin. MB speaks predominantly in Bahasa Indonesia, but FB is fluent in both English and Bahasa Indonesia. During this visit, FZ had already become English dominant and we would see that FB and FZ's mother had to be a translator to MB in their conversation.

3.2.2 Neurotypical participants

In Chapter Six, when we discuss about code switching, data from neurotypical participants will be presented. Table 2 is a summary of the neurotypical participants.

Table 2: Summary of neurotypical participants

Participants	**A**	**B**	**C**	**D**
Social history	24 year old female speech therapy student	24 year old female speech therapy student	40 year old female therapy assistant	23 year old female therapy assistant
Language and education background	SSE as first language Malay as second language Masters	SSE as first language Malay as second language Masters	Malay as first language SCE as second language Graduate cert	Malay as first language SCE as second language Graduate cert

A and B are 24 year old Speech Therapy students in the local graduate entry masters programme at point of recruitment. They are both bilingual in English and Malay, with dominance in the English language. English is used in school, at home, and with friends, even if they were Malay-speaking. The English form they use is Singapore Standard English.

C and D are 40 and 23 years of age respectively at point of recruitment. Both are graduates of the Institute of Technical Education and work as therapy assistants. C and D are bilingual in English and Malay, with dominance in the Malay language. Although English is the language medium at work, both C and D often speak Malay to colleagues who speak Malay. English is used with non-Malay speaking colleagues or in more formal settings. At home, C predominantly speaks Malay while D speaks Malay mostly with her parents and grandparents, but a mix of Malay and English with her siblings. The English form used by C and D is Singapore Colloquial English.

3.3 Data collection

Capturing 'natural interactions' was the aim of data collection as per CA principles. An audio recorder was given to each participant, for them to record their conversations whenever feasible. Specific instructions were given to the neurotypical participants and the conversation partners of the persons with TBI, which will be described below. A total of 20 minutes worth of conversations were collected from the neurotypical participants (see Table 3), and 95 minutes worth of conversations from the participants with TBI (see Table 4).

Participants contributed to data for at least two time points, at five months apart. AB and SS contributed to data at their first and sixth month whereas FZ first contributed to data fifteen months after his injury, when he started to speak at conversation level. He contributed to the data five months later and continued to do so for another four years. Data was collected over time to analyze if differences in interaction patterns occur with neurological recovery.

Table 3: Summary of data collected from neurotypical participants

Data no.	Neurotypical person	Neurotypical conversation partner	Location	Context	Length
1	A	B (A's classmate)	University	A and B's conversation after class	10 minutes
2	C	D (C's colleague)	Hospital therapy room	C and D's conversation while taking a break in the therapy room	10 minutes

Table 4: Summary of data collected from participants with TBI

Data no.	Person with TBI	Neurotypical conversation partner(s)	Time point	Location	Context	Length
3	AB	1. RS (AB's wife) 2. GW (AB's speech therapist)	1 month post injury	Clinic	AB and RS sharing with GW about what they did over a public holiday	8 minutes
4	AB	1. RS (AB's wife)	6 months post injury	Home	AB and RS discussing about their weekend	7 minutes
5	SS	1. M (SS's mother) 2. ST (SS's speech therapist)	1 month post injury	Clinic	SS sharing with ST about his experience after discharging from the hospital	10 minutes
6	SS	1. H (SS's best friend)	6 months post injury	On the phone (recorded at home)	SS speaks on the telephone with H about their holiday plans	5 minutes
7	SS	1. L (SS's best friend)	6 months post injury	On the phone (recorded at home)	SS speaks on the telephone with L about their meet up plans	5 minutes
8	FZ	1. Mom (FZ's mother)	15 months post injury	Clinic	FZ's mom discussing about what to do during her off day with FZ	10 minutes
9	FZ	1. Mom (FZ's mother) 2. R1 (female cousin) 3. R2 (male cousin)	20 months post injury	Home	FZ and mom have a multi party conversation with his female and male cousins who came for a visit at their home	10 minutes
10	FZ	1. Mom (FZ's mother)	22 months post injury	Bus stop	FZ and mom's conversation at the bus stop where he almost got onto the wrong bus	3 minutes
11	FZ	1. Mom (FZ's mother)	24 months post injury	Home	Mom speaks to FZ to ensure he understood why their plans had to change on this eve of eid-ul-adha	6 minutes

12	FZ	1. Mom (FZ's mother) 2. BS (FZ's helper)	30 months post injury	Home	FZ thanks helper at the end of the prayers held at their home	4 minutes
13	FZ	1. Mom (FZ's mother)	46 months post injury	Outside of home	FZ and mom's conversation while walking home (FZ had fetched mom from the bus stop)	5 minutes
14	FZ	1. Mom (FZ's mother)	50 months post injury	Home	FZ and mom's conversation on the eve of their Batam trip	8 minutes
15	FZ	1. Mom (FZ's mother) 2. MB (FZ's male relative) 3. FB (FZ's female relative)	50 months post injury	Relative's home	FZ's conversation with two relatives in Batam	10 minutes
16	FZ	1. Mom (FZ's mother)	60 months post injury	Home	FZ and mom's conversation about mom changing jobs	4 minutes

As decribed earlier in the section of feasibility of video-recording during the pilot study, it was found that the participants were not keen for video-recording and did not consent to it. Hence, only audio recordings were used as primary source of data. To supplement for the lack of video-recording to understand the context and behaviours surrounding the audio data, secondary source of data was collected via an interview immediately after submission of each audio recording. During these interviews, the audio recording was played back together with the participants and the context as well as some of the physical actions that might have accompanied the conversation were clarified. The interview data was however treated with caution, as it was less objective and there could be gaps in memory from the participants as well even though the interview was held immediately after the audio recording was submitted to me.

Neurotypical participants

A and B chose to record their conversation on campus at the university they attend, while C and D chose to record at their workplace. All neurotypical participants were informed that they are to record about 10 minutes of conversation that happens between them. They are to record it any time they are comfortable doing so. Neither topic of conversation nor language medium of use was instructed to the participants. Both A-B and C-D dyads chose to record a continuous 10 minute conversation instead of recording small samples of conversations.

Participants with TBI

For the participants with TBI, their closest conversation partner was identified and is the person responsible for co-ordinating the recordings if the participant with TBI is not able to manage the audio recordings. For AB, his wife RS was the person in charge of recordings. For FZ, it was his mother. AB's wife and FZ's mother feature in all the recorded audio data. During multiparty conversations involving the respective dyads and another usually less familiar conversation partner, AB's wife and FZ's mother takes on the role as the significant other who is present in those conversations. SS was confident of collecting his own audio recordings and did not identify a close conversation partner to assist him. All participants contributed to one in-clinic conversation to teach the participants how to use the recording device and to familiarise themselves with being recorded.

AB and RS contributed to two audio recordings, the first of which was the familiarisation session. In the first session, although they were asked to have a conversation between themselves, they had felt a bit shy. They requested to ask GW, who was their ST during the admission, and they had met along the corridor at the clinic, to join them in the conversation. At the end of that session, RS was instructed to bring home the audio recorder and record any conversations the couple may have. The second recording was made by RS while the couple was at home. As described in the previous section, the couple was unable to provide further recordings in view of ill health. AB and RS contributed to 15 minutes of recorded conversation

SS contributed to three recordings. SS's mother said that she did not have anything much to say and asked the ST to join them in the conversation. She did however, contribute to the conversation in the end after warming up to being recorded. At the end of that session, SS was instructed to bring home the audio recorder and record any conversations he may have with family or friends. SS decided to record conversations he had with his two best friends, H and L over the phone. SS subsequently became too busy at work, and due to the nature of his job, he was unable to record conversations at work and hence was unable to provide further recordings. SS contributed to 20 minutes worth of conversations altogether.

FZ contributed to the bulk of the data in this study. His mother recorded eight conversations altogether. The first familiarisation recording was made in clinic. Unlike the other two TBI participants, FZ's mother did not require the presence of the ST to record their first conversation in clinic. At the end of the session, she asked for permission to record using her phone, as it was difficult to carry the audio recorder around with her. She had predicted that they will be recording both in the home setting as well as outside of home and wanted to be able to record the conversations discretely. Their first out of clinic recording was vetted by myself to ensure that the quality of the recording was good. FZ's mother subsequently used her phone and recorded conversations at home, outside home and even on their overseas trip. FZ contributed 60 minutes worth of conversation altogether.

3.4 Transcription and analytic procedure

3.4.1 Transcription of data

Audibility of each recorded conversation ranged from 90-100%. Audibility was not 100% for the conversations recorded outside of home in a noisier environment as well as in some of the multi-party conversations where the other participants might be further away from the audio recorder or is talking in overlaps.

The audio recordings were first transcribed orthographically, word for word as produced by the speakers (in both English and Malay). Utterances are broken in terms of TCU units. Where a TCU unit exceeds the border of the page, a next line is used to continue transcribing this TCU. Malay words are transcribed in *italics*.

Transcription symbols as described and used by Wilkinson & Beeke (2012) were then added to the orthographic transcription (see Appendix C). These added information and details regarding pauses, overlaps and speech production characteristics, to the talk-in-interaction. Unintelligible utterances are also identified. Additionally, secondary source of data from interviews are also added to disambiguate certain transcripts (e.g. when there is a phyical action made in conjunction with the verbal output). These two steps makes up the first line of the transcript prepared.

A three-line convention transcription was chosen for this study in view of the presence of code-switching to a non-English language. The second line provided a word for word translation of Malay words into English. The translated word order was kept the same as it is produced in the Malay language. Each English-translated word in the second line is positioned directly below the original utterance in Malay transcribed in the first line. A third line was then added to provide a general gloss using appropriate English syntax.

It is to be noted that not all 115 minutes of data were transcribed in detail as described above. All the data were transcribed orthographically and secondary data added to the first line. Word for word translations in the second line and an English gloss in the third line were added, in order for my data to be understandable to my non-Malay speaking supervisors and data session participants. Only transcripts selected for detailed analysis (described below) had detailed transcription symbols added to them.

3.4.2 Data analysis

Data analyses began with “unmotivated looking”. All audio recordings were listened to and transcribed as described above. Data was shared with my supervisors and during these data sessions, phenomenon which were recurring in the data were extracted and catalogued according to various themes. The initial themes were guided by the established “organizations of practice” in CA studies such as repair, turns, and sequence organisation. During these data sessions, we particularly looked out for behaviours or utterances that were different from normal conversations (e.g. the use of test questions) and also those unique to the Singapore culture (e.g. code switching behaviour).

The easiest phenomenon to identify in the study data were the atypical actions and behaviours displayed by persons with TBI in their interaction with conversation partners. All such observations were catalogued together and then examined for common

underlying themes.

The second easiest phenomenon to identify were the various code-switching incidences. Data sessions regarding these phenomenon are always interesting and challenging. Questions to help me analyse and make sense of the data include asking “what would the difference be if this was produced in English/Malay?”, and “what is the impact of the code-switch on the receiver of the utterance?”. Given that code-switching has not been studied in detail in the TBI population makes it harder to fall back on existing theory or observations by other researchers.

Another phenomenon prominent in the data is the teacher-like behaviour displayed by the conversation partners of persons with TBI. Although in some of the data, the relationship between the two participants are husband-wife and peers, the nature of conversations captured in this study show that the balance of relationship is not the same as it might previously have been.

From these early discussions, analyses were focused on three broad areas, which will be described in detail in each of the three analyses chapters to be presented next. The first broad area (Chapter Four) is with a focus on the person with TBI – capturing observations of persons with TBI facing interactional problems during conversations. This includes observations of “atypical actions” (both verbal and non-verbal), SIR that contributes to delays in TCU progressivity, problems of understandability displayed by conversation partners of the person with TBI as demonstrated by OIR, and problems of understandability displayed by the person with TBI, also demonstrated by OIRs.

The second broad area (Chapter Five) is with a focus on the conversation partners of the person with TBI. In particular, I am interested in looking at the various adaptations they have had to make in order to facilitate conversations with the persons with TBI. The observations are categorised into two areas. Firstly, I pulled together examples of teacher-like behaviour displayed by the conversation partners. These include the use of “test questions”, “correct-production sequences” (Lock, Wilkinson, & Bryan, 2001), teaching of words and concepts, and OIRs as a form of hint at errors produced by person with TBI. Secondly, I collated examples of behaviours displayed by close conversation partners in multi-party conversations involving less familiar conversation partners. These include clarifying for person with TBI or the conversation partner, and assisting the person with TBI when answering questions from the less familiar conversation partner.

The third broad area (Chapter Six) is focused on the code-switching (CS) behaviour observed in the data. Firstly, comparisons between CS behaviour in neurotypical participants and persons with TBI are made. Similarities in function of CS behaviour are identified (e.g. lexical specificity, contextual influence, and reciprocity behaviour). Differences are likewise identified (e.g. more complex use of CS in negotiations and emphasising a point are not seen in the early transcripts of persons with TBI). Unique use of CS by significant others of persons with TBI (e.g. as a tool to scaffold conversations) are also collated and presented.

4 INTERACTIONAL PROBLEMS IN CONVERSATIONS INVOLVING PERSONS WITH TRAUMATIC BRAIN INJURY

CA studies have demonstrated interactional problems faced by persons with communication deficits. Three main ways the interactions involving persons with communication deficits differ from more typical interactions include: (1) atypical forms of delay in TCU progressivity; (2) atypical problems of understandability, intelligibility and hearing; and (3) the production of atypical actions (Wilkinson, 2019).

For persons with aphasia, these are often a result of language deficits. Problems include frequent intrusions in the form of other-initiated repair by conversation partners (Armstrong, Fox & Wilkinson, 2013), presence of long negotiation and repair sequences (e.g. hint and guess sequences; Laakso & Klippi, 1999; Laakso & Godt, 2016; Lindsay & Wilkinson, 1999), difficulties with topic shifts (Laakso & Klippi, 1999; Barnes & Ferguson, 2012) and utterances lacking in understandability due to being poorly designed for their recipient (Penn, Frankel & Wilkinson, 2015).

For persons with dementia, on top of language deficits, cognitive deficits play a large role. Interactional problems include tangentiality, repetitiveness, comprehension and word-finding deficits, confabulations and false beliefs (see e.g. Bayles & Tomoeda 2014; Djikstra et al., 2004; Lindholm, 2008, 2014, 2015).

Persons with TBI likewise face communicating with others in the face of language and cognitive deficits. Similar to persons with aphasia and dementia, previous studies have found persons with TBI to have interactional problems in conversations. These problems include unsuccessful self-repairs, minimal turns which do not contribute to topic development, inappropriate topic shifts (Friedland & Miller, 1998); topic perseveration (Frankel & Penn, 2007); and atypical actions such as touching (Denman & Wilkinson, 2011) and singing (Azios & Archer, 2017).

In this chapter, the analysis focuses on the behaviour of the person with a traumatic brain injury (TBI) in conversation with one or more conversation partners. Evidence of how conversations involving persons with TBI differ from typical conversations will be presented. Five key types of recurring interactional problems in conversation will be discussed. The first type of problem is the presence of atypical actions, both verbal and non-verbal, displayed by the person with TBI in conversation. The second is problems (related to linguistic and cognitive deficits) that result in delays to TCU progressivity. The third is problems of understandability – when the person with TBI displays difficulties understanding their conversation partners. The fourth is also about problems of understandability – but when the conversation partner displays difficulties understanding the person with TBI.

4.1 Atypical actions by the person with TBI

For persons with cognitive disorders, what makes their talk atypical is at the level of the social actions that are hearably performed by means of their turns-at-talk. This “pragmatic impairment” impacts how they use their communicative resources. This includes, for instance, poor recipient design due for example to not taking into account in the design of their utterances what the recipient may or may not already know (Wilkinson, 2019).

In this section, atypical actions performed by the person with TBI, both through non-verbal and verbal means are highlighted. These include inappropriate physical actions, excessive self- and other- praising, and inappropriate singing.

4.1.1 Inappropriate physical actions

In Excerpt 4.1, the atypical action takes a non-verbal form i.e. FZ kissing his mother's hand in a context where this action is not appropriate. As the extract starts, FZ and his mother are at the bus stop waiting for a bus. FZ had previously almost got onto the wrong bus by mistake. In line 1 his mother asks him where he is going. FZ's response is unclear because of the noise but in line 3, his mother repeats the question but phrases it differently "so why did you go to the front?", indicating that FZ had perhaps not understood the question in the first line and that she had decided to use a more direct form of questioning. This leads to a successful and appropriate response from FZ (line 4). In the next few lines, FZ's mother continues to ask him about what had happened. She then says in line 11, "Luckily I called you. Otherwise…" FZ then proceeds to apologise, by saying sorry and also by kissing his mother's hand (line 13).

Excerpt 4.1

01 M: you want to go where (.) *nak pergi mana*
you want to go where (.) want go where
Where are you going. Where are you going

02 FZ: ((*8 syllables, unintelligible)*)

03 M: ((*3 syllables, unintelligible*)) *abih!* go in front
((*3 syllables, unintelligible*)) then go in front
So why did you go to the front

04 FZ: because I I thought I saw seventy two

05 M: [then]

06 FZ: [((5 syllables, unintelligible))] become sixty eight

07 M: *lepas tu*
after that
After that

08 FZ: and two nine three

09 M: ah

10 FZ: ah two nine three ah

11 M: lucky I call you (.) *kalau tak* (.) ah (.)
lucky I call you (.). if not (.) ah (.)
Luckily I called you. Otherwise..

12 M: ok-k-k-k-k-k (.)

13 → FZ: sorry ((*kisses mom's hand*))

14 M: *kalau tak macam mana*
if not like how
Otherwise, what will happen

15 FZ: ah

Although kissing your elder's hands (*salam*) is a mark of respect in the Malay-Muslim culture, in this context, it is deemed inappropriate because it was done as a form of apology. Doing the *salam* as a form of apology is done typically during the Eid-ul-Fitri festival where everyone does the *salam* with one another to ask for forgiveness. Hence, FZ could have over-generalized the use of *salam* during Eid to this context. Evidence that FZ's mother also thinks it is inappropriate comes in her response to that action. If she had accepted it as an apology, the typical response may have been to verbally accept the apology in a form such as "it's ok, never mind". However, she, in effect, ignores the apology, including the kissing, and instead continues to ask what would have happened if FZ had gotten onto the wrong bus.

FZ kissing his mother's hand is not the only inappropriate action in this episode, as can be seen in Excerpt 4.2 that continues on from Excerpt 4.1. The relevant lines here are lines 12 and 14, where FZ asks his mother "You want to touch my body?" Line 15 informs us that FZ's intention was apparently to show off his muscles to his mother. However, the question in line 12 does appear to be inappropriate, and there is evidence that FZ's mother treats it that way by responding to it with a request to FZ to provide an account for his utterance. ("ah why" in line 13; see Robinson & Bolden (2010) for the use of 'why?' as challenging another participant's action and soliciting an account for that action). FZ does not provide the requested account, but instead repeats his utterance (line 14). Although a video recording of this exchange would have been helpful to observe the body language of the two participants, as explained in the methods section, this was not an option for these recordings.

Except 4.2

01 M: *kalau tak*
if not
otherwise

02 FZ: I I will laugh at myself

03 M: ah

04 FZ: laugh laugh laugh

05 M: *lepas tu*
after that
what happens next

06 FZ: comedy

07 M: ah *lepas tu*
ah after that
Yes, what happens next

08 FZ: because usually I want to just [get in]

09 M: [you see]

10 FZ: what

11 M: nothing

12 → FZ: you want to touch my body

13 → M: ah (.) why!

14 → FZ: you want to touch my body

15 M: waaah (.) wah muscle ah (.) sweating ah

16 FZ: energy

4.1.2 Inappropriate verbal actions

In Excerpt 4.3, FZ is being visited by his older cousins after his discharge from the hospital. In this conversation, FZ's mother had started recording after his female cousin asked FZ whether anyone came to visit.

FZ responds with Line 1 "semua seh… ada chinese ada melayu semua kenal (Everyone. There are Chinese, Malay, they all know me.)". FZ's response that everyone knows him is hearable as self-praise, This action is noticeable in the conversation since there is a normative expectation that speakers will avoid it (Pomerantz, 1978). And indeed it could be hypothesized this is even more the case in Malay culture, where humility is seen as an important cultural feature.

Excerpt 4.3

01 → FZ: *semua* seh (.1) *ada* chinese *ada* *melayu semua kenal*
all seh (.1) have chinese have malay all know
Everyone. There are Chinese, Malay, they all know me.

02 R1: *semua kenal* very popular ((*laughs*))
all know very popular ((*laughs*))
You are very popular for everyone to know you
(2.0)

03 M: very popular *apa*
very popular what
Indeed very popular

04 FZ: *tak* lah
no lah
not really

05 R2: *semua kawan kerja* lah eh *kawan kerja* ah (2.0)
all friend work lah eh friend work ah (2.0)
All are your colleagues? Colleagues yes?

06 R2: [*kat* office lah]
at office lah
At the office yes?

07 → FZ: [*tapi semua*]
but all
but all

08 → FZ: *perempuan aje* lah
women only lah
women only

09 R1: [((*laughs*))]

10 R2: [(*5 syllables*)]

11 → FZ: [*lelaki* o- *lelaki* ok]
man o- man ok
Not so many men

12 → FZ: *tapi perempuan banyak* seh
but women many seh
But there were many women

13 R1: ((laughs))

14 M: nurse lah nurse nurse therapist

15 R1: *kawan kerja ingat*
friend work remember
Do you remember your colleagues?

16 FZ: *kat mane*
at where
From where?

17 R1: *kawan kerja kat polis*
friend work at police

Colleagues from the police force

18 FZ: [*polis*]
[police]
Police?

19 R1: [*dah*] *dah jumpa semua*
[already] already met all
Have you met all of them?

(2.0)

20 → FZ: oh *ada* lah *ada ada yang* (.2)
oh have lah have have that (.2)
Yes I have met some.

21 → oh *itu* lah *semua perempuan* eh that time
oh that lah all women eh that time
But that's right, all who came then were women

22 R1: ((*laughs*))

FZ's female cousin plays along and further comments that he is "very popular", followed by laughter. At this point, FZ could have downplayed his comment and rejected the idea that he was "very popular". Instead, he remained silent. The fact that FZ's cousin did not fill the silence with further talk may indicate that she found the situation awkward.

FZ's mother then interjects by repeating the cousin's comment. This time, her intonation indicates that the comment is being done sarcastically. It is only at this point, when the inappropriateness of FZ's self-praise is alluded to, that FZ finally downplays his popularity with *"*tak lah*"* ("not really").

This was followed by a further elaboration requested by his male cousin, who asked if these were all his colleagues. FZ's response, instead of a "yes" or "no", ended up being hearable as another example of self-praise. He claims in lines 7 and 8, that "all who came were women". FZ's female cousin again responds with laughter, as she did in line 2, and again this laughter appears to be a response orienting to the self-praise, which the laughter may be dealing with by treating it as a purposefully non-serious action by FZ.

FZ could have been asserting a fact in Lines 7 and 8. However, his further response in Lines 11 and 12, stating that he also had male visitors but there were not as many as the females, is again hearable as being boastful and self-praising about his popularity with his female colleagues.

True to the pattern observed earlier, his female cousin again responds with a laughter response as followed the two previous inappropriate comments by FZ. This is when FZ's mother interjects to clarify that the female visitors he had been talking about were actually staff of the hospital. FZ's nurses and therapists were mainly female.

This self-praising/boasting displayed by FZ is evident again when he asserts this information again in Line 21. Indeed, it may be that FZ is here perseverating on the topic of having a lot of females around him. Again, FZ's female cousin responds to FZ's utterance here in the same way she did to his previous instances of self-praise/boasting i.e. with laughter (Line 22).

Line 21, where FZ continues to boast about his female visitors is an example of how he continues to repeat these comments despite the laughter by his female cousin in response. It could be possible that one factor here is the ambiguity of the function of laughter between 'laughing with' versus 'laughing at' (Glenn, 1995), and that FZ is here treating the laughter as evidence that the cousin is treating him as witty.

In Excerpt 4.4, we see how possibly well-intended actions can be hearable as pragmatically inappropriate behaviour. In this excerpt, FZ's mother had organised a *kenduri* (thanksgiving prayer feast), which she does annually since FZ was discharged from hospital. While guests were leaving, one of the guests commented that the helper had done a good job. FZ agrees with this comment and proceeds to thank the helper in front of everybody. Unlike in the first two excerpts where the atypical actions displayed by FZ appeared to be negative (e.g. self-praise), here it is a positive act (thanking another) that he is demonstrating. However there are two features of this which are hearable as inappropriate.

Firstly, FZ's helper was embarrassed by the over-effusive display of thanks. This was evident in Line 7, when she downplays the compliment in a soft voice and breaks into nervous laughter. This was after FZ had repeated three times his thanks and praised the helper (Lines 1, 4 and 6).

Excerpt 4.4

01 FZ: thank you for the drinks

02 R1: bibik su::
helper su
Bibik Su (helper's name)

03 R2: *terima kasih banyak banyak*::
receive love many many
Thank you very much

04 → FZ: bibik su is very to the best hard working you know

05 M: Ok say thank you bibik su

06 → FZ: thank you so much (.) *terima kasih*
thank you so much (.) receive love
Thank you so much. Thank you.

07 BS: °ia selamat saja° ((*laughs*))
Yes safe only ((*laughs*))
Thank you, everything went well. ((*laughs*))

08 → FZ: ((*breaks out into a song*)) *terima kasih sayang ku ucapkan kepadamu*
((*breaks out into a song*)) receive love love I wish to you
Please receive the love I am professing to you
09 *tanganku yang hampir layu*
my hands that almost limp
My hands are going limp
10 *[janganlah] kau khianati cinta ini*
[don't] you betray love this
Don't you betray this love

11 BS: [°menyanyi pulak dia°]
[sing now he
Now he starts singing

12 FZ: [that's why I wanna say thank you so much you know]

13 BS: [°nanti nak pergi solat ye°]
later want go pray ya
I'm going to do my prayers

Secondly, FZ, who was a keen singer prior to his accident, displayed inappropriate singing behaviour. It is inappropriate in two ways. As previously discussed, Bibik Su has already displayed her embarrassment in Line 7. Despite that, FZ breaks out into a song in the next two lines. The fact that Bibik Su again felt uncomfortable about the singing is evident in Line 11 when she says in a soft voice "*menyanyi pulak dia*" which means she was lamenting that he has now started singing (on top of the previous verbal praise given to her). Similar to FZ's cousin above, BS also responds to the inappropriateness with a rather nervous laughter.

The singing behaviour is further made inappropriate because of the choice of song. Although the first two words of the song were relevant ("*terima kasih*" which means "thank you"), the first line of the song is not meant to be parsed that way. The song starts with "*terima kasih sayang ku ucapkan pada mu*", which means "please receive the love that I am professing to you". This could be an indication that FZ had literally interpreted the meaning of the first two words in the lyrics to suit his intent to praise his helper. However, the fact that this is a love song probably adds to Bibik Su's discomfort with the singing. Had FZ stopped at the first line, Bibik Su would probably be less embarrassed. FZ however continued to sing two more lines that were definitely not relevant to the situation. Her discomfort is evident in Line 13 where she makes an excuse to leave the room to perform her prayers, although she does not usually do that until all the guests have left from the ceremony.

In AB's data there was also evidence of atypical actions. In Line 1 of Excerpt 4.5, AB proposes an activity, but this proposal is inapposite because it is not possible (because AB has dengue fever, a fact he appears to have forgotten or be overlooking). AB and his wife have been discussing what to do over the weekend, and AB suggests going to the cinema. However, AB's wife identifies that this is not appropriate because he has dengue fever and has to rest at home (Lines 7 and 8). Although this information should have been known to AB as well, he was unable to identify why his suggestions were not appropriate, despite

the two other-initiations of repair (OIR) in Lines 2 and 4 by his wife. When AB continues to be unaware of this problem in Lines 5 and 6, his wife finally explains why his suggestion is inappropriate in Lines 7 and 8.

Excerpt 4.5

01 →AB: this weekend we go for cine- cinema

02 RS: cinema?

03 AB: cinema show ah

04 RS: cinema show ((laughs)) for what

05 →AB: cinema show ah to relax (.) just ah (.) we go everywhere (.)
06 → go shopping (.) scrolling- strolling

07 RS: shopping, we cannot go shopping because you got dengue (.)
08 we must stay at home (.) rest (.)

09 AB: stay at home and so stay at home only::

10 RS: ah

4.2 Self-initiation of repair by the person with TBI resulting in delays to TCU progressivity

The deficits related to TBI can also lead to word searches or to word errors that are dealt with through SIR within the TCU in which the trouble source occurs. These cause delays in the progressivity of the TCU towards possible completion.

This phenomenon is similar to those found in the aphasia literature (Laakso & Klippi,1999). Word searches are a frequent and persistent feature of aphasic speech. These word search problems are often treated sequentially in a collaborative fashion: conversation partners supply the missing words for the aphasic speakers in turns that follow the problem (Ferguson, 1992; Milroy and Perkins 1992; Klippi 1996). People with aphasia often request help from their conversation partners either verbally by directly asking for help ("what is it?") or non-verbally by looking at the conversation partner to signal the need for help (Laakso & Klippi, 1999). However, in some instances, people with aphasia take these word-searches as a self-directed activity and signal this through withdrawing their gaze from conversation partners (Laakso, 1997).

Word searches as a form of SIR are particularly evident in the data of the TBI participants with more severe deficits (FZ and AB). The following are examples from their data.

In Excerpt 4.6, AB's word search and word error result in several attempts to self-correct the word "void deck" (Line 2). When these attempts appeared to be unsuccessful, AB's wife steps in to give the answer. However, when she started her other-repair attempt, AB had simultaneously obtained the right answer and she acknowledges that with "Ah…" at the end of Line 3.

Excerpt 4.6

01 AB: exercise (0.5) at my house there (.)
02 → void (.) void (.) [void duck?] void deck?

03 RS: [void.] deck ah::

In Excerpt 4.7, AB again faces word-finding difficulties and he has a number of attempts at naming "*sambal* chicken". The trouble source started in Line 2 where he also retrieved the wrong word ("morning" instead of "lunch"). This was responded to by the ST in Line 3 in the form of an other repair. AB's utterance continued in Line 4, where he gets closer, identifying that it was a chicken dish, but retrieval of the word "*sambal* (chilli paste)" was effortful, although he gets it in the same utterance in Line 5. However, despite successfully retrieving the word, AB ends up self-repairing again, resulting in a new failure to retrieve the word. At the end of that turn, AB requested for help in his word search. This occurs after the search has caused a severe delay in TCU progressivity. With GW's part word cue in Line 6, AB finally gets the word out successfully and confidently in Line 7.

Excerpt 4.7

01 GW: after that what did your wife cook for you

02 → AB: my wife cook ah::: she cook for me (0.5) morning ah=

03 GW: =lunch lunch

04 AB: lunch ah chicken with (.) chicken with ah (.)
05 → *sambal* eh what chicken with *salah* ah sa (.) sa (.) what
chilli paste eh what chicken with wrong ah sa (.) sa (.) what
Chilli paste? What is it, chicken with what?

06 GW: sam:::

07 AB: *SAMBAL*
chilli paste
Chilli paste

While AB showed attempts at self-repair in his word searches, FZ only did so earlier in his recovery, as evidenced in Excerpt 4.8. However, unlike AB's successful attempts, FZ's attempts are failed ones (Line 1) and he required the help of his mother to retrieve the words (Line 2 – mother initiates a sentence completion cue to assist FZ in retrieving the word).

Excerpt 4.8

01 →FZ: changi:: hospi- eh changi

02 M: changi generAL::

03 FZ: general hospital

04 M: ah::

05 FZ: oh changi general hospital

06 M: um::

With the sentence completion cue given by his mother, FZ manages to retrieve the last two words that he originally had difficulties with in Line 1 ("changi…") in Line 3 ("general hospital").

Unlike the examples above where the word search resulted in mainly TCU progressivity delays, in this excerpt, it led to sequence progressivity delays as well because FZ and his mother engaged in a sequence of acknowledgement of correct answer, repetition of information for confirmation, and lastly affirmation that their utterance is accurate.

In Excerpt 4.9, unlike the ones previously, FZ does not attempt a self-repair in Line 1 when he could not retrieve the word "airport". Instead, he immediately requests his mother to assist him in his word search. His mother readily offers the information in Line 2. She then proceeds in the same utterance to clarify what his intention was, bringing up the name "Changi Airport".

Excerpt 4.9

01 → FZ: *ini* changi apple- *apa* name *dia*
this changi apple- what name it
This Changi *phonemic error* What's it's name?

02 M: CHANGI AIRPORT *nak pergi* changi airport *ke* (.)
CHANGI AIRPORT want go changi airport or
Changi airport? Do you want to go changi airport?

In the data sets collected later in his recovery (Excerpt 4.10), FZ adopted a new strategy – circumlocuting in order to assist him in his word search (Line 1). FZ's mother appears to encourage his circumlocutions (Lines 2 and 9), probably hoping that it would help him retrieve the word. When he continues with vague circumlocutions in Line 3, FZ's mother finally steps in to guess the word he was trying to say (Lines 5 and 6). This is a 'hint and guess' sequence (Laakso and Klippi, 1999). However, she does not guess correctly and FZ continues in his word search using circumlocutions in Lines 7, 8 and 10. At the end of the 'hint and guess' sequence, FZ and his mother had still not come to the answer and the search was abandoned (Line 12).

Excerpt 4.10

01 FZ: because I told I told mama I want to eat something western

02 M: mmhmm

03 → FZ: something like beef or chicken (.) I don't know what it's called (.)
04 there's a bit of [french fries]

05 M: [steak.]

06 M: is it steak

07 → FZ: something like something like steak (.)
08 *tapi* maybe chicken or maybe beef
but maybe chicken or maybe beef
Perhaps chicken or beef

09 M: a-ah

10 →FZ: maybe fish

11 M: and then

12 FZ: but then sud- but today mama was very very to the max busy

While the earlier examples (Excerpts 4.6 To 4.9) were similar to that reported in the aphasia literature where the person with communication deficits invites the conversation partner into the word search attempt, they differ from the aphasia literature because these are rather short exchanges, unlike the extended 'hint and guess' sequences reported in the aphasia literature (Laakso & Klippi, 1999). Only Excerpt 4.10 was a close semblance, with the hints from FZ in lines 3 and 4, and the guess from his mother in Lines 5 and 6. However, this 'hint and guess' sequence is relatively short, probably because the word FZ was looking for is not central to the conversation and hence abandoning the search was an acceptable choice.

4.3 Understandability problems I: the conversation partner displaying difficulty in understanding the person with TBI

In the previous section, it can be seen that the trouble source manifested itself in the turn of the person with TBI, leading to attempts at self-initiated repair. These repair initiations took place in "first position" (Schegloff, 1992). These are typical of word search behaviour and we now have evidence that it exists not only in the aphasia literature but also in conversations of persons with TBI.

However, other types of communication problems exist. For example, in the atypical interaction literature (e.g. Wilkinson, 2019) it has been noted that a feature of agrammatism (a symptom of aphasia) in conversation is that regularly the aphasic speaker's turn is responded to with an OIR, i.e. a repair launched from "second position"

(Schegloff, 1992). This type of repair is produced when the recipient is having difficulties in understanding what the person with aphasia is saying.

In this study's data, OIRs are frequently produced by conversation partners, and display that the conversation partner is having difficulties understanding the person with TBI.

Excerpt 4.11 is taken from a conversation where FZ and his mother were planning what to do on his mother's upcoming days off. FZ's utterance in Line 1 was syntactically, grammatically and linguistically inaccurate. This led to an open class OIR from his mother in Line 2. The intonation in which she delivered it demonstrated how perplexed she was about his utterance. In response, in Line 3, FZ broke down his question to only ask "about when the event happened. Although the utterance is again syntactically and grammatically inaccurate, FZ's mother was able to understand it given the context established in Line 3 "*bila* that time *saya* kena (when did it happen to me)" which was in reference to his accident, and FZ's guess of the temporal information about the stay in hospital "six months" in Line 4.

Excerpt 4.11

01 →FZ: oh *tapi dekat mana* eh *apa* time *kita berapa*::
oh but at where eh what time we how much
Oh, but where, what time, how much

02 M: HUH!

03 FZ: *berapa*:: one two three four five. *bila:: bila* that time *saya kena*
how many one two three four five. When when that time I got
How many… one two three four five. When did I get?
04 (.) six months

05 M: six months (.) ah::

06 FZ: *mana satu* eh
which one eh
Which one

07 M: ah:: *dekat* hospital changi general hospital
ah:: at hospital changi general hospital
Yes at the hospital, Changi General Hospital.

08 FZ: changi general hospital

In Excerpt 4.12, FZ and his mother had just completed a sequence of teaching FZ the name of his workplace that they had intended to visit ("Loyang Base"). Immediately following the establishment of the name "Loyang Base", FZ requests for a clarification in Line 1. This becomes a problem for his mother because they had just established where they were going, and she was not expecting him to pursue the topic. Secondly, his erroneous production of the word "Loyang Base" was semantic in nature (he mentioned "Changi apple" which likely referred to "Changi General Hospital") hence not immediately clear to his mother that we is still on the previous topic. Thirdly, there was a phonemic

error in his semantic error ("Changi apple") that is close in sound to "Changi Airport" which both FZ and his mother used to frequent.

As a result, Lines 1 to 4 becomes a failed "hint and guess" sequence which results in two OIRs in Lines 2 and 4, with Line 4 produced with an exasperated tone by his mother indicating that this is a problem and is frustrating for her. FZ finally manages to clarify the context related to his request for clarification in Line 1. However, his mother misunderstands this and instead asks if he has other suggestions where he wants to go (Line 6).

Excerpt 4.12

01 →FZ: *ini* changi apple- *apa* name *dia*
this changi apple- what name it
This "change apple" what is the name?

02 M: CHANGI AIRPORT! *nak pergi* changi airport *ke*?
Changi airport want go changi airport or?
Changi airport! Do you want to go changi airport?

03 →FZ: *TAK! kita pergi mana* eh?
no we go where eh
No! Where are we going?

04 M: *BILA*!
when
When?

05 →FZ: *yang awak tak kerja tu* (.) eh *awak dah* free
that you not work that (.) eh you already free
The one that you are not working… the one you are free

06 M: oh (.) ah ogy *nak gi mana*
oh (.) ah ogy want go where
Oh. Where do you want to go?

FZ was not the only one whose conversation partner had difficulties understanding him because of a question or request that is poorly designed for the recipient. SS, the least severe of the three participants also faced the same problem.

In Excerpt 4.13, SS makes a phone call to his friend, H. They start with exchanging pleasantries. In Line 4, SS then uses a pre-sequence (Schegloff, 2007) to set up the question that he starts to ask in Line 6. However, H produces an OIR in Line 8, indicating that he had difficulties understanding the question.

Excerpt 4.13

01 SS: whats up!

02 H: *((sniffs)) macam gitu jugak ah kau* whats up
((sniffs)) like that also ah you whats up
Just like before. How about you?

03 SS: oklah, so far doing we::ll trying to catch up with my life lah (.)
04 bu:::::t eh *aku nak tanya kau* something [er:::]
bu:::::t eh I want ask you something [er:::]
But I want to ask you something…

05 H: [ah]

06 → SS: for the gathering right? when is possible you [think I should make ah]

07 H: [((7 syllables, unintelligible))]
08 >what-what-what-the-<u>what</u><

09 → SS: this is regarding about the::: er the gathering meet up with the rest of
10 the guys

11 H: [oh ok ah]

12 SS: [ok so *bila eh]* *agak-agak* you think the best time (.)
[ok so when eh] roughly you think the best time (.)
When roughly do you think is the best time
13 because *aku tak boleh fikir banyak ah* (.) *pasal pasal ni*
because I not can think much ah (.) about about this
Because I cant think too much about this.

14 H: oh

Although it is possible that H's difficulty arises from his overlapping talk in Line 7 resulting in his inability to hear the rest of the question in Line 6, H's other-initiation specifically asks "the what", indicating that his difficulty was understanding some aspect of a noun phrase, presumably the "gathering" mentioned by SS in Line 6. This also appears to be the way in which SS treats the repair, since he explains in line 9 that he has been talking about a gathering. H then displays that he has now understood what SS is saying (line 11).

Interestingly, immediately after the telephone conversation in the previous Excerpt 4.13, SS made a phone call to another friend, D. In Line 1, SS informs D that he had just spoken to H "about this thing". SS goes on to add a bit more information by saying in Line 2, that H wants to "make a gathering". In Line 3, he asks if the plan works well for D. However, in Line 4, as with H in the previous call, D produces an OIR, displaying he had difficulties understanding the question.

Excerpt 4.14

01 SS: ah *apa ni:: pasal ni benda:: aku pun baru cakap dengan* haron.
ah what this about this thing I also just spoke with haron
Yes, about this thing. I also just spoke with Haron.

02 → Haron say:: he want to make gathering on January

03 is it ok for you guys

04 D: he want to what?

05 SS: he want to make a gathering for:: all of us (1.0) to meet up

06 D: ok

There is a possibility that D had found rather ill-formed phrase "want to make a gathering" problematic. However, when SS repeats the same phrase in Line 5 "he want to make a gathering", D how displays he understands SS's talk (Line 6). This may be due to the fact that SS had disambiguated the context and added that the "gathering" was for all their friends to meet up.

In this section, we can see that problems with the design of the TBI person's turn appeared to cause difficulties for conversation partners in understanding the speaker with TBI. This difficulty faced by them is evidenced by the OIRs produced in response to the person with TBI's original utterance/question. In the next section, OIRs are again investigated, but this time, they are produced by the person with TBI, indicating that they too have difficulties understanding their conversation partners.

4.4 Understandability problems II: Persons with TBI having difficulties understanding their conversation partner

Unlike the typically short sequences observed when the OIR is initiated by conversation partners secondary to difficulties understanding the person with TBI, OIRs produced by persons with TBI in response to difficulties understanding their conversation partner in these data can regularly result in longer delays in the progressivity of the conversation.

In Excerpt 4.15, FZ displays difficulties understanding his mother while on the topic of what they can do during her off days from work. FZ's difficulties with short-term memory appear to contribute to his difficulty in understanding here. He demonstrates difficulties holding information about when the dates/days are of his mother's off day, as well as what places or activities have been suggested to fill those days. As a result, repeated OIRs both from FZ and his mother resulted in this extended sequence that did not appear to come to a resolution, with both FZ and his mother ended up talking at cross purposes.

Excerpt 4.15

01 M: next week mama three day off *kita gi* loyang base
next week mama three day off we go loyang base
We go to Loyang Base next week on my three day off.

02 → FZ: *bila* (.) *awak* free:: *dekat mana bila*,
when (.) you free at where when
When are you free? Where? When?

03 M: six seven eight mama off

04 FZ: six seven eight

05 M: ah six seven eight april mama off

06 → FZ: yay this this year

07 M: this (.) next week (1.0) next week not year:: this next week

08 → FZ: oh this coming year

09 M: ah this coming week ah

10 → FZ: oh friday saturday sunday

11 M: no not friday saturday (.) I not so sure what day (.) but six april (.)
12 seven and eight (.) *kita gi* loyang eh
seven and eight (.) we go loyang eh
We go to Loyang on the seventh and eighth..

13 → FZ: ah *apa*
ah what
What?

14 M: six seven::

15 FZ: six seven (1.0)

16 M: eight april

17→ FZ: eight nine?

18 M: ah six seven EIGHT

19 FZ: six seven eight

20 M: ah mama off

21 FZ: oh::

22 M: *kita gi* loyang eh?
we go loyang eh?
We go to Loyang ok?

23 FZ: six seven eight

24 M: ogy *nak pergi tengok wayang tak*
ogy want go watch movie not
Do you want to watch a movie or not?

25 FZ: oh six seven eight coming SOON

Excerpt 4.15 was preceded by FZ's mother proposing an activity for them to do on her off day from work. She had established that her off days were 6th, 7th and 8th April and she had suggested they went to Loyang Base, his previous workplace.

Line 1 is a repeat suggestion from mom about going to FZ's previous workplace during her off days. However, FZ responds with an OIR, asking for information that he had already been given before. FZ's OIR indicates that he finds this utterance a problem because he was still not able to orientate to the temporal details to help him process the information. His OIR in Line 2 ("*bila awak* free, *dekat mana bila*" i.e. "when are you free? Where? When?") suggests that he did not get the context of the date and place of the proposed event.

What follows is a sequence of FZ's mother patiently explaining the information (Line 3), FZ repeating the information (Line 4) and his mother confirming the information by repeating it again in Line 5. However, what follows next is a series of three sequences where FZ displays some understanding of his mother's talk (Lines 6, 8, 10) which, in each case, his mother subsequently indicates to be an incorrect understanding (Lines 7, 9, 11-12). FZ's concept of time appears to be fuzzy and he here mistakes the event to be happening within the span of the year (Lines 6 and 8), despite his mother clarifying in Line 7 that the event is happening within the span of the week. When she corrects him again in Line 9, he now mistakes the information to be about the weekend (Line 10). FZ's mother proceeds to explain that she wasn't sure which days they fall and repeats the information that on the 6th, 7th and 8th, they will go to Loyang (Lines 11-12). However, this too is responded to by FZ with a display of problematic understanding, here in the form of an open class OIR in Line 13, again displaying that is having trouble grasping what is being discussed. In Line 17, FZ again displays trouble with what his mother has just said and she again responds by correcting the information (Line 18). Eventually, FZ's mother attempts to change the topic in Line 24 by asking if he wanted to go and watch a movie. However, it is clear in Line 25 that FZ is not yet ready to move to a new topic because he still has difficulties with the information about when and where they were going.

Excerpt 4.16 is taken from the conversation between FZ, his mother and his two cousins when they visited FZ at home after his discharge. In Line 1, FZ's female cousin asked "do you remember your colleagues?". FZ's OIR in Line 2 ("from where?") demonstrates his difficulty understanding his female cousin. FZ's difficulty here may well ne not so much a linguistic deficit as a consequence of his reduced orientation to information about his past self. FZ has only one work place and hence the question "where" these colleagues his cousin is referring to are from appears odd.

Excerpt 4.16

01 R1: *kawan kerja ingat*
friend work remember
Do you remember your colleagues?

02 →FZ: *kat mane*
at where
from where?

03 R1: *kawan kerja kat polis*
friend work at police
Colleagues from the police force

04 →FZ: [*polis*]
[police]
Police?

05 R1: [*dah] dah jumpa semua*
[already] already met all
Have you met all of them?

(2.0)

06 → FZ: *oh ada lah ada ada yang* (.2)
oh have lah have have that (.2)
Oh there are…
07 oh *itu* lah *semua perempuan* eh that time
oh that lah all women eh that time
That's what I was saying, those who came were all women

08 R1: *((laughs))*

09 → FZ: your your friend *ke perempuan*
your your friend is it woman
Was the lady your friend?

10 M: ah *takde* kakak zura tanya *pergi kawan kerja tak kawan kerja*
ah no sister zura asked go friend work not friend work
No, Kakak Zura was asking have you been to see your colleagues

11 R1: [police police *dah jumpa*]
[police police already met]
Have you met your colleagues from the police force?

12 M: [police police loyang your friend]

13 R1: [your police friend]

14 → FZ: [*siapa nama dia eh*]
[who name he eh]
What is his name?

15 M: *siapa siapa kawan kerja semua* ah
who who friend work all ah
Whoever your work friends are, all of them.

16. [*mana-mana yang you jumpa*]
[where where that you meet]
Whoever you have met

17 R2: [loyang base]

18 → FZ: *apa dia*?
What he?
What is it?

19 M: loyang base your friend *dekat* loyang base
loyang base your friend at loyang base
Loyang base. Your friend at Loyang Base.

20 FZ: loyang base

21 M: ah
22 [*kat* loyang coast guard]
[at loyang coast guard]
At loyang coast guard

23 R2: [coast guard]

24 M: police

25 R1: [*ada jumpa lagi tak*]
[have meet again no]
Do you still meet them?

26 FZ: [oh *ada lagi* I *terus*]
[oh have again I continue]
Oh yes I still meet them, I continue.
27 I *rasa* lah (.2) *ke lupa* eh *tapi* alpha bravo charlie delta
I think lah (.2) or forget eh but alpha bravo charlie delta
I think so, but I could be wrong. Alpha, Bravo, Charlie, Delta

FZ's cousin responds with a direct answer to his question in Line 3 ("colleagues from the police force"). This time, FZ has difficulties recalling about him being part of the "police force", finding a problem with the information "police" (Line 4), initiating an OIR through repeating the information.

In Line 5 FZ's female cousin asks a further question about FZ's colleagues i.e. whether FZ has met all of them. But again there is evidence subsequently that FZ is having difficulty in understanding this turn and perhaps broader features of the topic underway. Following a long two seconds pause, FZ's response in Lines 6 and 7, which does not appear to be related to the prior questions, appears to display that intersubjectivity has broken down and that the two are speaking at cross purposes. Here, FZ is again talking about the women he had met in the hospital (nurses and therapists, whom he had mistaken for his friends earlier in the conversation as discussed above). His lack of understanding of who these women were, is obvious in Line 9, where he asks if the women were his cousin's friends. This is also another example of FZ's atypical action of asking for information that he had earlier been oriented to (when his mother told him that the women were nurses and therapists), and would appear to be a result of his reduced memory.

In Line 10, FZ's mother initiates a third position repair (Schegloff, 1992), saying "No, Kakak Zura was asking have you been to see your colleagues", informing FZ that he has misunderstood what his cousin had originally meant. His mother's rephrasing of the female cousin's question in Line 10, adding context to the topic in Line 12, as well as his cousin's subsequent attempts at repeating the context again in Lines 11 and 13 gives him information about his colleagues so that he can recall them. In Line 16, FZ's mother tried to constrain the number of possible names he has to recall by telling him that he can name any of his friends. In Line 17, FZ's male cousin repeats the information to help him understand (Loyang Base) but FZ continued to have difficulties with the information, evidenced by his open class OIR in Line 18.

What follows are repeated attempts by all three conversation partners in helping FZ understand the question and context. It appears that FZ finally understood the question and context in Lines 27 and 28 although he had doubts about the accuracy of his recall.

AB, who has less severe language and cognitive deficits compared to FZ, also demonstrated difficulties understanding his conversation partners. However, unlike FZ, AB's repair sequences are often short, whereas what we have just observed for FZ were prolonged sequences of attempting to understand the conversation.

In Excerpt 4.17, AB and his wife had just concluded their discussion about the menu for the weekend while in the ST's clinic. AB's wife had asked him what he would like to eat and they talked about what ingredients they require to prepare the meal. Immediately following that discussion, AB's wife asks "Then later on?" in Line 1. This was met with an OIR by AB in Line 2, indicating that he had difficulties understanding the question in Line 1.

Excerpt 4.17

01 RS: then later on?

02 → AB: huh

03 RS: later on::,

04 → AB: later on [what?]

05 RS: [later] on what you want to eat (.)
06 [downstairs]

07 → AB: [tonight ah] oh later?

08 RS: ah (.) afternoon

09 AB: later ah (.) later we have to see (.) and then see what to eat ah

10 RS: um::

11 AB: see what can (2.0)

12 RS: yong tau foo

13 AB: yong tau foo also not bad ah?

14 RS: um (2.0)

15 AB: see whatever ah

16 RS: ok::

AB's open class OIR in Line 2 is akin to FZ's example in Excerpt 4.15 where he was unable to carry forward information from a previous sequence/topic to the next. AB's wife was still on the topic of "what he would like to eat", except she had moved from a far prospective time frame (weekend) to a more immediate time frame (after the conversation).

In response to AB's open class OIR in Line 2, RS repeats her question in the form of a sentence completion cue. This is something that she regularly does, usually giving AB time to process her questions and come up with the correct answer. However, in this instance, RS is unaware that AB apparently does not understand the context of her question. This led to another OIR from AB, this time more specifically asking "later on what?"

As a result, AB's wife was able to clarify with more information "later on what you want to eat" (Line 5). AB understood the question before RS could give the temporal/spatial information. RS's location information "downstairs" (referring to the food court located the floor below the clinic they were at) in Line 6 was produced in overlap with AB's OIR in the form of a guess about the temporal information in Line 7 ("tonight"). AB still has difficulties answering because he is unable to think of specific food items to suggest. He acknowledges wife's suggestion in Line 12 but repeats that they can decide later in Line 15.

The long sequence to establish what AB wants to eat after the session with GW would appear to be a result of his cognitive deficits. Firstly, he had difficulties carrying over information from the previous turn, complicated by the fact that his wife had also shifted the temporal stamp from the future to the immediate situation. Secondly, when the context has been established, AB still had difficulties answering the question because he had

difficulties retrieving what are the possible options he can choose from, saying “later we have to see”.

Excerpt 4.18 is a three-way conversation between AB, his wife and their ST (GW). AB was asked to describe what he had been doing over the past week. The excerpt starts with GW asking AB “what did you do on labour day”. AB’s difficulties here are again due to the cognitive load in this question. He needed to orientate himself to when labour day was, and secondly recall what he did on labour day.

AB’s OIR in Line 2 is atypical because the information he asked for (“when”) was already given in the question in Line 1. Thereafter, likely upon realising that the information was given, he proceeds to ask if it is during “my” (his) labour day. This is again odd because AB’s labour day should be the same as everyone else’s labour day as it is a public holiday. Similar to the Excerpt 4.17 above, AB demonstrates the ability to orientate himself and understand the question asked (Line 6) once the repair had been made by his conversation partner (Line 5). Although his responses were wrong likely due to impaired recall, the conversation continues and the sequence progresses.

Excerpt 4.18

01	GW:	what did you do (.) on labour day.
02 →	AB:	when- during my (.) labour day?
03	GW:	when was labour day
04 →	AB:	uh::: (2.0) monday?
05	RS:	thurs (.) day!
06	AB:	first of may, so on that day::: i::: (0.5) go:: walk (.) walk with my wife ah
07	RS:	walk? (1.0) exerCISE [ah::::]
08	AB:	[exercise] (0.5) at my house there (.)

The difficulties faced by FZ in understanding his conversation partners are a result of reduced short-term memory, resulting in an inability to retain information that had just been discussed with him or given to him. His sequences are much more long drawn compared to AB because the conversation partner has to repeatedly orientate him to the details of the context surrounding questions, ending up with the abandoning of the original question at the end of the conversation.

With AB, the difficulties arise when he is cognitively loaded, for example when he needs to retrieve the topic that was just discussed and shift his temporal orientation, or when he needs to recall more than one information in order to answer the question (when the event happened and what he did on that day). As a result, when he is oriented to the information once more, AB is able to participate in the conversation and provide information to the accuracy of his recall abilities. Conversations with AB did not result in abandoning the first pair part or question asked.

4.5 Conclusion

In this chapter, the analysis focused on the behaviour of the person with TBI in their conversation with conversation partners. Four key sources of interactional problems were discussed.

Firstly, there were atypical actions. Two examples of inappropriate physical behaviour was demonstrated by FZ, who has severe TBI – kissing his mother's hands as a form of apology, and asking her to feel the muscle on his arms, both while they were in a public domain (waiting for a bus at the bus stop). Both these actions can be deemed appropriate in a different context. FZ's intention to ask his mother to feel his muscles to show how healthy he has become would have been appropriate in the private home domain. Kissing the hands is something that is done in the Malay culture as a form of respect to elders, but not as a form of apology. In both instances, FZ's mother's response confirms that these are inappropriate behaviours. These physically inappropriate actions occurred when FZ had difficulties responding to his mother – he was unable to explain why he almost got onto the wrong bus and the possible implications of his actions.

Pragmatic inappropriateness was the next atypical action observed in the conversations in this study. Firstly, FZ demonstrated self-praise, albeit unwittingly, in his conversation with visitors who were not very familiar to him after his injury (cousins). FZ had commented that many people knew him in the hospital and that almost all of them were women. This self-praise behaviour was not only demonstrated in his talk but also in the intonation used. These actions were met with laughter by his cousin, likely an indication of her awareness that this was an inappropriate behaviour. His continued self-praise despite his conversation partner's responses to indicate the inappropriateness of these actions, as well as despite his mother explaining his account with an alternative explanation (that the ladies he was boasting about were not his visitors but the staff in the hospital), indicates that he has a reduced ability to pick up social signals from others.

A second pragmatic inappropriateness was borne out of good intentions, again, involving FZ. While trying to thank his helpler for her good work, he ended up making her embarrassed because of the extended sequence that involved excessive giving of thanks and also singing an inappropriate song. In FZ's data, the singing episode is inappropriate in two ways: firstly, it was an over-excessive display of thanks that left the recipient (his helper) uncomfortable; secondly, it was a literal interpretation of the first two words in the song lyrics that led to FZ using the song which is inappropriate in that context because it is a love song. The words "*terima kasih*" means thank you, which would have been appropriate for his intention to give thanks to the helper. However, the song actually is parsed differently "*terima kasih sayang*" which means a request to receive the love professed to another person. Hence, in addition to the singing itself that was inappropriate, FZ showed that the choice of song was equally so, and likely added to the helper's embarrassment.

The final example of atypical action is from AB, who proposed an activity, but this proposal is inapposite because it is not possible. AB had suggested going to the movies when he has dengue fever, a fact he appears to have forgotten or be overlooking. AB's difficulties identifying the inappropriateness of the activity he had suggested was evident when he

does not catch the hint given by his wife, RS, despite two OIRs elicited in response to his repeated suggestion.

It would be obvious to the reader that most instances of atypical actions came from the data involving FZ. This is likely due to the severity of his injury compared to the other participants. One possibility though, which will be further discussed in the limitations section later, is that there was insufficient data from varied contexts from the other two participants to allow the capturing of such atypical behaviours.

The language deficits faced by persons with TBI became the second key interactional problem. These lead to word search behaviour, resulting in the need for SIR within their turn that end up delaying TCU progressivity. This phenomenon was particularly evident in the data of the TBI participants with more severe deficits (FZ and AB).

While AB's attempts at SIR often ended up successful, FZ's attempts were failed ones and required his mother to complete the repair. Thus, in FZ's data, the word searches not only led to TCU progressivity delays but also sequence progressivity delays because FZ and his mother had to engage in a sequence of acknowledgement of correct answer, repetition of information for confirmation, and affirmation of the accuracy of information read back.

Our data once again suggests that TBI severity could have contributed to differences between persons with TBI. SS, whose language and cognitive deficits were the least severe did not face issues with TCU or sequence progressivity resulting from these deficits.

The third interactional problem arises from the person with TBI's language and cognitive deficits, causing conversation partners to have difficulties understanding them. The key evidence of this interactional problem is the OIR displayed by the conversation partners. The OIRs described in this section can be a result of agrammatism – where FZ asks his mother a question which is syntactically inaccurate, leading her difficulties understanding what the question wanted. Other than agrammatism, another key reason for problems with understandability are poorly designed questions or utterances. This was observed in FZ and SS's data, where they asked questions to the conversation partner without establishing the context hence requiring an OIR by the conversation partner to nudge them into reformulating their questions.

The last interactional problem faced by persons with TBI in their conversation was their difficulties understanding the conversation partner's utterance. The key evidence showing this difficulty was the OIRs initiated by the participants with TBI. These difficulties occur as a result of poor short-term memory (especially for FZ, who demonstrates an absence of recalling information that was covered in previous turns while in conversation with his mother). As a result, FZ's conversations have extended sequences of re-orientation to information. AB, who has less severe language and cognitive deficits compared to FZ, also demonstrated difficulties understanding his conversation partners. However, unlike FZ, AB's repair sequences are often short.

These are again observed most frequently across the data sets from the two more severe TBI participants, FZ and AB, where *talking at cross-purposes*, speaking about the same topic but not achieving common language or understanding occurs.

From the summaries above, one can deduce that the cognitive problems faced by persons with TBI affect their conversations more than the language problems they face. This is despite the fact that both cognitive and language deficits are present in all three of our participants. The severity of the problems correlate with the severity of the cognitive and language deficits of the participants.

5 ADAPTATION BY CONVERSATION PARTNERS OF PERSONS WITH TBI IN CONVERSATION

In the previous chapter we examined how the linguistic and cognitive impairments associated with TBI could be seen to have impacted on the talk of three people with TBI, with a focus on phenomena such as atypical actions, self-initiations of repair by the person with TBI, and other-initiations of repair by either the person with TBI (due to having a problem in understanding the conversation partner) or the conversation partner (due to having a problem in understanding the person with TBI). A theme of research studies which use conversation analysis to examine interactions involving participants with acquired disorders such as aphasia, dementia, dysarthria and, to some extent, TBI, is that, in some cases at least, these participants and their regular conversation partners may *adapt* their talk and interactional conduct in response to the impacts which these impairments have caused interactionally. Wilkinson, Lock, Bryan & Sage (2011: 85) define adaptation (here, in the context of aphasia) as 'the process whereby contributions to conversation produced by a speaker with aphasia and/or a conversation partner can be seen to be designed in distinct and systematic ways in light of the speaker with aphasia's impairments and their potential impact within conversation'.

Some of these research studies have highlighted ways in which the participant with the communication disorder may adapt their talk or conduct, often in ways which may lessen the consequences of the disruptive repair activity which is now occurring in these participants' conversations. This has been the case, for example, in aphasia (Heeschen & Schegloff, 1999; Beeke, Wilkinson & Maxim,2003; Wilkinson, Beeke & Maxim, 2010;) and dementia (Kindell, Sage, Keady & Wilkinson, 2013). Other studies have highlighted how the regular conversation partner has adapted their talk or interactional conduct when talking with a person with aphasia (e.g. Lock, Wilkinson & Bryan, 2001; Beeke, Beckley, Best, Johnson, Edwards & Maxim, 2013), dementia (Young, Lind & van Steenbrugge, 2016) or dysarthria (Bloch, 2005).

In research on interaction in TBI, there has been only a limited focus on adaptation practices. One relevant study is that by Barnes (2012), who highlights how the regular conversation partner of a man with TBI talks in a particular way in order to assist his friend with TBI in planning a trip abroad. This manner of talk involved various ways in which the conversation partner controlled the discussion about planning through, for example, the recurrent use of particular kinds of actions (for example, proposals, directives and advice giving) and question formats, and by structuring the interaction in order to achieve the task at hand. Another relevant study is that by Mann et al. (2015). While this was a study of an intervention for TBI, the paper included an example of a test question sequence (i.e. a question to which the questioner already knows the answer) initiated by a conversation partner.

The use of test questions in these interactions echoes findings from the conversation analysis literature on aphasia, where test questions have been regularly noted (Lock et al., 2001; Bauer & Kulke, 2004; Beeke et al., 2013) along with other forms of what I will call here 'teacher-like' behaviour, where the conversation partner elicits talk from the person with aphasia and then evaluates that talk as adequate or not (Wilkinson, 2014). This includes, for example, the elicitation by the conversation partner of 'correct production sequences' where the conversation partner elicits attempts by the person with aphasia to correct a linguistic error, such as a phonemic paraphasia (Wilkinson et al., 1998; Booth &

Perkins, 1999). Finally, another way in which conversation partners of persons with TBI have been shown to adapt and enable continued participation and sequence progressivity is by displaying behaviours such as accepting and affiliative responses to disaligned actions (e.g. inappropriate singing) by a person with TBI (Azios & Archer, 2017).

As with the Barnes (2012), Mann et al. (2015) and Azios & Archer studies, we will focus here on adaptations by the conversation partner, since these were the most obvious features of adaptation in the data set. As well as highlighting and examining the regular occurrence of test questions and other forms of teacher-like talk in my data set, we will be examining how the conversation partners can adopt particular interactional roles in the interaction which appear to be adaptations to the presence of TBI. While this is a phenomenon which has been explored to a limited extent in aphasia (Bloch & Beeke, 2008; Ferguson & Harper, 2010) and in dementia (Purves, 2009), it has not been previously explored in relation to TBI interaction. Bloch & Beeke (2008), for example, showed that conversation partners can help to co-construct multi-party conversations (especially those involving a non-familiar partner) by becoming the spokesperson for the PWA via repeating, rephrasing the PWA's utterances, electing the PWA as the next-turn speaker, and bring up common knowledge between the two to provide context to the conversation.

We will note that a possible relationship between TBI severity and degree of adaptation required of the conversation partner is observed in this study's data. Despite the large number of instances from the two more severe participants (AB and FZ), there were no data from SS for any of the themes identified. This highlights the fact that conversation partners may be more drawn towards adapting their interactional talk and conduct when the person with TBI is more severely impaired and therefore less able to function in conversations independently.

5.1 'Teacher-like' talk by conversation partners

5.1.1 Test questions

In this section, we look at how the person with TBI's conversation partners use test questions. While it can be difficult to know from the interaction what the conversation partner is attempting to achieve through the use of test questions, it appears that in some cases at least the test question functions to prompt the person with TBI to recall certain key information in their lives.

In Excerpt 5.1, FZ's mother talks to FZ about the doctor that performed surgery on him, eventually leading up to a first pair part in Line 10 that takes the form of a test question about the name of the hospital they are currently in. As such, FZ's mother here may be attempting to orient FZ to his current location. FZ produces a correct answer in Line 12, although he still appears to be uncertain about his answer.

Excerpt 5.1

01	M:	ah *tadi* *hari tu kan* mama *nampak* ogy *punya* doctor *tau* ah just now day that right mama saw ogy own doctor know **Did you know, that day Mama saw Ogy's doctor**
02		doctor *yang-* doctor that- **The doctor…**
03	FZ:	doctor?
04	M:	ah, doctor *yang* operate ogy:: ah, doctor who operate ogy **Yes, the doctor that operated on you.**
05	FZ:	oh *ya ke*? oh yes or? **Oh is that right?**
06	M:	doctor eric teo (.) ah:::
07	FZ:	i think *dulu* i six months i think last time i six months **I think six months ago**
08	M:	aha::
09	FZ:	*kan kat sini* right at here **In here right?**
10 →	M:	[ah *ni apa*] *nama* hospital *apa nama dia* [ah this what] name hospital what name it **Yes, what's the name of this hospital, what's the name?**
11	FZ:	[six months]
12	FZ:	[changi::] general hospital eh *apa* [changi::] general hospital eh what
13	M:	[hosp-] *kat sini* cha- ah::: hosp- at here cha- ah::: Hospital over here cha yes…

Excerpt 5.2 is another example of how FZ's mother uses a test question to orientate him to important details of his personal life. This time, she asks FZ a test question in the form of a directive in Line 1, requesting FZ to recall where his workplace was. Similarly to the extract

above, although FZ provides the correct answer in Line 3, he is uncertain about it, as evidenced in Line 5 where he expresses doubt about his answer.

Excerpt 5.2

01 →	M:	ah ogy *cakap kerja mana* (3.0) ah ogy say work where (3.0) ogy Ok, tell me where you work.
02		[ogy]
03	FZ:	[i] *pernah pergi* lo:ya::ng [i] ever go lo:ya::ng I have been to Loyang…
04	M:	ah
05	FZ:	eh *ke belum* eh eh or not eh Or have I not?

RS, AB's wife, also demonstrates the use of test questions. In Excerpt 5.3, RS and AB are planning their week ahead. In Line 1, prompts AB to remember about an upcoming event not through the use of a test question in the first instance, but rather through what Koshik (2002) terms a 'designedly incomplete utterance', where here the lack of production of the final word acts as an elicitor for AB to produce that word (the upcoming event). When AB has difficulties recalling the information (Line 2), RS produces a test question, to again attempt to elicit a recall of the event from AB. This time (Line 4) AB is able to produce the main gist of the event (that it is a blood test) and RS then completes the information about the event by producing for AB what the blood test is for (Line 5).

Excerpt 5.3

01	RS:	on Tuesday don't forget to go for-
02	AB:	on Tuesday don't forget to go for::
03 →	RS:	for what?
04	AB:	for our:: ah: blood test on::
05	RS:	dengue
06	AB:	on:: deng-ee
07	RS:	dengue!

Test questions are also used by AB's speech and language therapist (GW). In Excerpt 5.4, AB is speaking with GW and RS. GW opens up the exchange with a first pair part requesting information i.e. "what did you do on labour day". AB was unable to answer GW's question, instead asking "when, during my labour day?" in Line 2.This utterance appears to display some confusion by AB, since there is only one labour day and not different ones for each person. GW then changes his question into a test question in Line

3 which may be used to get AB to re-orientate to this temporal information. AB answers erroneously in Line 4, saying that labour day was on “Monday” when it should have been Thursday. RS then provides the correct day for AB in the form of a guess in Line 5, and with this re-orientation to the correct day, in Line 6 AB is then able to provide an answer to GW’s request for information in Line 1 i.e. he went for a walk with his wife.

Excerpt 5.4

01	GW:	what did you do (.) on labour day.
02	AB:	when- during my (.) labour day?
03 →	GW:	when was labour day
04	AB:	uh::: (2.0) monday,
05	RS:	thurs (.) day?
06	AB:	first of may, so on that day::: i::: (0.5) go:: walk (.) walk with my wife ah

In Excerpt 5.5, AB in Line 1 is talking about going to the toilet but appears to be producing a circumlocution due to a word finding difficulty and produces the vague formulation ‘do all my job ah my internal’. GW responds to AB’s circumlocution in Line 3 with a test question, explicitly eliciting from AB what a more common formulation would be. This includes a prompt with the first word of the phrase (‘pass?’). AB is able to use this prompt to produce the phrase ‘pass motion’ in Line 5 (with RS also producing it at the same time, in Line 6). Later in the excerpt, there is another example of a test question by GW. In Line 14, she asks him a question to elicit from him the word lift. AB is successfully able to produce this word in line 15 (again with RS producing the word simultaneously in Line 16).

Excerpt 5.5

01	AB:	no the fresh fresh air then after that then after after do
02		all do my job ah my internal
03 →	GW:	what is that called. [you] go to the toilet you? (0.5) pass?
04	AB:	AH
05		[pass motion]
06	RS:	[pass motion]
07	AB:	after that after that [we:::]
08	RS:	[then you pray] also right?
09	AB:	then we pray first ah. and then ah then I start ah she will bring me
10		to the:: [void void] deck

11 RS: [void deck]

12 GW: huh?

13 AB: second floor my house

14 → GW: ok so you take the what down

15 AB: [lift]

16 RS: [lift]

5.1.2 Hints by the conversation partner to guide the person with TBI towards the correct answer/response

Another way in which conversation partners display teacher-like talk is by responding to an error or inadequacy in the talk of the person with TBI by providing a hint to them about the error/inadequacy. The hint thus can function as a prompt for the person with TBI to produce a self-repair.

One way this is regularly done is through the conversation partner using an OIR. As such, the purpose of these OIRs is not to resolve difficulties in the recipient's understanding of the person with TBI, which is perhaps the most common function in conversation (Schegloff et al., 1977); rather, it is used to highlight the error/inadequacy so that the prior utterance by the person with TBI can be self-repaired.

In Excerpt 5.6, AB and RS are discussing about their plans for the weekend. AB makes errors in this excerpt which RS responds to with OIRs, mainly in the form of repeats. The first error is in Line 1, where AB says "Monday" instead of "weekend". RS responds with an OIR in Line 2, repeating the errorful phrase ('this Monday?'). This appears to function as a hint to AB that it is an error. She then produces a possible correct version of what he might have meant in the form of a guess ('this weekend?'). AB uses the correct time formulation of 'this weekend' in Line 3, only to make a second error, this time suggesting an activity that is not appropriate to their context i.e. "go for cinema". Again, RS initiates an OIR in the form of a repeat (Line 4), again to hint to AB that it is not appropriate. However, AB does not catch the hint, and reiterates in Line 5 that they should go to the cinema. In Line 6, RS again produces an OIR, here asking him explicitly for the rationale of giving that suggestion. AB gives a good rationale for his choice of activity in Lines 7 and 8, but fails to pick up why it is still inappropriate. In Lines 9 and 10, RS explains the reason why they should not be going to the cinema and shopping i.e. he has dengue and has to stay at home to rest.

Excerpt 5.6

01 AB: this Monday we have a lot of (0.2) we go for (.)

02 → RS: this Monday? this weekend?

03 AB: this weekend we go for <cine- cinema?

04 → RS: cinema?

05 AB: cinema show ah!

06 → RS: hhh. cinema show for what hhh *((laughs))*

07 AB: cinema show ah to relax (0.2) just ah (.) we go everywhere (0.2)
08 go shopping (0.2) scrolling- strolling

09 RS: shopping? we cannot go shopping because you got dengue (0.2)
10 we must stay at home (0.2) rest

11 AB: stay at home and so stay at home only::

12 RS: ah

Excerpt 5.7 is again from a conversation between AB and RS. When AB erroneously says that they should keep themselves busy in Lines 1 and 2 (from the context, it is clear that he meant that they should relax and rest), RS in Line 3 produces an OIR in the form of a repeat of the erroneous part of his statement, signaling to AB that this part of his utterance is inappropriate or erroneous. Again, she does not immediately correct him but allows him time to self-repair, stepping in in Line 5 only when he demonstrates a word search. Later, in Line 10, AB again makes another error, saying “take good our healths”. RS responds with an open class OIR in Line 11. AB responds with two repair attempts, saying “our health” and then “our selves”.

Excerpt 5.7

01 AB: we need to keep our self busy if we have time to keep our time
02 busy also

03 → RS: keep our time busy?

04 AB: eh no (.) we give (.) ah::

05 RS: relax::

06 AB: relax (.) relax ourselves, get a give more:: [more]

07 RS: [exercise]

08 AB: time:: yes for exercise:::

09 RS: um

10 AB: and (.) take good our healths ah

11 → RS: eh?

12 AB: our health, our selves::

5.1.3. Other-repair by the conversation partner

A distinctive form of repair that has been reported in aphasic interaction is what has been termed 'correct production sequences' (Booth & Perkins, 1999; Lock et al., 2001). This form of repair occurs in response to an item in the talk which has been mis-produced by the aphasic speaker, with the error usually being phonemic. These 'correct production sequences' also exist in this study's data. These are a form of adaptation because the conversation partner, knowing what the intended word is, is helping the person with TBI produce the correct form of it in their conversation.

In Excerpt 5.8, FZ and his mother are recalling the times when he used to go the polyclinic (public clinics) for his fever and asthma. FZ's mother begins with recounting the frequency of their visits in Lines 1 and 2. FZ recalls these incidents and offers the reason why he used to go to the polyclinic so often. He produces the word "fever" in overlap with the last word in his mother's turn in Line 3. In Line 4 FZ's mother expresses her surprise that he can remember the incident. FZ continues by attempting to refer to the other reason why he frequents the polyclinic in Line 5, but makes a phonemic error, producing "adam" instead of "asthma". He appears to realise there is something problematic about his utterance, producing 'eh what?' after his error and stopping talking. What then follows is a correct production sequence where his mother other-repairs (Schegloff et al., 1977) his error, providing the correct word form in Line 6. When FZ's mother produces the first syllable of the word, FZ then produces the second half of the word in overlap with his mother in Line 7. M acknowledges his correct response in Line 8.

Excerpt 5.8

01 M: ah *tadi kita pergi apa pergi mana pergi* polyclinic
ah just now we go what go where go polyclinic
Last time we go polyclinic

02 *selalu eh pergi* [polyclinic]
often eh go [polyclinic]
often go polyclinic

03 FZ: [fever::]

04 M: ah *dia kalau* fever:: *dia ingat*
ah he if fever:: he remember
When it comes to fever he remembers

05 → FZ: adam:: eh *apa*
adam (phonemic error) eh what
Adam, eh, what?

06 → M: asth[ma:::]

07 FZ: [ma::]

08 M: ah::

Excerpt 5.9 is an example of a "correct production sequence" from AB's data. AB's talk is characterised by phonemic errors. In this excerpt, AB starts by stating that RS gives him "essence of chicken" as a health supplement. Although he has correctly produced the word, he treats it as incorrect through repairing it (at the end of Line 1) to 'chisen', an incorrect form of the word. In Line 2 he again repairs it to the correct form, 'chicken', and then expands this to 'essence of chicken'. At the same time as AB corrects the word back to 'chicken', however, RS enters the turn and produces an other-correction of 'chisen' in the form of the correct word 'chicken' (Line 3). Although he has repeated the whole phrase correctly at the end of Line 2, AB continues to ask RS for a clarification of what it is called in Line 4. In Line 5, RS produces the correct whole phrase, emphasizing the second syllable of the problematic word, and AB then produces this phrase correctly in Line 6.

Excerpt 5.9

01 AB: ah she gave me essence of chicken chisen
02 [chicken] essence of chicken

03 → RS: [chicken]

04 AB: *apa tu?*
what that?
What is it called?

05 RS: essence of chicKEN?

06 AB: essence of chicken

5.2. The conversation partner adopting distinctive roles within multi-party interactions

The phenomenon of significant others adopting distinctive roles in multi-party interactions has been investigated in relation to persons with aphasia (PWA) in an institutional setting (Ferguson & Harper, 2010). Family members who accompanied PWAs to their medical appointments assumed the following "speaking roles": contributing to the talk of PWAs, speaking on the behalf of the PWA, and supporting the talk produced by PWAs. The speaking roles occurred more frequently in the giving of biographical information and personal recount rather than opinion giving.

In this study, supporting speaking roles are also observed. These are mainly undertaken by the close conversation partners when an interaction includes others who are less familiar to the person with TBI. These roles include helping assist the person with TBI to communicate information to others, and clarifying, both for the less familiar conversation partners, and also for the person with TBI.

5.2.1 The significant other assisting the person with TBI to communicate information to a third party

Excerpt 5.10 has already been discussed above (as Excerpt 5.5). Here we note that after AB has answered the test question (Line 5), he proceeds to inform ST about what happens next in the evening routine. He starts to produce this in Line 7, but displays some difficulty in progressing with the utterance (note the repeated 'after that') and at this point RS enters AB's turn in overlap, addressing him and providing the relevant information that AB needs to inform ST of the evening routine. In Line 9 AB uses content from this utterance ('then you pray' becomes 'then we pray') to continue his turn informing ST of the routine. As AB's turn continues, a second instance of the phenomenon occurs.

As AB continues describing what he does next in Line 10, he shows evidence of possible word finding difficulties when he says "she will bring me to the::", with a prolonged 'the' (see Schegloff et al., 1977 on prolongations of sounds as hearable as a sign of an upcoming trouble). At this point (Line 11), RS enters AB's turn again to provide him with the relevant information, which is produced simultaneously with AB then producing the relevant phrase ('void deck'). As such, we can see here how the knowledge shared between AB and RS can be a resource for RS to assist AB when he is having trouble communicating some information to a third party.

Excerpt 5.10

01	AB:	no the fresh fresh air then after that,
02		then after after do all do my job ah my internal
03	GW:	what is that called. [you] go to the toilet you? (0.5) pass?
04	AB:	[AH]
05	AB:	[pass motion]
06	RS:	[pass motion]
07	AB:	after that after that [we:::]
08 →	RS:	[then you pray] also right?
09	AB:	then we pray first ah. and then ah then I start ah
10		she will bring me to the:: [void void] deck
11 →	RS:	[void deck]

In Excerpt 5.11 GW has elicited from AB a summary of what activities he does in the afternoons. As AB produces this telling (Line 1), RS, who is obviously monitoring his telling, comes in overlap with 'he scared' (Line 2) which, unlike her intervention in the previous extract, is addressed to GW. In effect, then, AB and RS are here producing a form of co-telling (see Lerner, 1992). As AB continues with his telling (Line 3), RS enters his turn again (Line 4), this time apparently addressing RS about him being scared when walking in the park next to their home. AB then picks up on this, saying that he is scared of falling with kids running around. After this utterance, RS intervenes in the telling again

(Line 7) to prompt him to elaborate on the telling so far with 'after that?' (and interestingly, GW simultaneously produces the same prompt in Line 6). Finally, when AB continues his telling (Lime 8) by talking about what happens after that, he displays a possible word finding difficulty (in the form of a brief pause and a prolonged 'ah), and at that point RS enters his turn space again, to complete the utterance, and the possible word search, for him (Line 9), as well as continuing the telling herself (Line 10).

Excerpt 5.11

01	AB:	then got one more bark- park also [my place I]
02 →	RS:	[he scared] ah
03	AB:	haven't go next my house also because [you]
04 →	RS:	[you] scared right
05	AB:	kids ah all run run run I scared *abih jatuh sekali* kids ah all run run run I scared then fall once **Kids are running and I am afraid what if I fall**
06	GW:	[after that?]
07 →	RS:	[after that]
08	AB:	after that I go my house then I will (.) ah:: [what]
09 →	RS:	[watch tv]
10		then wait for me to cook

5.2.2 The significant other clarifying for a third party what the person with TBI has said to them

In multiparty conversations, the significant other may take on the role of clarifying for a third party (typically someone less familiar with the person with TBI), what the person with TBI is attempting to communicate to them.

In Excerpt 5.12, FZ is speaking to his cousins together with his mother. In Line 1, FZ produces an utterance which is responded to in Line 2 with an open class OIR by one of the cousins (R2). The problem with FZ's utterance is at least in part due to the fact that is grammatically incorrect. As the cousin produces this OIR, FZ's mother enters the conversation and clarifies for the cousin what she believes FZ was trying to communicate in Line 1 (see also Bloch & Beeke, 2008). In Line 4, FZ elaborates on this information about the visitor. By this stage the cousin now appears to better understand what FZ is saying, as displayed by her "oh" receipt in Line 5.

Excerpt 5.12

01	FZ:	one two three four *dah tu empat empat kali tau dia* one two three four after that four four times know he

One, two, three, four. After that four times you know?

02 R2: [eh?]

03 → M: [*empat kali datang*]
[four times came]
He came four times

04 FZ: *datang dia tengok terperanjat* seh
came he look shock seh
He came. He visited. I was shocked.

05 R1: oh

In Excerpt 5.13 which is from the same conversation as Excerpt 5.12, FZ's cousin asks if the people who visited him were his colleagues. FZ proceeds to respond in a way which does not really address the question, stating that all the visitors were women, a point he repeats in Lines 5 and 6. In Line 8, FZ's mother enters the conversation and provides information that the 'visitors' were actually hospital staff (nurses and therapists). In effect, therefore, FZ's mother is answering R2's question from line 1 in a context where FZ's answer has not been correct.

Except 5.13

01 R2: *semua kawan kerja* lah eh *kawan kerja* ah (2.0)
all friend work lah eh friend work ah (2.0)
All are colleagues? Colleagues yes? (2.0)
[*kat* office lah]
at office lah
At the office yes?

02 FZ: [*tapi semua] perempuan aje* lah
but all women only lah
But all were women

03 R1: [*((laughs))*]

04 R2: [*((5 syllables, unintelligible))*]

05 FZ: [*lelaki* o- *lelaki* ok]
man o- man ok
Not so many men

06 FZ: *tapi perempuan banyak* seh
but women a lot seh
But there were a lot of women

07 R1: *((laughs))*

08 → M: nurse lah:: nurse (.2) nurse, therapist

5.2.3 The significant other clarifying for the person with TBI what a third party has said to them

In the following excerpt, FZ is asked by his cousin (R1) in Line 1 whether he has seen his colleagues. FZ, however displays difficulty with what the cousin has said to him (Line 2) and this difficulty occurs again when R1 attempts to clarify who she was referring to by mentioning his colleagues i.e. his colleagues from the police force (Lines 3 and 4). When R1 pursues the line of questioning, FZ does respond, albeit after a long silence (Lines 5 and 6). At this point (Line 7), however, he perseverates on the topic of being visited by many ladies (described in the previous excerpt). As the conversation between FZ and his cousin proceeds, FZ's mother enters into their interaction at Line 10 and, addressing FZ, provides a re-formulation for him of what his cousin has been asking him, and what FZ appears to have been not answering, perhaps due to misinterpreting it in some way. Following this intervention from FZ's mother, the cousin returns to her line of questioning of FZ (Line 11).

Excerpt 5.14

01 R1: *kawan kerja ingat*
friend work remember
Do you remember your colleagues?

02 FZ: *kat mane*
at where
from where?

03 R1: *kawan kerja kat polis*
friend work at police
Colleagues from the police force

04 FZ: [*polis*]
[police]
Police?

05 R1: [*dah]* *dah jumpa semua?*
[already] already met all?
Have you met all of them?

(2.0)

06 FZ: *oh! ada lah:: ada* (.3) *ada yang* (.2)
oh have lah have (.3) have that (.2)
Oh there are…

07 oh *itu* lah *semua perempuan* eh that time
oh that lah all women eh that time
That's what I was saying, those who came were all women

08 R1: *((laughs))*

09 FZ: your your friend *ke perempuan*
your your friend is it woman
Was the lady your friend?

10 → M: ah *takde* kakak zura tanya *pergi kawan kerja tak kawan kerja*
ah no sister zura asked go friend work not friend work
No, Kakak Zura was asking have you been to see your colleagues

11 R1: [police police *dah jumpa*]
[police police already met]
Have you met your colleagues from the police force?

5.3 Conclusion

Adapted talk leads to lesser need for repair within the conversation (Wilkinson, 2019), because it compensates for the person with communication impairment's limitations. With this, data analysis was targeted at examining adaptation by conversation partners, in conversations involving persons with TBI. Two key adaptive behaviours were displayed by the conversation partners. Firstly, the conversation partners display "teacher-like" talk. Secondly, they demonstrate collaboration with participants in multi-party conversations involving persons with TBI.

One of the most distinct and frequent "teacher-like" talk is the asking of test-questions in conversations between the close conversation partners as well as the therapist and the person with TBI. While it is expected that the therapist engages in such behaviours, test questions from a close conversation partner is not common in typical conversations. Test questions were used by close conversation partners to prompt the person with TBI to recall certain key information in their lives.

In FZ's data taken fifteen months post injury, test questions not only orientate him to important information, but also enabled the conversation partner to expand on his turns by asking follow up questions, ensuring continued contribution to the conversation. This is similar to the behaviour of AB's wife, RS, who asked test questions in order to orientate AB to prospective events before continuing to seek his input on some decision-making related to the event.

Although test questions from a therapist are again used to orientate the person with TBI to information, they appear to take on the form of a hint for the person with TBI to correct a previous erroneous production (e.g. AB gives a wrong information, or circumlocuting instead of using a single specific word). Hence, these are true teaching behaviour. However, the therapist also uses test questions to expand on AB's utterances and participate further in the conversation.

Another way in which conversation partners display teacher-like talk is by responding to an error or inadequacy in the talk of the person with TBI by providing a hint to them about the error/inadequacy. The hint thus can function as a prompt for the person with TBI to produce a self-repair.

One way this is regularly done is through the conversation partner using an OIR. As such, the purpose of these OIRs is not to resolve difficulties in the recipient's understanding of the person with TBI, which is perhaps the most common function in conversation (Schegloff et al., 1977); rather, it is used to highlight the error/inadequacy so that the prior utterance by the person with TBI can be self-repaired.

These are observed in Excerpts 5.6 and 5.7 where erroneous productions by AB are responded to by RS with OIRs in the form of repeating the erroneous production. These allow AB to attempt a self-repair, albeit, on occasions, unsuccessfully.

Another distinct form of repair observed in the conversations analysed in this study is that taking the form of 'correct production sequences'. This form of repair occurs in response to an item in the talk which has been mis-produced by the aphasic speaker, with the error usually being phonemic. These 'correct production sequences' also exist in this study's data. These are a form of adaptation because the conversation partner, knowing what the intended word is, is helping the person with TBI produce the correct form of it in their conversation.

This behaviour is seen in the data of both AB and FZ, who have significant language issues, making phonemic and semantic errors in their talk. The incorrect production for example "adam" for "asthma", by FZ, and "chisen" instead of "chicken" by AB are often noticeable by the person with TBI, resulting in a direct or indirect request for repair from the conversation partner.

The conversation partners adopt distinctive roles within multi-party interactions. These include assisting the person with TBI to communicate information to a third party, and clarifying, both for the person with TBI and the less familiar conversation partner.

One of the behaviours displayed by significant others when involved in multi-party conversations is ensuring that the person with TBI is able to answer questions accurately and adequately.

RS, AB's wife, often helps him produce the word during his word searches, even though on occasions, AB ends up getting the word the same time as her resulting in an overlap. Other than completing his sentences during word searches, RS also monitors the accuracy of his responses, initiating an OIR when she deems the answer as inaccurate or inappropriate. RS also elaborates on AB's answers.

In multiparty conversations, there is a need for the significant others to ensure that the unfamiliar conversation partner understands the utterances produced by the person with TBI. In this study's data, we observe FZ's mother clarifying his utterances to make it understandable for the other conversation partners who are less familiar with him and the content of what he is sharing. For example, when FZ produces an utterance without context, his mother will rephrase and include the context.

Other than clarifying for the conversation partners, FZ's mother also had to clarify questions posed by the conversation partners so that FZ can understand them. One example was when FZ and his cousins were speaking at cross purposes about the people who had come to visit him, FZ's mother had to enter the conversation, reformulate the

question that was originally asked by the cousin. Only then did FZ manage to answer the question.

Once again, a possible relationship between TBI severity and degree of adaptation required of the conversation partner was inferred from this study's data. Despite the large amount of evidence from the two more severe participants (AB and FZ), there were no data from SS for any of the themes identified above. This highlights the fact that adaptive behaviours might only be necessary if the person with TBI is unable to function in conversations independently.

6 CODE-SWITCHING IN MALAY-ENGLISH BILINGUALS WITH AND WITHOUT TRAUMATIC BRAIN INJURY

Code-switching is used in neurotypical bilinguals for various functions: as an alternative to conversational markers in monolingual speakers (e.g., code-switching instead of changing tone of voice to emphasise a point), or as an adjunct to such markers (e.g. change of tone of voice and code-switching) (Gardner-Chloros, Charles & Cheshire, 2000); to gain control over a situation using language of power (Bain & Yu, 2000); to indicate language of preference (Dolitsky, 2000); to organise the internal structure of conversation (Su, 2009); to negotiate interpersonal relationships (Su, 2009) and even as a model of pragmatic language use in multilingual interactions (Tare & Gelman, 2011).

Bilingual adults with aphasia display more code-switching than neurotypical adults and this is related to an increased dependence on both (impaired) languages. Interestingly, inappropriate code-switching (not following acceptable code-switching norms) typically occurs in patients with frontal lobe lesions (Ijalba, Obler & Chengappa, 2006; Munoz, Marquardt & Copeland, 1999).

In a study of patients with Alzheimer's dementia (AD), (Friedland & Miller, 1999). severity of disease displayed no relationship to the amount of code-switching observed. Bilingual adults with AD demonstrated difficulties selecting the appropriate language, and maintaining the language once chosen. Furthermore, code-switching in the AD population is characterised by difficulties inhibiting the dominant language (L1) when using non-dominant language (L2).

Given the limited number of studies conducted on bilinguals or code-switching in CA literature, there was a need to collect our own sample to analyze and compare for this study. The code-switching literature frequently comes from classroom settings and this information would not be applicable as a form of comparison to what is observed in the bilinguals with TBI in this study.

In this chapter, comparisons of code-switching behaviour both quantitatively and qualitatively, between persons with TBI and neurotypical individuals are presented. The comparisons centre on five key dyads in this study's data set. The first two dyads are neurotypical familiar conversation partners, and the next three are dyads made up of a person with TBI and their neurotypical main conversation partner.

6.1 Quantitative comparisons

Table 5 summarises the pattern of code-switching in five dyads. The first two are the neurotypical dyads (A and B; C and D). Participants A and B both have English as their dominant language (SSE), and Malay as their less dominant language. Participants C and D are Malay-dominant, and their less dominant language is English (SCE).

The next three dyads consist of the person with TBI and their familiar conversation partner (AB and his wife, RS, SS and his best friend, H, and FZ and his mother, M). The third dyad has Malay as their dominant language and English as their less dominant language (Singapore Colloquial English variant). The last two dyads are of mixed language background. The person with TBI is more dominant in English (Singapore Colloquial English variant) and the conversation partner is dominant in Malay.

Interestingly, FZ, was premorbidly dominant in the Malay language (this was reflected in his earlier conversations recorded for this study). However, he subsequently became English-dominant, as reflected in his later conversations. As such, FZ's mother has had to use more English (SCE) in the conversations with FZ. Likewise, SS, who was premorbidly Malay-dominant became English-dominant after the injury. SS's change in language dominance was not captured in the study because it happened immediately after the injury and there was no recorded evidence of his conversations prior to the injury.

Table 5: Summary of code-switching behaviour by participants

Conversation dyads	Participant	Neurological status	Main language used	Code-switch language	% of turns produced by person in the conversation	% of turns with code-switching
1	A	Intact	SSE	Malay	48%	13%
	B	Intact	SSE	Malay	52%	9%
2	C	Intact	Malay	SCE	51%	65%
	D	Intact	Malay	SCE	49%	73%
3	AB	TBI	SCE	Malay	56%	8%
	RS	Intact	SCE	Malay	44%	7.5%
4	SS	TBI	SCE	Malay	49%	26%
	H	Intact	Malay	SCE	51%	28%
5	FZ	TBI	SCE	Malay	49%	29%
	M	Intact	Malay	SCE	51%	37%

In the data, participants spoke primarily in their most proficient language. Turns were fairly evenly distributed between conversation partners. The pattern of code-switching was consistently from the more proficient language to the less proficient language. This occurred regardless of whether both partners had the same or different language background.

The amount of code-switching between the partners were fairly similar. Similar to Friedland and Miller's (1999) findings in persons with AD, the severity of TBI in our data appears to have no relationship to the amount of code-switching observed. Code-switching was observed most predominantly in the data of FZ (most severe TBI) and SS (least severe TBI), in fairly equal amounts (29% and 26% respectively).

However, unlike in Friedland & Miller's (1999) study where persons with AD demonstrated more code-switching than the neurological intact partners, the participant with the most severe aphasia (AB) had a similar percentage of code-switching with his conversation

partner (8% vs 7.5% respectively). Furthermore, although his aphasia is the most severe amongst the three participants, he had the least percentage of code-switching in his data.

6.2 Conversation analysis

6.2.1 Code-switching in conversations of non-TBI dyads

Based on the data obtained from the neurotypical dyads in this study, there appears to be three key themes to the code-switching behaviour observed. Firstly, code-switching at the semantic level – a word that is frequently represented in another language or carries a more specific meaning in that language. Secondly, code-switching as a form of, or adjunct to, conversational markers typical of monolingual conversations – to emphasise a point or to neutralise a tense situation. Thirdly, code-switching as a pragmatic function – to reciprocate the language choice of the conversation partner or to retell information that was originally given in another language.

6.2.1.1 Lexical specificity in the code-switch language

There are a few categories of words that are typically represented in the English referent amongst speakers of Malay in everyday conversation, and are also exemplified in this study's data. These include pronouns – "I" instead of "*saya"* or "you" instead of "*awak*"; names of food – "chicken chop", "fish and chips"; names of places – "hospital" instead of "*rumah sakit*", "Simei Care Centre" instead of "*Pusat Penjagaan Simei*"; days of the week – "saturday" instead of "*sabtu*"; and numbers "five" instead of "*lima*" or "ten" instead of "*sepuluh*".

However, there are other Malay-English referents which are equally frequent in our vocabulary and are code-switched by some but not others. The choice of which referent to use often depends on the specificity of the message that needs to be put across. Often, the word has more than one meaning in the other language and hence the other referent, which is more specific, is chosen.

In the Excerpt 6.1 below, there are two words related to religion (mosque and *solat*). Both have an English and a Malay referent. However, the English referent is used for the word "mosque" as it is commonly produced in everyday conversations and refers solely to the place of worship for Muslims. However, the word "*solat*" was used instead of "pray" as it is the more specific word to be used in this context. "Pray" refers to the act of faith in any language whereas "*solat*" specifically identifies the prayers performed by Muslims.

Excerpt 6.1

01 → A: i went to the mosque to *solat* (.)
i went to the mosque to pray (.)
I went to the mosque to pray.

In Excerpt 6.2, B uses the word "*tudung*" in an otherwise English utterance, because the english referent "*scarf*" is not only the less frequent referent but also refers to other clothing and not specifically the headscarf worn by Muslims. A second word is also code-switched in this excerpt – "*kuih lapis*". Food items are often labeled in the language it originates from (kuih lapis is a traditional Malay dessert item).

Excerpt 6.2

01 →	B:	by the way I like your *tudung* colour
		by the way I like your scarf colour
		By the way I like the color of your scarf
02		[I was going to say] ((*talking while giggling*))
03 →	A:	[oh! I like your *tudung* colour too!]
		[oh! I like your scarf colour too!]
		I like the color of your scarf as well
04 →		it's like *kuih lapis*:: ((*talking while giggling*))
		it's like cake layered:: ((*talking while giggling))*
		It looks like layered cake. ((talking while giggling))

6.2.1.2 Word search

In Excerpt 6.3 below, there is evidence that occasionally, a lexical item is not "selected" because it has a more distinct meaning or is a more frequently used word in a person's lexicon. Occasionally, when faced with a word-retrieval deficit, a person will end up using the word in another language to replace it. Here, B says "what's that thing called" indicating that she is searching for the word in English but could only retrieve the malay version to which she adds an "eh" as a form of request for confirmation or corroboration. She subsequently retrieves the word in Turn 3 – "sparklers".

Excerpt 6.3

01 →	B:	*I went for the gathering (.) and then we ha::d um we played (1.0)*
		what's that thing called. bunga api eh.
		what's that thing called. sparklers eh.
		What's that thing called, is it sparklers?
02	A:	[oh.]
03	B:	[sparklers] yah sparklers (0.5) and it was the smoky kind. .hhh so:::
04		[you can imagine ah I was] I was choking on the smoke and coughing
05		(1.0) non-stop (1.0) yah so it got worse
06	A:	[°it exacerbated it°]

6.2.1.3 Emphasise a point

As described in the literature, code-switching is an effective means of a conversational marker to place emphasis on a word to drive the main point home to the recipient of the utterance.

In the Excerpt 6.4 below, B uses the word "*Melayu"* instead of the english referent "Malay" in an otherwise English utterance. This is likely a strategic choice, and is coupled with a stress marker on that word based on her intonation. The word "*melayu*" is important

because it drives the point home that the shop is an unexpected one. This shop is not where typical Malay clothes are bought from.

Excerpt 6.4

01	A:	[oh! I like your *tudung* colour too!]
		[oh! I like your scarf colour too!]
		I like the color of your scarf as well
02		it's like *kuih lapis*:: ((*talking while giggling*))
		it's like cake layered:: ((*talking while giggling))*
		It looks like layered cake. ((talking while giggling))
03	B:	guess where I got it (3.0)
04	A:	uh is it that shop that you went to? no right!
05		[that shop doesn't have all these colours]
06	B:	[no no no no no no no::::]
05 →		no this is not anywhere *Melayu*-related ((*laughs*))
		no this is not anywhere Malay-related ((laughs))
		No, this shop is not Malay related

In Excerpt 6.5, code-switching to Malay is again observed to emphasise a point. While describing how she fell ill, B started the turn in SSE but subsequently code-switched to Malay to describe the root cause of what led to her falling sick - "*tak bawak paying* (did not bring umbrella)*"*, and continued the conversation in SSE thereafter. Saying the phrase in Malay highlights the root cause to A and at the same time, B's tone of voice shows that she wanted to indirectly highlight the fact that she should not have left without an umbrella.

Excerpt 6.5

01	B:	yah. then it rained I was caught in the rain (0.5) then (0.5) um::
02	A:	caught in the rain after (.) on the way back [yesterday?,]
03	B:	[yah yah]
04 →		I went to the mosque to *solat* (.) and then. (.5) *tak bawak payung*
		I went to the mosque to pray (.) and then. (.5) not bring umbrella
		I went to the mosque to pray but I didn't bring an umbrella
05		right, so I just (.) like ran in the rain
05	A:	ah::
06	B:	yah. then after that I had runny nose and then at night (.)
07		actually it was ok already not too bad already

Excerpt 6.6 contain further examples how A and B highlight key information using not only their tone of voice but switching the language to Malay. In line 3, although A had already asked in line 1 questions about B's traveling in the English language, she chose to ask the

key information – did B reach on time, in the Malay language using the word "*sempat* (on time)?".

In response, B replies in Malay that she reached in time – "*sempat* (on time)", and added the word "*betul-betul lah* (just barely)" to further emphasise how close she was to being late for the prayer call. She continues the utterance in English but switches back to Malay at the next key information "*sekali baru habis lipat sekali bang* (just as I finished folding the prayer call came)". This is further information describes how time-pressed B was at that point.

Excerpt 6.6

01	A:	I went to::: An Nur (1.0) the one at Woodlands (2.0)
02		did you get down at Raffles Place?
03	B:	yes
04 →	A:	*sempat?* on time? **Did you reach on time?**
04 →	B:	*sempat* (.) *betul-betul* lah (.) actually I thought I had a lot of time (.) on time (.) just barely lah (.) actually I thought I had a lot of time (.) **I reached on time but barely so. I actually thought I had a lot of time**
05 →		*sekali baru habis lipat sekali bang* once just finish folding suddenly prayer call **but just as I finished folding, I suddenly heard the prayer call.**

In Excerpt 6.7, B demonstrates to A how sympathetic she was at the fact that one of A's best friends will not be able to attend A's wedding. In exchanges which are dominated by SSE, B uses the word "*sedih* (sad)", together with a change in intonation to highlight how much sympathy she has for A's situation.

Excerpt 6.7

01	A:	I don't want to cry on my wedding (0.5)
02		anyway Farhana won't be there.
03	B:	how come?
04	A:	she's going to Cambodia
05	B:	[again?]
06	A:	[yah]
07	B:	[for]
08	A:	[um yah] for about two weeks she will be travelling around

09 B: and she had to choose the period when you have your wedding?

10 A: no actually she bought the tickets before she found out [yah]

11 B: [oh]

12 A: then she asked me (.) can't you postpone it so that I can attend?
13 then I was like <u>huh</u> how does that work? ((*talking while giggling*))

14 → B: Cos *sedih kan*:::
Cos sad right:::
Because it will be sad for her right?

12 A: yah initially she wanted to (.) to fly back and then fly back to
13 Cambodia (0.5) as in fly back in to Singapore then fly back
14 to Cambodia

15 B: just for that one day right?

16 A: but I think I don't know it's not quite possible lah cos she has to travel
17 from the village to the city to the airport (.) so=not=convenient (.)
18 so I thought never mind lah. cos on the day itself it's gonna be
19 busy also and it's not like I will really need my friends there (1.0)
20 [I mean]

21 B: [yah lah] it is nice that she's there for your big day right.

In Excerpt 6.8 below taken from a conversation between C and D, C begins to whisper about a lady within their visual field who approached a therapist to express her dissatisfaction about the patient's care. D, upon listening to the conversation between the lady and the therapist, goes on to summarise what they are witnessing as the daughter "complaining". This word in English carries a more negative connotation. In Malay, the word is "*mengadu*" and can mean someone confiding in another person hence carries a more positive undertone.

<u>Excerpt 6.8</u>

01 → C: °oh *dia ni anak yang nyonya tadi tu*°
°oh she is daughter that Chinese lady just now°
Oh this is the daughter of the Chinese lady who was here just now
(6.0)

02 → D: *dia tengah* complain?
she is complain?
Is she making a complaint?

03 C: *apa ni:::*
what this:::

What is it about?

In Excerpt 6.9, C and D are commenting on an elderly patient who suffered a stroke and had been practising his walking religiously. When D commented that this man is "*bagus*" (good) and added the singlish pragmatic particle "*seh*" to indicate her surprise at the situation, C reciprocates and agrees with D, this time in English, probably to demonstrate that she too is surprised and is full of praise for the elderly patient.

Excerpt 6.9

01 C: eh *pakcik ni jalan lagi*?
eh old man this walk again?
Eh? Is this old man walking again?

02 D: ah *pakcik ni bagus* seh
ah old man this good she
This old man is good

03 → C: not bad eh?

6.2.1.4 Neutralise a situation

Code-switching can also be used as a conversation marker to diffuse a tense situation. In Excerpt 6.10 below, B finds herself describing an event that A was not part of. A responds with a "When?!", which B understood as her being surprised and not pleased about not being part of the programme. In order to diffuse this tense situation, B uses Malay at the start of her sentence to pacify A. When using the Malay language, it gives a sense of closeness and hence effective in trying to calm down A who was obviously unhappy about it.

Excerpt 6.10

01 B: I was just telling Evelyn and Frances the other day after the:: (1.0) eh
02 you didn't (.) oh you didn't come along [because] of your wedding

03 A: [WHEN?]

04 → B: *takde:: yang kita::* we went for the lunch (.) class lunch
no:: that we:: we went for the lunch (.) class lunch
No, the one that we... we went for the class lunch.

6.2.1.5 Reciprocal code-switching

Pragmatic reciprocity can be established by echoing the language chosen by a bilingual partner. In Excerpt 6.11 below, A asks B a question in English in Line 1. Later in Line 3, she switches to Malay, which we established earlier was to highlight how tight the time was for B. Here, A could have chosen to respond in English, but she reciprocates and even reflected the same word used in the first part of her response, to acknowledge that she too understood the nuances of that question.

Exceprt 6.11

01 A: I went to::: An Nur (1.0) the one at Woodlands (2.0)
02 did you get down at Raffles Place?

03 B: yes

04 → A: *sempat?*
on time?
Did you reach on time?

04 → B: *sempat* (.) *betul-betul* lah (.) actually I thought I had a lot of time (.)
on time (.) just barely lah (.) actually I thought I had a lot of time (.)
I reached on time but barely so. I actually thought I had a lot of time
05 → *sekali baru habis lipat sekali bang*
once just finish folding suddenly prayer call
but just as I finished folding, I suddenly heard the prayer call.

6.2.1.6 Contextual influence

A second pragmatic reason for code-switching to another language is when the primary experience which is being conveyed was experienced in the English language. English is the main language medium in formal settings, including in the medical field. While there are Malay referents to medical terms, they are not often used because the English terms are widely understood. Furthermore, for most bilinguals, the language choice of medical speak is often English. For example, when medical issues are discussed with a Malay-dominant patient or family member who also knows English, the bulk of medical jargon is discussed in English. Hence when they convey information about a medical experience, it is easier for them to do so in English, even if the conversation was mainly in Malay. Excerpt 6.12 below is an example of that.

Excerpt 6.12

01 → C: and then. *Nenek* doctor *cakap apa*?
and then. grandmother's doctor say what?
So what did your grandmother's doctor say?

02 → D: no they just said *dia memang ada* kidney infection lah [*tapi*]
no they just said she already has kidney infection lah [but]
They merely said she already has an existing kidney infection but…

03 C: [and then]

04 D: because *dia* orang *cakap macam* they want to do *nenek*
because they say like they want to do grandmother
Because they wanted to work on grandma's
05 → *punya* kidney *ada nanah* (.)
own kidney have pus (.)

kidney has pus

06 this big grow until this big ((*showing the size of a thumb*))

07 C: *abih*?
so?
So?

08 → D: then they said *dia orang nak buat tu* (.) operation. (1.0)
then they said they want do that (.) operation. (1.0)
Then they said they want to do the operation.

09 operation *dengan* surgery *tu sama* eh?
operation and surgery that same eh?
Are operation and surgery the same?

10 C: ah *sama* ah
ah same ah
Yes they are the same.

11 D: *sama* kan?
same right?
They are the same right?

12 C: [ah]

13 → D: [ah] they want to do operation to remove it (0.5)

14 then *tak buat* (.) *tapi dia orang cakap dah boleh balik* (.)
then not do (.) but they say already can go home (.)
But they didn't do it. But they say she can already go home.

15 so she's going back today after lunch

16 C: ah

17 → D: but then still need (1.2) [observation lah]

18 → C: [oh:::] *abih tak* operation lah
[oh:::] so no operation lah
So there will be no operation done?

19 D: *tak tahu lah (.) tengok nanah tu macam mana (.)*
not know lah (.) see pus that like how (.)
I don't know. See what happens with the pus.

20 *pasal dia orang cakap* it grow until this big
because they say it grow until this big
Because they said it has grown this big.

21 *[dekat dia punya* kidney]
[at her own kidney]
In her kidney

22 → C: [*abih tak* operation *macam mana* seh?]
[then no operation like how seh?]

Then what will happen without an operation?

15 → D: no I think they give her (1.1) antibiotic to see whether
16 → it's working or not (.) maybe the antibiotic will clear (2.0) ((*laughs*))

6.2.2 Code-switching by conversation partners in TBI conversation

In this section, we examine the code-switching behaviour of neurotypical individuals when they are in conversation with a person with TBI. Overlapping themes with the neurotypical dyads were found. Code-switching at the semantic level – words that are more specific in the other language; using code-switching as a conversation marker – to emphasise a point; as well as a pragmatic use of code-switching – retelling information that was previously experienced in another language. However, there is a unique use of code-switching that was observed, which is to scaffold the conversation of the person with TBI.

6.2.2.1 Lexical specificity

The few categories of words which are typically represented in the English referent amongst speakers of Malay in everyday conversation, was also found in the conversation of neurotypical partners of persons with TBI – the pronouns, names of food, names of places, numbers and temporal information (date, time). Likewise, the pattern of choosing a referent in another language which is specific to that context even if it is not the most frequent choice was observed.

In Excerpt 6.13, RS asked AB what he wanted to wear to the wedding function that weekend. In the Malay culture, men's dress code is more flexible than women. They may choose to wear the traditional Malay costume – "*baju kurung*" or a modern combination of shirt and pants. Traditionally, shirt and pants is considered a simple option because it is something available in daily wear however, the *baju kurung* is more formal and not worn for daily activities.

AB's response in Line 3 "just simple pants ah" was a surprise to RS, because he usually chooses to wear the traditional costume to weddings. She requests for confirmation in the next line, and when he replied with an affirmative, she asks specifically in Malay this time "you don't want to wear *baju kurung*?", stressing on the word and choosing to use the Malay referent instead of saying "traditional costume" which carries less weight. This highlights to AB the alternative that he did not choose, and insinuates that it could be the more expected option. When AB responded with an unbudging choice of not wearing the *baju kurung*, RS laughs likely because she found the choice amusing.

Excerpt 6.13

01 RS: then ah:: what you want to wear? (.) this:: ah weekend
02 [for] the wedding

03 AB: [this] weekend just simple (1.0) pants ah (.)

04 RS: simple?

05 AB: um pants (1.5) [pants and shirt]

06 → RS: [you don't want to] wear *baju kurung?*
[you don't want to] wear clothes enclosed?
You don't want to wear traditional Malay clothes?

07 AB: no ah::

08 RS: ((*laughs*))

6.2.2.2 Emphasise a point

The use of code-switching as a conversation marker seems to play an important role when a conversation partner of the person with TBI is speaking to them or with other people in a conversation involving the person with TBI. The code-switched word aids in highlighting information that was misunderstood by the person with TBI, or to highlight the oddity of what had transpired before that utterance. It is also used to highlight the importance of the information that was intended for the person with TBI.

In Excerpt 6.14, we see FZ and his mom using English for numerical and temporal concepts. FZ's mom was trying to orientate him to the dates that she will be on leave, and that it was coming soon. However, FZ had difficulties orientating himself to the dates in the previous turns. As a result, FZ's mom emphasises the information in Line 2 below by saying it firstly in English, which they had been doing in the previous turns, and then repeating it in Malay, with stress placed on that phrase "*ni hari kan tiga puluh march*!". This hints at her possible exasperation about the fact that he didn't understand the information.

This successfully directs FZ's attention to that day's date, and while he was still unsure of the fact, he accepts the date in the later lines and explained why he found it difficult to orientate himself to the date – he blames it on his visual deficits resulting in difficulties looking at the date on his watch.

Excerpt 6.14

01 FZ: oh six seven eight coming soon ah

02 M: coming soon ah (1.0) today is thirtieth jan- eh thirtieth march (1.0)
03 → *ni hari kan tiga puluh* march!
This day right thirty march!
Today is 30th March!

04 FZ: *ni hari kan* thirty?
this day is thirty?
Today is thirtieth?

05 M: thirty ma::rch (0.5)

06 FZ: oh really

07 M: ah yah (2.0) thirty march ah today

08 → FZ: *susah* ah *tengok jam* [*tengok pun susah tau*]
difficult ah look watch [look also difficult know]
Looking at the watch is difficult. Look also difficult you know?

In Excerpt 6.15, FZ and his mom were having a conversation about the amount of money they needed to bring with them for their trip to Batam (an Indonesian island). What preceded this excerpt were mom's repeated attempts at informing FZ about the cost of the vehicle rental as well as the fact that she had enough money for it.

In Line 1, FZ's mom reassures him that she has enough money, and ends the utterance with an emphasis on the words "don't worry" to add weight to the words at the beginning of this utterance. FZ was still unable to understand which currency his mom was talking about and clarified this in Line 2, to which she replied in Line 3 the need to convert the "twenty dollar" amount to rupiah (Indonesian currency). However, in Line 4, he still misunderstood the information, leaving Mom exasperated and she explains in Line 7 the math behind his mistake and with a stressed intonation says "*takkan kasi kereta* two dollar", making salient the incredulity of the amount of money he had mistaken the vehicle rental for. FZ by then understood that mom was frustrated and in Line 8 and tries to neutralize the situation by bringing the topic to a close.

Excerpt 6.15

01 → M: *ok takpe CUKUP mama dah bawak* don't WORRY
ok it is ok enough mama already bring don't worry
Don't worry, I have already brought enough

02 FZ: at at Singapore

03 → M: AT *SANA* TWENTY DOLLAR INTO *RUPIAH* LAH
at there twenty dollar into Indonesian currency lah
Over there we change twenty dollars into Indonesian currency
04 [*alamak*]
oh dear
Oh dear

05 FZ: [oh twenty rupiah]

06 M: eh twenty rupiah is two dollar *tau*
eh twenty rupiah is two dollar you know
Twenty rupiah is equivalent to two dollars you know?

07 FZ: two hundred rupiah

08 M: hundred rupiah is one dollar two hundred rupiah is two dollar
09 → *TAKKAN KASI SEWA KERETA* TWO DOLLAR!
Cannot give rent car two dollar
We cant rent a car for two dollars!

10 FZ: Ok later we talk again ok

In Excerpt 6.16, FZ had gone to the bus stop to walk his mom back home after her night shift. Concerned about FZ's well-being, his mom dispenses some advice, code-switching into Malay for words and phrases she wanted to emphasise. The majority of the conversation recorded was in English. In the turns preceding this excerpt, FZ had informed his mom that he was hungry because he only ate "*mee goreng*" at lunch and that he was tired from the day's work.

In the first line, FZ's mom uses the word "*ambik*" instead of fetch, to highlight to him that is the thing he can avoid doing in future. She also asks FZ in Line 4 how work was for him in Malay, with which her concern is expressed more saliently. When she proceeds with her next advice in Line 8 about the type of food he should eat, she again says it in Malay – "*jangan makan mee goreng* (dont eat mee goreng)" and "*mee goreng tak kenyang* (mee goreng wont make you full)".

Excerpt 6.16

01 →	M:	Next time you tired don't need to come and *ambik* mama lah.
		Next time you tired don't need to come and fetch mama lah.
		Next time you are tired you don't have to come and fetch me.
02		Ok *lagi apa nak cakap*
		Ok some more what want say
		Ok what else do you want to say?
03 →	FZ:	after eat pray settle my queen *permaisuri* [*ratu*]
		after eat pray settle my queen queen [queen]
		After I eat and do my prayers I will attend to my queen
04	M:	[*abih* eh]
		[then eh]
		Then
05		*dekat kerja ok tadi*
		at work ok earlier
		Was everything alright at work earlier?
06	FZ:	huh like normal
07	M:	ahah:::
08	FZ:	like normal
09 →	M:	next time *jangan makan* mee goreng lah don't eat *mee goreng*
		next time dont eat noodle fried lah dont eat noodle fried
		Next time dont eat fried noodles, dont eat fried noodles.
10 →		*mee goreng tak kenyang*
		noodle fried not full
		Fried noodles are not filling
11	FZ:	no, FREE!

In Excerpt 6.17, FZ suggested combining all their rupiah currency for the trip to Batam. FZ's mom was concerned about the possible implications of bringing a large amount of currency and in Line 4 asks him in Malay (in an otherwise English dominant conversation), "*tak apa-apa ke?*" (will there be any problems?). Using Malay, the message about her concern is multiplied – the message is not only clearly articulated, but the manner in which it is produced (uncertain tone of voice) and the use of Malay language instead of English makes the question and her concern more salient.

FZ's mom was also confused about what he wanted to do with all the money they are bringing. In Line 6, she asked him for the reason why he wanted to bring so much money, in Malay.

Excerpt 6.17

01	FZ:	you want to finish up first the because last few months we went to
02		batam you have the balance
03	M:	then
04	FZ:	then combine with the-the new others
05 →	M:	*tak apa-apa ke?* Not what-what ke? **Will there be any problems?**
06	FZ:	two million with fifty thousand because-
07 →	M:	*tukar banyak sangat ni nak mana nak* shopping ah no no no change many too much this want where want shopping ah no no no **Why did you change so much? You want to go shopping? No.**
08 →		*cakap nak* shopping? say want shopping? **Tell me do you want to shop?**
09	FZ:	huh?
10 →	M:	*nak shopping* want shopping **Do you want to shop?**
11	FZ:	because we because we sel-dom come to batam

In Excerpt 6.18, FZ was displaying an act of self-praise, sharing with the relatives visiting him at home that a lot of people know him, people of all races (Line 1). This inappropriate behaviour was detected by his cousin (R1), and she proceeds to tease him by saying that he was "very popular", code-switching to English. This could be interpreted as an attempt to make light of the situation. Should it be said in Malay, it wouldn't have been as salient.

FZ's mom picks up on this and also uses the word in her next utterance following R1's turn. Together with her tone of voice, and the use of the word "*apa*" which is often used to

indicate the intention to insinuate, the message that they were calling out on FZ's boastful behaviour is achieved. FZ realises this and responds with a denial, "*tak lah*", of the previous label given to him (popular). This is an expected response. In the asian culture, when someone praises you, you should play down the praise instead of accepting it.

Excerpt 6.18

01 FZ: *semua seh* (.1) *ada* chinese *ada melayu semua kenal*
all seh (.1) have chinese have malay all know
All came – Chinese and Malay all know me

02 → R1: *semua kenal* very popular ((*laughs*))
all know very popular ((*laughs*))
You are very popular for everyone to know you
((2 seconds pause))

03 → M: very popular

04 → FZ: *tak* lah
no lah
not really

In Excerpt 6.19, the code-switching occurs not to make a point salient to the person with TBI but when describing a key information about the person with TBI to others. Here, FZ's mom was sharing with his cousins about how keen he is to go back to driving. Although the conversation is mostly in Malay, FZ's mom uses the words "desire" and "yearning" instead of the Malay referent "*keinginan*", making the information about FZ's desire to drive even more salient to his relatives.

Excerpt 6.19

01 M: *tapi* neurosurgeon *cakap jangan kasi dia* drive *dulu*
but neurosurgeon said don't give him drive first
But the neurosurgeon said not to let him drive first

02 R1: *ye lah*
Yes lah
Yes of course

03 → M: *dia punya* desire *dia tu punya* yearning cik idah *bawak kereta*
he own desire he that own yearning cik idah bring car
His desire and yearning to drive. While I was driving the car
04 *dia pegang* steering
he hold steering
He held the steering wheel.

6.2.2.3 Contextual influence

Similar to the findings in the neurotypical dyads, when speaking about medical events, FZ's mom is seen to be using English instead of Malay which was dominant in the rest of

the conversation. The phrases “never mind”, to put FZ at ease; “eye clinic”, “polyclinic” are all produced in English. Most salient is Line 5 which mom produced entirely in English “but polyclinic doctor refer to eye clinic”, If she had said it in Malay it is less likely that FZ would understand it as the words and the concept is of low frequency in the Malay language.

Excerpt 6.20

01 → M: never mind lah *nanti insya allah kita pergi* eye clinic eh (1.0)
never mind lah later god willing we go eye clinic eh (1.0)
Never mind, God willing we go to the eye cilnic.

02 FZ: oh

03 → M: on the (1.0) ah *kita pergi* eye clinic *nanti kita* check eh
on the (1.0) ah we go eye clinic later we check eh
On the… Ah we go to eye clinic and we have a check.

04 → FZ: *kita pergi* (1.0) polyclinic (1.0)
we go (1.0) polyclinic (1.0)
We will go to the polyclinic.

05 → M: polyclinic but polyclinic doctor refer to eye clinic (1.0)

06 → FZ: eyes clinic

07 → M: EYE clinic

Other than the medical setting, many of the conversation between FZ and his mom centres around the topic of religion. In Excerpt 6.21, we see that FZ and his mom were conversing in English. However, when she needed to describe one of the actions muslims had to perform during Haj, she says it entirely in Malay (Line 4) “melontar melontar melontar jamnatul al kaabah”. In Lines 13 and 15, mom again produces her utterance in Malay. Saying “*kita patutnya berdoa*” is a specific way to highlight the need to pray to Allah instead of saying “we should pray”. She continues to use the word “*berdoa*” in Line 15, probably to highlight the salience of the word. Saying the word “pray” would have been simpler (in articulatory complexity, syllable length) but would not carry so much weight.

Excerpt 6.21

01 → FZ: because I thought during *ramadhan* you g-
because I thought during fasting month you g-
because I thought during fasting month
08 I don’t know what- what- what you said (.2)
09 → during *ramadhan* you went to *umrah*
during fasting month you went to mini pilgrimage
during fasting month you go to mini pilgrimage
10 because we have to throw the- the stone

11 → M: no the stone no no not (.1) that’s during *haji*

no the stone no no not (.1) that's during pilgrimage
No not the stone, that's during pilgrimage.

12 → during *haji* only we throw the stone
during pilgrimage only we throw the stone
We throw stones only during pilgrimage.

13 FZ: [OHH]

14 → M: [The] melontar melontar melontar jamnatul al kaabah
[The] throwing throwing throwing arabic name of kaabah
The throwing of stones at the kaabah

15 FZ: this during ramadhan is it

16 → M: during *haji* now [after this] after this *wukuf* (.2)
during pilgrimage now [after this] after this presence (.2)
During pilgrimage, after this they will be present

17 FZ: [oh oh]

18 → M: at *makah* [the] *jemaah*
at Mecca [the] pilgrims
At Mecca, the pilgrims.

19 → FZ: [oh] that's during during eid mubarak *haji* right
[oh] that's during during eid Mubarak haj right
Oh that's during haj pilgrimage right?

20 M: ah (.) ah

21 FZ: oh::

22 → M: so at this time *kita patutnya berdoa*
so at this time we should pray
so at this time we should pray

23 FZ: [oh::]

24 → M: [so you w-] you want *berdoa cakap nak berdoa untuk apa*
[so you w-] you want pray speak what pray for what
If you want to pray, say what you will pray for

25 FZ: what

26 M: you want to pray for-

27 → FZ: about my *doa?*
about my prayers?
About my prayers?

28 → M: aah! what *doa*
yes! what prayers
yes what are your prayers

29 FZ: you see I can tell about my *doa* it gonna take around
you see I can tell about my prayers it gonna take around
You see, I can tell you about my prayers but it will take around
30 two three four days for my *doa* you know
two three four days for my prayers you know
up to four days for my prayers you know?

31 M: [two three four days?]

32 FZ: [I have a lot!]

6.2.2.4 Scaffolding

An interesting use for code-switching when neurotypical conversation partners converse with people with TBI is to use it as a tool to scaffold the understanding of the person with TBI.

In Excerpt 6.22, GW was asking AB what he had for breakfast. AB responds in Line 2 with a phonemic paraphasia (oat → hoat). In Line 3, RS corrects him (Other-initiated Other-repair) but gets him to elaborate by asking with "*apa*" (with what?). However, it was RS who had to expand the utterance by elaborating what they had other than oatmeals.

Excerpt 6.22

01 GW: what did you do. what did she prepare for you.

02 AB: hoat hoat hoat

03 → RS: oatmeals (.) with *apa*, with raisins,
oatmeals (.) with what, with raisins,
oatmeals with? with raisins…

04 AB: ah with skazins and after that we take medicine also
05 ah we take medicine

Similarly, in Excerpt 6.23, RS invited AB to be more specific about the medication that he described to GW, asking him what medication it was for in Malay "medication *apa bah*?" Unlike in the previous example, AB was able to expand on the information and in Line 7 clarify that he was talking about his blood pressure medication.

Excerpt 6.23

01 RS: I help him ah

02 AB: help me for then after that I think ah after finish we go for er

03 medication ah we check took already ah

04 GW: ahah hmm

05 AB: took already,

06 → RS: medication *apa bah*?
medication what dear?
Which medication dear?

07 AB: ah? Our our my blood my my blood high blood that one all this

FZ's mom also uses code-switching to scaffold his understanding in conversations. In 6.24 where FZ had earlier had difficulties understanding the question posed by R1 (his cousin). In Line 1, M rephrases the question in Malay, in line with the previous turns which were produced in Malay. However, when FZ still had difficulties understanding the question, she code-switches to English in Line 3, clarifying the workplace and who they were talking about. R1 takes the cue from mom and repeated in English "your police friend". These proved effective – in Line 5, FZ understands the question but had difficulties remembering the name of the friend.

Excerpt 6.24

01 → M: ah *takde kakak* zura *tanya pergi kawan kerja tak kawan kerja*
ah no sister zura asked go friend work not friend work
No, Kakak Zura was asking have you been to see your colleague

02 → R1: [police police *dah jumpa*]
[police police already met]
Have you met your colleagues from the police force?

03 M: [police police loyang your friend]

04 R1: [your police friend]

05 → FZ: [*siapa nama dia* eh]
[who name he eh]
What's his name?

In Excerpt 6.25 taken from the conversation where FZ and his mom were at the bus stop and he almost took the wrong bus. In Line 1, we see mom asking him where he wanted to go (indirectly asking why he almost took the wrong bus), both in English and in Malay. Although his utterance was unintelligible in Line 2, he was likely making an excuse, leading to mom responding in Line 3 "*abih* (so) why did you go to the front?" The word "*abih*" is often used at the front of utterances in response to when people claim they know what they are doing but their actions prove otherwise.

Subsequently, in Line 7, FZ's mom invites him to continue reflecting on his mistake by asking him in Malay "*lepas tu*". In Line 11, she reiterates that he should be careful in future

by adding to what she said in English “luckily I called you” with “*kalau tak*” emphasising that the consequence would have been grave if she had not.

FZ’s responses in Lines 13, 17, 19 and 21 suggests that he has still not gotten the point and was taking it lightly, resulting in mom repeating her question “*kalau tak*” in Lines 14, 16, 18, 20 and 22. She only stopped doing so after FZ responds in Line 24 that he understands he should not repeat the same mistake again.

Excerpt 6.25

01 → M: you want to go where (.) *nak pergi mana*
you want to go where (.) want go where
Where are you going. Where are you going

02 FZ: ((*8 syllables, unintelligible)*)

03 M: ((*3 syllables, unintelligible*)) *abih!* go in front
((*3 syllables, unintelligible*)) then go in front
So why did you go to the front

04 FZ: because I I thought I saw seventy two

05 M: [then]

06 FZ: [((5 syllables, unintelligible)) become sixty eight

07 → M: *lepas tu*
after that
After that

08 FZ: and two nine three

09 M: ah

10 FZ: ah two nine three ah

11 → M: lucky I call you (.) *kalau tak* (.) ah (.)
lucky I call you (.). if not (.) ah (.)
Luckily I called you. Otherwise..

12 M: ok-k-k-k-k-k (.)

13 FZ: sorry ((*kisses mom’s hand*))

14 → M: *kalau tak macam mana*
if not like how
Otherwise, what will happen

15 FZ: ah

16 → M: *kalau tak*
if not
Otherwise

17 FZ: I-I will laugh at myself

18 M: ah

19 FZ: laugh laugh laugh

20 → M: *lepas tu*
after that
and then

21 FZ: comedy

22 → M: ah *lepas tu*
ah after that
and then

23 FZ: because usually I want to just [get in]

24 → M: [you see!]

6.2.3 Code-switching by people with TBI

In this section, the focus will be on the code-switching behaviour of the persons with TBI. Overlapping themes with the neurotypical dyads were found. These include code-switching at the semantic level – words that are more specific in the other language; using code-switching as a conversation marker – to emphasise a point; as well as a pragmatic use of code-switching – to reciprocate the language choice of the conversation partner.

In the data from the least severe person with TBI (SS), we find evidence of higher level use of code-switching. This may indicate a metacognitive awareness which allows SS to negotiate conversations using code-switching. These include using code-switching to signal a change in topic, as a form of repair and also for the action of requesting. Interestingly, these data also came from recordings at the later stages of his injury (5 months post). This could indicate an element of neurological recovery and hence increasing the sophistication in the use of code-switching in conversation.

In the data from the two more severe persons with TBI (FZ and AB), we observe some atypical actions when code-switching. There were four examples of code-switching into a language that is unknown to one of the conversation partners and one example of code-switching which does not follow syntactical rules.

6.2.3.1 Code-switching: basic level

6.2.3.1.1 Lexical specificity in the code-switch language

In Excerpt 6.26 AB used the word "*kaypoh*" which has a stronger connotation than merely using the word "busybody" in English. This also seems to be an attempt to emphasise the fact that he should not actually be engaged in such activities.

Excerpt 6.26

01 → AB: sometimes *kaypoh* lah go and see Malaysian politics all this
sometimes busybody lah go and see Malaysia politics all this
sometimes I am a busybody and watch Malaysian politics

In Excerpt 6.27, AB, who was speaking in SCE, labelled the fish as "*kurau*", the Malay referent. While it is common that names of fish is mentioned in Malay instead of their lower frequency English referent, what is uncommon here is that AB code-switched only the name of the fish "*kurau*" but not the entire phrase it is known as – "*ikan kurau* (threadfin)". Despite the mixture of English and Malay for a single noun, this utterance is grammatically accurate. Once corrected by his wife, AB was able to use the full single noun in Malay in subsequent utterances.

Excerpt 6.27

01 RS: um ok:: (1.0) what fish you wa- you like? I need to buy:: like me to buy

02 → AB: sometimes actually I like *kurau* fish also lah
sometimes actually I like threadfin fish also lah
Actually I also like threadfin.

03 → RS: *ikan kurau*::
fish threadfin::
threadfin.

04 AB: ah:::

05 → RS: *ikan kurau* then ah:: ok (.) you want me to pan fry or you want me to
fish threadfin then ah:: ok (.) you want me to pan fry or you want me to
Ok, threadfin. Do you want me to pan fry or..
06 (1.0) I think I make soup lah eh

06 AB: ah soup better lah:::

6.2.3.1.2 Temporal concepts

In FZ's data which was mostly made of Malay utterances (in the early stages of the injury), he consistently uses English when addressing temporal concepts. Below are three examples from the data.

In Excerpt 6.28, FZ's mom was describing how she had met his doctor while in the hospital. Although he had been using Malay in Lines 2 and 6, he switches to English in Line 8, when he started bringing up the timeline of his injury and hospital stay. The code-switching was solely for temporal concepts, as evident from his next turn in Line 10 where he switched back to Malay.

Excerpt 6.28

01 M: ah ogy

02 FZ: *apa dia*
what it
What is it?

03 M: ah *tadi* *hari tu kan* mama *nampak* ogy *punya*
ah just now day that right mama saw ogy own
Did you know, that day Mama saw Ogy's doctor who…
04 doctor *tau* doctor *yang-*
doctor know doctor who-
doctor who…

05 FZ: doctor?

06 M: ah, doctor *yang* operate ogy::
yes, doctor who operate ogy::
Yes, the doctor that operated on you.

07 FZ: oh *ya ke*?
oh yes or
Oh is that right?

08 M: doctor eric teo (.) ah:::

09 → FZ: I think *dulu* I six months
i think last time i six months
I think six months ago

10 M: aha::

11 FZ: *kan kat sini*
kan at here
Here right?

In Excerpt 6.29, again, the conversation was predominantly in Malay. However, when FZ started speaking about temporal concepts "time" in Line 1, as well as counting and stating the number of months in Lines 3 and 4, he uses English. The utterances surrounding these numerical concepts within the same utterance as well as those between these utterances were all in Malay.

Excerpt 6.29

01 → FZ: oh *tapi dekat mana* eh *apa* time *kita berapa*::
oh but at where eh what time we how much
Oh, but where, what time, how much…

02 M: huh!

03 → FZ: *berapa*:: one two three four five *bila*:: *bila* that time *saya kena* (.)
how many one two three four five when:: when that time i got (.)
How many? 1,2,3,4,5. When? When did I get (into the accident)?

04 → six months?

04 → M: six months (.) ah::-

05 FZ: *mana [satu* eh]
which one eh
Which one…

06 M: ah:: *dekat* hospital changi general hospital
ah:: at hospital changi general hospital
Yes at the hospital, Changi General Hospital.

In Excerpt 6.30, similarly, FZ's utterances were predominantly in Malay whereas the temporal and numberical concepts were in English. Although it is possible that FZ used English to reciprocate mom's use of English in Line 1, his Malay utterances on non temporal/numerical concept in Lines 2 and 12 suggests otherwise.

Excerpt 6.30

01 M: next week mama three day off *kita gi* loyang base
next week mama three day off we go loyang base
We go to Loyang Base next week on my three day off.

02 FZ: *bila* (.) *awak* free:: *dekat mana bila*,
when (.) you free at where when
When are you free? Where? When?

03 → M: six seven eight mama off

04 → FZ: six seven eight

05 → M: ah six seven eight april mama off

06 → FZ: yay this this year

07 → M: this (.) next week (1.0) next week not year:: this next week

08 → FZ: oh this coming year

09 → M: ah this coming week ah

10 → FZ: oh friday saturday sunday?

11 → M: no not friday saturday (.) I not so sure what day (.) but six april (.)
12 seven and eight (.) *kita gi* loyang eh

seven and eight (.) we go loyang eh
seventh and eighth, we go to loyang.

12 FZ: *ah apa*
ah what
What?

6.2.3.1.3 Emphasise a point

Similar to the conversations of the neurotypical participants, the TBI participants also use code-switching to emphasise information that they wanted to convey in their utterance.

In an otherwise predominantly English conversation, SS not only code-switched to Malay on the word "*kalau*", he repeats this word in the utterance. This serves to emphasise that going back to work largely "depends" on whether he would feel better.

Excerpt 6.31

01 → SS: i::'m not sure because *kalau* everything *kalau* ok (.)
i::'m not sure because if everything if ok (.)
I**'m not sure because if everything is ok**
02 I::: need to go back one of these days

In Excerpt 6.32, he was discussing with his friend L about when to organise a catch-up session with their friends. When L dismisses that the event is not yet nearing, SS responds with saying that he needed to "book" his friends early. In his explanation, he code-switched to Malay and says "*macam susah je*" [it seems difficult] to obtain a date with their friend Zaini.

Later in this excerpt, SS again code-switched to Malay when he wanted to ask for help from his friends. To emphasise that he needed help with organising their gathering, he again code-switched to Malay and says "*aku dah tak ingat macam mana aku buat hari tu"* [I don't remember how I organised it previously].

Excerpt 6.32

01 L: january its still early mah ((*laughs*))

02 SS: er january its ok lah still early but the thing is I need to talk to tell
03 you guys earlier lah then book January
04 → *macam susah je lagi-lagi Zainol* ah (1.0)
like difficult only especially Zainol ah (1.0)
difficult to get you guys especially Zainol
05 ah you know you need to book in advance you know

06 L: we just need to ask zainol what (1.0) for me it should be alright ah

07 SS: yah lah that's why im asking you is it a good suggestion or not

08 if want to make it in January

09 L: i-i-i don't mind but (2.0) where

10 SS: where ah er that one I don't know

11 L: [oh ok]

12 → SS: [*aku dah tak] ingat macam mana aku buat hari tu*
[i already don't] remember like how I do day that
I cant remember how I organised it previously

13 L: oh ok lah I don't mind I don't mind

14 SS: ok in case of that then I call you again orhs

Using code-switching to emphasise their point was also observed in AB's data. The following are two examples from his data. In Excerpt 6.33, AB was describing the places that he was still avoiding after his brain injury. When explaining why, he says in Malay "*abih jatuh sekali* (what if I fall)" emphasising the uncertainty of whether he will be able to walk without falling in such crowded places.

Excerpt 6.33

01 AB: then got one more bark- park also [my place I]

02 RS: [he scared] ah

03 AB: haven't go next my house also because [you]

04 RS: [you] scared right

05 → AB: kids ah all run run run I scared *abih jatuh sekali*
kids ah all run run run I scared then fall once
kids are running and I am afraid what if I fall

06 RS: [after that]

07 GW: [after that?]

08 AB: after that I go my house then I will (.) ah [what]

09 RS: [watch tv]
10 then wait for me to cook

In Excerpt 6.34, AB's indecision about what he wanted for lunch the next day was made salient by the fact that he code-switched to Malay – "*tengok ah*" instead of saying "let's see".

Excerpt 6.34

01 RS: what you want me to cook?

02 → AB: I think *tengok* ah::
I think see ah::
I think let's (wait and) see.

03 RS: tomorrow

04 AB: tomorrow I think better we eat (1.0)

05 RS: soup?

06 AB: ah soup ah (1.0) some soup with (0.5) err veggie
07 um broccoli all these ah

In FZ's data below, he was explaining to his mom why he didn't want to go and watch a movie – because his vision is "blur", which he repeated twice. These were code-switches into English from his and mom's otherwise Malay utterances. The code-switching and repetition made this point more salient.

Excerpt 6.35

01 M: *kita pergi ini* eh (.) *mata susah tengok* eh (2.0) *tak nampak ke tu*? (.)
we go this eh (.) eye difficult see eh (2.0) not see or this? (.)
We go to the.. Your eyes have difficulties seeing? Cant you see this?
02 *nampak*? [*tak nampak*]::
see? [not see]::
Can you see? You cant see…

03 → FZ: [tak nampak] blur *lagi*
[cannot see] blur again
I can't see. Still blur.

04 → M: blur?

05 → FZ: *susah tengok* ah (.) blur [*dia macam*]
difficult see ah (.) blur [it like]
Difficult to see. It is blur like…

In Excerpt 6.36, FZ was trying to describe his surprise at how often his boss came over to visit him at home. He counts in English, making each number salient and then repeats the utterance in Malay.

Excerpt 6.36

01 → FZ: one two three four *dah tu empat empat kali tau dia*
one two three four after that four four times know he
One, two, three, four. After that four times you know?

02 R2: [eh?]

03 → M: [empat kali datang]
[four times came]
He came four times

04 FZ: *datang dia tengok terperanjat* seh
came he look shock seh
He came. He visited. I was shocked.

05 R1: oh

In Excerpt 6.37 taken from when FZ had started to speak more English than Malay, FZ was trying to suggest alternatives for prayer venues to mom, in view of the closure of the mosque they often frequent. While his other utterances were in English, in Line 6, FZ pacifies his mom and says "*kan boleh solat*" instead of saying it in English "we can pray there". This highlights the point he wants to put across to his mom. In response to that, she accepts his suggestion and reassurance but at the same time still has a hint of disappointment in her tone of voice.

Excerpt 6.37

01 FZ: maybe maybe (.) maybe there's another place (.) in tampines-
02 tampines mall or

03 M: mm

04 FZ: century square

05 M: don't know

06 → FZ: *kan boleh solat*
right can pray
we can pray there

07 → M: mm (.) *takpe* lah
mm (.) never mind lah
Never mind. It's ok

08 FZ: then again (.) allah the most merciful

In Excerpt 6.38, FZ code-switches to Malay when he wanted to emphasise the fact that his mom was quick to learn the new foreign phrase that he had taught her. FZ says mom was quick to "*hafal*" which made his point more salient.

Excerpt 6.38

01 M: *duduk sana lah mama nak solat*
sit there lah mama want pray
Sit over there, I want to pray

02 → FZ: *dulu* I say adios amigos ((*laughs*))
previousy I say adios amigos ((*laughs*))
in the past I would have said adios amigos

03 M: ok adios amigos

04 → FZ: OH very fast you *hafal* you know
OH very fast you memorise you know
Oh you memorised it really quickly

05 M: ok bye

6.2.3.1.4 Reciprocal code-switching

In the neurotypical data, we saw how a conversation partner picks up on the other person's code-switching. This is an example of how we pick up social cues from each other and reciprocate to show that we have that pragmatic awareness.

In Excerpt 6.39, SS was having a conversation with his ST about how he copes with the sensory overstimulation and the anxiety he feels in those situations. In Line 1, ST code-switched to Malay, asking "*selain daripada tu*". In Line 2, SS showed that he acknowledged the code-switching and understood the question by repeating the exact same phrase in his response to ST.

Excerpt 6.39

01 → ST: *selain daripada tu* what do you do
other than that what do you do
other than that what do you do?

02 → SS: ah. *selain daripada tu::* ah:: what I'm trying to do is actually ok,
ah. other than that:: ah:: what I'm trying to do is actually ok,
other than than, what I am trying to do is…

03 For a shop- shopping centre::

04 ST: um
05 SS: it'd be very easy:: ah:: I settle down.

In Excerpt 6.40, we can see that SS was speaking predominantly in English until ST code-switched to Malay in Line 9 and 10 after which he responds with some code-switching within the utterance in Lines 12 and 14. Here, not only does he show awareness of the conversation partner's code-switching, his code-switching also serves to emphasise the reason why it is not possible for his mom to accompany him.

Excerpt 6.40

01 ST: ah all those places are very [very crowded]

02 SS: [tampines is] one of the places that (.) ok

03 ST: ah? REALLY?

04 SS: [yah that's why]

05 ST: [but that can be] busier than orchard road

06 SS: That's why my main objective (.) places to go is [orchard]

07 ST: [orchard road]
((laughs))

08 SS: [ah: orchard and suntec]

09 → ST: [*macam mana cik kena pergi lah. nak kena pergi*] orchard lah
[like how aunty must go lah want must go] orchard lah
Aunty must go to orchard.

10 → macam ni ((*laughs*))
like this ((*laughs*))
in this case.

11 M: ((*shakes her head and laughs*))

12 → SS: my mum *tak* my mum *tak tak boleh sangat lah*
my mum no my mum cannot cannot able too much lah
My mum can't do (walk) too much.

13 ST: um

14 → SS: *pasal dia tak boleh jalan*
because she not able walk
because she's not able to walk

15 ST: um

16 SS: ah so I:: [thought of bringing my] mum- ah my sis.

17 M: [*takut lah kaki*]
[afraid lah leg]
Worried about my leg

18 ST: oh ok.

19 SS: ah. so my sis actually want- wanted to bring me along- along

The next excerpt is another example of SS code-switching to Malay (Line 7) after ST does so (Line 6). When ST resumes speaking in English in Line 8, SS also responds with an English utterance (Line 9).

Excerpt 6.41

01	SS:	I::: need to go back one of these days
02	ST:	ok
03	SS:	just to try lah ah:: need to see how their ((*5 syllables, unintelligible*))
04	ST:	they are allowing you to do that?
05	SS:	um my manager told me I'm allowed to do that
06 →	ST:	ok *boleh* lah good lah ok can lah good lah **ok that's good**
07 →	SS:	at least I got some experience *dari situ* lah at least I got some experience from there lah **at least I got some experience from doing that**
08	ST:	correct so slowly::: you go back:: [and then you]
09	SS:	[I gain my confident] back

This last excerpt (Excerpt 6.42) is taken from FZ's data. This excerpt is interesting because it reflects both FZ's ability to reciprocate the code-switching displayed by his conversation partner, but it also reflects the latency of his reciprocation. Unlike the other participants' data above, where the reciprocal behaviour occurs in the next turn, for FZ it occurs at a later turn.

In Line 5, mom already asks FZ if he wanted to watch a movie in Malay. However, in Line 6 and 7 he still responds in English. Only when mom again code-switched to Malay in Line 8 does he respond in the Malay language at his next turn in Line 9. As mom continues to use Malay in Line 10, FZ continues with the Malay utterance in Line 11.

Excerpt 6.42

01	M:	*kita pergi ini* ah (.) SIX apRIL we go this ah (.) six april **We are going then. Sixth April.**
02	FZ:	six april::
03	M:	*kita pergi* loyang base we go loyang base **We go to Loyang base**

04 FZ: loyang base

05 M: ah (1.0) or *nak pergi tengok wayang tak*
yes (1.0) or want go watch movie not
Yes, or do you want to go watch a movie?

06 FZ: we can go loyang base lah (.)
we can go loyang base ** (.)
We can go to Loyang Base.
07 [we] can go

08 M: [ok] we can go (.) oh *tengok* movie *nak tak*
[ok] we can go (.) oh watch movie want not
Ok, can go. But, do you want to watch a movie or not?

09 → FZ: *susah nak tengok [dia punya ((3 syllables, unintelligible)) susah ah]*
difficult want watch [it own *((3 syllables, unintelligible))* difficult ah]
Difficult to watch the *((3 syllables, unintelligible))*.

10 → M: [oh *mata tak nampak* eh] oh oklah
[oh eye not see eh] oh oklah
Oh, the eyes cant see clearly? That's fine.

11 → FZ: *susah tengok* ah
difficult see ah
It is difficult to see.

6.2.3.2 Code-switching: sophisticated level

SS contributed more data five months after his injury. This time, he was recorded in two telephone conversations with his two close friends (H and L). A noticeable feature of these two conversations was the increase in repertoire of code-switch functions used in SS's conversations including: to signal a change in topic, as a form of conversation repair, and to lower his position as a requestor in the conversation. These appear different from the basic function of the code-switch attempts demonstrated above.

6.2.3.2.1 Signal change in topic

In Excerpt 6.43, SS, who was mainly using English in the conversation, replied to H in English, but code-switched to Malay when he wanted to change the topic of conversation (Line 4). SS switches back to English in Line 6 after gaining the attention of H.

Excerpt 6.43

02 H: *((sniffs)) macam gitu jugak ah kau* whats up
((sniffs)) like that also ah you whats up
Just like before. How about you?

03 SS: oklah, so far doing we::ll trying to catch up with my life lah (.)
04 → bu:::::t eh *aku nak tanya kau* something [er:::]

bu:::::t eh I want ask you something [er:::]
But I want to ask you something…

05 H: [ah]

06 → SS: for the gathering right? when is possible you [think I should make ah]

In Excerpt 6.44, SS was speaking in English prior to this utterance, and they were talking about the dates of their meet up and trying to get the contact number of their friends. However, when he wanted to broach the subject of one of their friend's gender, he code-switched to Malay (as seen in Line 1), and gingerly broached the subject in Malay "*nama dia ann* (his name is Ann)". In Line 1, there are two pieces of information that he wanted to convey to H. Firstly, the fact that he doesn't have Ann's number; and secondly the fact that "Ann" was actually a male friend of theirs who has since identified himself with the female gender. The efficacy of his information exchange is exemplified by H's surprise in Line 5 when he says "*apa nama dia ann?*" (what, his name is ann?).

Excerpt 6.44

01 → SS: because why, ann *punya nombor*:: actually ann, *nama dia*::
because why, ann own number:: actually ann, name him::
Because I don't have Ann's number. Actually Ann's name…
02 → *nama* ann is actually ann ok:: ah ann *dengan* the rest of guys,
name ann is actually ann ok:: ah ann and the rest of guys,
Ann's name is actually… ok Ann and the rest of the guys…
03 → you know *aku takde nombor dia* (3.0)
you know I don't have number him (3.0)
I don't have his number.

04 H: nombor *s::iapa* amir amir *punya nombor kau takde?*
Number who amir amir own number you don't have?
Whose number? You don't have amir's number?
05 → *[apa nama dia* ann?]
[what name his ann?]
What? His name is Ann?

06 SS: [ah amit *punya nombor*] ah *nama dia* ann
[ah amit own number] ah name he ann
Yes amit's number. Yes his name is ann.

In Excerpt 6.45, SS had been talking to L about the possibility of changing the dates of their batam trip because he was unable to take leave on that day. The conversation up till this point was predominantly in English. However, when SS wanted to ask about suitable dates for meeting up friends, he code-switched to Malay (Lines 1 to 3) in order to make it salient the fact that he wanted to change the topic. SS then continues the rest of the conversation in English.

Excerpt 6.45

01 → SS: ah ah *apa* eh *lupa* (.2) *lupa aku* (4.0)
ah ah what eh forgot (.2) forgot I (4.0)
I forgot… I forgot
02 → ok-k-k-k eh *aku nak tanya kau* (1.0)
ok-k-k-k eh I want ask you (1.0)
Ok I wanted to ask you

03 L: ah

04 → SS: ah *apa ni:: pasal ni benda:: aku pun baru cakap dengan* haron.
ah what this:: about this thing:: I also just spoke with haron
What is it, about this thing.. I just spoke to Haron
05 haron say:: he want to make gathering on January is it ok for you guys

06 L: he want to what

07 SS: he want to make a gathering for:: all of us (1.0) to meet up

08 L: ok

09 SS: [on] January is it ok

10 L: [ah] (2.0) january

6.2.3.2.2 Repair

In Excerpt 6.46 below, SS was trying to get information from L about suitable dates when they could meet up. When H first initiated a repair (OIR) in Line 3, SS repeated the question in English as a form of self-repair in Lines 4 and 5. However, when H failed to give a satisfactory reply in Line 6, SS code-switched to Malay to repeat his request in Lines 7 and 8. Only then did he manage to obtain a concrete answer from H in Line 9.

Excerpt 6.46

01 SS: for the gathering right? when is possible you [think I should make ah]

02 H: [((7 syllables, unintelligible))]
03 >what-what-what-the-what<

04 SS: this is regarding about the::: er the gathering meet up with the rest of
05 the guys

06 H: [oh ok ah]

07 →SS: [ok so *bila eh] agak-agak* you think the best time (.)
[ok so when eh] roughly you think the best time (.)
When roughly do you think is the best time
08 → because *aku tak boleh fikir banyak ah* (.) *pasal pasal ni*

because I not can think much ah (.) about about this
Because I cant think too much about this.

09 →H: oh january lah, December *aku gi* holiday
oh january lah, December I go holiday
January. I'm on holiday in December.

6.2.3.2.3 Requesting

The example above not only demonstrated code-switching as a form of repair, but also as a form of polite request for assistance (Line 7). In Excerpt 6.47 below, we see a continuation of the conversation. After code-switching to Malay in Line 4 as a form of request, SS returns to using English but switches back to Malay again in Line 12 when he is requesting for a friend's number.

Excerpt 6.47

01 SS: this is regarding about the::: er the gathering meet up with the rest of
02 the guys

03 H: [oh ok ah]

04 →SS: [ok so *bila eh]* *agak-agak* you think the best time (.)
[ok so when eh] roughly you think the best time (.)
When roughly do you think is the best time
05 → because *aku tak boleh fikir banyak ah* (.) *pasal pasal ni*
because I not can think much ah (.) about about this
Because I cant think too much about this.

06 H: oh january lah, December *aku gi* holiday
oh january lah, December I go holiday
January. I'm on holiday in December.

07 SS: again?

08 H: december *aku gi* holiday (.) January *bagus*
december I go holiday (.) January good
In december I'm going on a holiday. January would be good

10 SS: january is it

12 H: yeah

13 SS: o::k in case of this then ok who:: shall I invite ah

14 → *pasal*:: anyway *kau ada nombor talifon* tau-taufik *tak*
because:: anyway you have number telephone tau-taufik not
because... anyway do you have taufik's number?

15 H: .hhhh *ada tapi tak tahu aku ada simpan ke tak*

.hhhh have but don't know I have keep or not
((*deep breath*)) **have, but I am not sure if I kept it**

In Excerpt 6.48, SS is again seen using Malay to request for his friend to make amendments to their travel plans (Lines 6 and 11). Unlike in the previous excerpt where SS was merely requesting for information, here he is negotiating to adjust dates with a friend and hence his tone of voice as well as the code-switch to Malay makes it more salient what his intentions were. However, when he finds that he was getting nowhere in the negotiation with L, SS switches back to English in Line 13. Eventually, in Lines 21 and 22, he concedes that they are unable to make a special arrangement just to accommodate his leave schedule.

Excerpt 6.48

01	SS:	hello L
02	L:	yah
03	SS:	eh I just want to ask you something eh this is about the regarding
04 →		about the *melaka* trip, about the Malacca trip, **about the Malacca trip**
05	L:	ah
06 →	SS:	ok (1.0) ah:::: *korang takde hari lain* eh [other than] ok (1.0) ah:::: you guys don't day other eh [other than] Ok you guys don't have any days other than…
07	L:	[*hari lain*::] [day other::] **Other days?**
08		no the thing is that it's until thirtieth November
09	SS:	until thirtieth November is it
10	L:	yah I just check it out it's until thirtieth November
11 →	SS:	[ok *pasal aku punya*] [ok because I own] Ok because my
12	L:	[ah until thirtieth] *jadi* rushing [ah until thirtieth] so rushing **yes until the thirtieth, so it's a bit of a rush.**
13 →	SS:	ok because my::: l::leave right now they unable to approve lah
14	L:	they what?

15 SS: my leave () my leave actually unable to approve

16 L: [ok]

17 SS: [and i]

18 SS: cannot swap my off day because [someone took leave that day]

19 L: [I I try]
20 I try the following week they don't have slots

21 SS: ok (2.0) ok I tell you what (.1) ah:: D is there any possible like you
22 guys go ahead [ok]

Excerpt 6.49 below occurs a few turns after the second excerpt above. Here we can see SS throwing a last attempt at negotiating for alternative dates for their group holiday so that he could join them. In Line 2, he explains why in Malay again "*pasal aku tak boleh ambik cuti ah* (because I cant take leave)", with the hope that L will sympathise with his situation.

This time, he succeeds, and L asks which days he could go in Line 3. However, SS soon realises that there is not a common day they can accommodate each other's schedules. In Lines 8 and 9, SS again puts in an explanation why he couldn't accommodate a weekend trip – "*aku kena kerja*" [I have to work]. When L does not change his mind, SS once more concedes that he will have to miss the trip in Line 11. Even in this line he uses Malay, likely to gain sympathy over what he has had to decide on.

Excerpt 6.49

01 SS: ok so in case of this you guys go ahead lor
02 → *pasal aku tak boleh ambik cuti* ah
because I not can take leave ah
Because I can't take leave.

03 L: ok when (.5) which other days you you you can go

04 SS: which other day ah

05 L: ah it must have to be a weekend ah

06 SS: ok because weekend

07 L: because I got no more leave also::

08 → SS: because weekend *aku punya* schedule quite packed ah
because weekend I own schedule quite packed ah
Because my weekend schedule is quite packed
09 → *aku kena kerja*
I need work
I need to work

08 L: oh::

09 SS: ah

10 L: ok

11 → SS: so in case of that then *terpaksa* lah *aku rasa aku* burn lor
so in case of that then forced lah I think i burn lor
In that case I think I let the money go

6.2.3.3 Atypical use of code-switching

Similar to the Friedland & Miller's (1999) findings with AD patients, the participants with TBI showed difficulties inhibiting the use of their dominant language when speaking in the less dominant language. AB demonstrates this four times in his data.

In the Excerpt 6.50, while trying to explain why he has yet to walk at the park near his house, he explains to GW who is non-Malay speaking, "*abih jatuh sekali*" (what if I fall). While this makes his concerns very salient to her, GW is likely not able to understand the utterance except for the familiar word "*jatuh (*fall)" which is a commonly understood Malay word by allied health professionals practicing in Singapore. GW likely inferred the meaning of that utterance from that word, and took the cue from RS who did not flag up this error by asking AB to elaborate in Line 4.

Excerpt 6.50

01 AB: then got one more bark- park also [my place I]

02 RS: [he scared] ah

03 AB: haven't go next my house also because [you]

04 RS: [you] scared right

05 → AB: kids ah all run run run I scared *abih jatuh sekali*
kids ah all run run run I scared then fall once
kids are running and I am afraid what if I fall

06 RS: [after that]

07 GW: [after that?]

Similarly, in the second example (Excerpt 6.51), AB had difficulties inhibiting the Malay language from his conversation with GW. In this case, it was likely a word-search that necessitated the code-switch. Again, given that the code-switched word is a number in line 7 and two other words that are familiar to most Singaporeans in Line 16 "*makan* (eat)" and "*jaga* (look after)", GW was likely able to infer the meaning of the utterances which contained a language she did not understand.

Excerpt 6.51

01	GW:	what do you watch on TV?
02	AB:	watch lah I see channel [newsasia]
03	RS:	[he likes] ah channel newsasia
04 →	AB:	sometimes *kaypoh* lah go and see [Malaysian] politics all this sometimes busybody lah go and see Malaysia politics all this **sometimes I am a busybody and watch Malaysian politics**
05	RS:	[Malaysia:::]
06	GW:	when are they voting?
07 →	AB:	I think ten- tomorrow ah they all I think one or two *dua* ah ah I think ten- tomorrow ah they all I think one or two two ah ah **I think tomorrow yes I think in one or two days** so a bit- a bit *kaypoh* a bit ah so a bit- a bit curious a bit ah **So im just a bit curious**
08	RS:	kaypoh ((*laughs*))
09	GW:	other than channelnewsasia
10 11	AB:	I watch then I watch [the what the one the] Amer- the what the American guy ah doctor knows knows about
12	RS:	[drama::: Malay drama]
13	RS:	oh doctor noose (.) noose eh? [<n>]<o><o><s><e>
14	AB:	[ah]
15	RS:	ah that one channel five
16 →	AB:	American its American about health you *makan must jaga* (.) American its American about health you eat must guard (.) **it's an American show about health you must watch what you eat**
17		I don't know whether you watch
18	GW:	No I never heard of

In the third example (Excerpt 6.52), the code-switched word is also a word that many people may understand even if they are non-Malay speaking. The word "*sambal* (chilli paste)" is a known dish. In fact, when AB searches for the word at the end of Line 5, GW actually provided the part word cue for him to retrieve it in Line 6.

Excerpt 6.52

01 GW: after that what did your wife cook for you

02 AB: my wife cook ah::: she cook for me (0.5) morning ah=

03 GW: =lunch lunch

04 AB: lunch ah chicken with (.) chicken with ah (.)
05 → *sambal* eh what chicken with *salah* ah sa (.) sa (.) what
chilli paste eh what chicken with wrong ah sa (.) sa (.) what
Chilli paste? What is it, chicken with what?

06 → GW: sam:::

07 → AB: *SAMBAL*
chilli paste
Chilli paste

08 RS: not tum- ah tomato chicken right?

09 AB: ah tomato chicken

Despite the possible familiarity of these words to conversation partners who do not speak Malay, it is still expected that a person does not use words in a language that the other person is not familiar with. Should these words be first used by the non-Malay speaker, then it is more socially acceptable, as they have demonstrated their awareness of these words. In AB's case, this was not so, as he was the first one to bring up these words in their conversation.

FZ also has an example of inappropriate code-switching when conversing with someone who doesn't understand the language. In Excerpt 6.53 below, FZ and his mother went to Batam. When speaking to his relatives, one who is proficient in English (FB) and one who is not (MB), FZ had code-switched some lexical items into English.

In Line 1, FZ says "the job" which necessitated FB to translate in Line 2 for MB's understanding. In Lines 3-7, again FZ code switched to English, which necessitated a other-initiated repair request from MB in Line 10. This was then again translated by the FB.

Hence, unlike in AB's examples above where GW, the ST was likely trying not to disrupt the flow of conversation by stopping AB, partially driven by the fact that she understood some of the common words substituted to Malay, FZ's example shows that there is a communication breakdown experienced by the conversation partner and this necessitates requests for repair.

Excerpt 6.53

01 → FZ: the job *daripada* [*sembilan tahun lepas*]
the job from [nine years ago]
The job from nine years ago

02 → FB: [*pekerjaan, pekerjaan*]
[occupation, occupation]
Occupation

03 FZ: *sembilan tahun lepas sampai sekarang* police force police coast guard
nine years ago until now police force police coast guard
Since nine years ago until now I'm in the police force coast guard.

04 *dulu* five years ago ogy *ada kemalangan* accident *tapi masih*
before five years ago ogy have accident accident but still
Five years ago I had an accident but still

05 *kehidupan kerana allah allah kasi kesempatan* chance to live
living because allah allah give chance chance to live
alive because allah gave a chance to live

06 because of allah but I really *taubat* but now I still *masih kerja kat*
because of allah but I really repent but now I still still work at
Because of allah I really repented but now im still working at

07 → police *tapi* office
police but office
police force but doing office work

08 MB: oh

09 → FZ: office

10 → MB: [office *tu kantor ya*]
[office is office yes]
Office is office yes?

11 → FB: [*kantor*, *kantor*]
[office, office]
Office, office

Aside from pragmatic incompetence, a non-typical code-switching behaviour was observed in FZ's data. In Excerpt 6.54, he code-switches a word that he already produced in the sentence – "got *ada*". These mistakes are typically made by non-Malay speakers who tend to use the Malay word after saying the English word in the sentence. For example, a common mistake made by non-Malay speakers is saying "She is so arrogant like macam she is the best". 'Like' and 'macam' are cognates and should not be repeated one after the other as it is grammatically inappropriate.

Excerpt 6.54

01 → FZ: if I got free food from the team then got *ada* balance
If I got free food from the team then got got balance
If i get free food from the team it means they have leftovers

02 M: ahah

03 FZ: then its like something there is free for your lunch

04 M: oh *rezeki* *tu*
oh blessings that
oh that is a blessing

In fact, Excerpt 6.53 contains a few more examples of this. In Lines 4, 5 and 6 (underlined words).

6.3 Conclusion

The conversations that were studied demonstrated that there was a broadly equal proportion of turns between the person with TBI and their conversation partners, similar to the proportion shared by each person in the neurotypical dyads. The amount of code-switching varies across different dyads depending on the dominant language of the pair. Dyads who were English-dominant tended to code-switch less, whereas those who were Malay-dominant code-switched more, regardless of whether they were neurotypical or with TBI.

Similar to Friedland and Miller's (1999) findings in persons with AD, the severity of TBI in our data appear to have no relationship to the amount of code-switching observed. Code-switching was observed most predominantly in the data of FZ (most severe TBI) and SS (least severe TBI), in fairly equal amounts (29% and 26% respectively). However, unlike Friedland & Miller's (1999) findings that the person with aphasia would code-switch more than their neurotypical partner, both the neurotypical dyads and dyads involving a person with TBI demonstrated symmetry in the amount of code-switching produced by each participant.

In the neurotypical dyads, code-switching was used for these functions: 1) when the lexical form in the other language is more specific; 2) as a compensatory strategy during a word-search situation; 3) to emphasise a point; 4) to neutralize a tense situation; 5) as a form of pragmatic competence – to reciprocate the code-switching displayed by the conversation partner; and 6) when it is contextually relevant to do so (e.g. speaking about medical terms).

In their conversation with a person with TBI, the function of code-switching is more restricted, namely: 1) when the lexical form in the other language is more specific; 2) to emphasise a point; 3) when it is contextually relevant to do so (e.g. speaking about medical terms). In addition to the above three, which are the same as that observed in the neurotypical dyads, the conversation partners of persons with TBI have an additional function for code-switching, which is as a form of scaffolding or teaching technique to be used with the person with TBI during repair sequences.

The data collected in this study shows three patterns of code-switching behaviour in persons with TBI: 1) using code-switching at the basic level; 2) using code-switching for a more sophisticated function; 3) inappropriate code-switching.

Similar to the data from the neurotypical dyads and conversation partners, the persons with TBI in this study demonstrated the use of code-switching for these functions: 1) when the lexical form in the other language is more specific; 2) for temporal concepts; 3) to

emphasise a point; and 4) as a form of pragmatic competence – to reciprocate the code-switching displayed by the conversation partner.

What was interesting is the finding that SS, who was the least severely injured, demonstrated an evolution of code-switching behaviour to demonstrate more sophisticated use of it in conversations when recorded 5 months post injury. SS used code-switching: 1) to signal a change in topic; 2) as a form of repair; and 3) for the action of requesting. These may indicate a metacognitive awareness that allows SS to negotiate conversations using code-switching.

Data from the two more severely injured participants (FZ & AB) though, demonstrated inappropriate code-switching – using a language that the other person does not know. All five occurrences happened in multi-party conversations and were directed towards a conversation partner who was less familiar to the person with TBI. These inappropriate code-switching findings mirror those found in persons with Alzheimer's Dementia (AD) by Friedland & Miller (1999), where, it was found that persons with AD showed difficulties inhibiting the use of their dominant language when speaking in the less dominant language.

Another phenomenon observed is the change in language dominance in two participants. FZ was premorbidly more dominant in Malay, and this was apparent in his earlier audio recordings. However, he gradually became more English dominant, and this was apparent in his later audio recordings (at least six months post the initial recordings). SS, who was also premorbidly more dominant in Malay, became more English dominant after the injury. In SS's case, we do not have any of his pre-injury conversations to make meaningful comparisons to the data that we have (which is predominantly in Singapore Colloquial English).

7 DISCUSSION

In this discussion chapter, I will first recap the aims of the study before summarising the key findings from this study and describing the theoretical as well as clinical implications for the findings. Next, the strengths and limitations of the study will be discussed, and lastly the future research directions will be laid out.

7.1 Aims of the study

At the end of the literature review chapter, the aims of this study were described. They are:

1. To understand the problems in conversations involving persons with TBI
2. To understand how conversation partners adapt to conversations involving persons with TBI
3. To explore code-switching behaviour in persons with TBI

7.2 Summary of findings

In this dissertation, I have presented the key findings in three chapters, each with a specific theme. The first focuses on the person with TBI and their key interactional problems. Four key sources of interactional problems were 1) the presence of atypical actions, both verbal and non-verbal (physical), 2) self-initiation of repair by the person with TBI – resulting in delay of TCU progressivity, 3) understandability problems – the conversation partner displaying difficulty in understanding the person with TBI, and 4) understandability problems – when the person with TBI had difficulties understanding his conversation partners.

A salient interactional problem in the data was the display of atypical actions. Two examples of inappropriate physical behaviour demonstrated by FZ, who has severe TBI were highlighted– kissing his mother's hands as a form of apology, and asking her to feel the muscle on his arms, both while they were in a public domain (waiting for a bus at the bus stop). Both these actions could be deemed appropriate in a different context. FZ's intention to ask his mother to feel his muscles to show how healthy he has become would have been appropriate in the private home domain. Kissing the hands is something that is done in the Malay culture as a form of respect to elders, but not as a form of apology. In both instances, FZ's mother's response confirms that these are inappropriate behaviours. These physically inappropriate actions occurred when FZ had difficulties responding to his mother; he was unable to explain why he almost got onto the wrong bus as well as the possible implications of his actions.

Pragmatic inappropriateness was also highlighted as an interactional problem. FZ demonstrated self-praise, albeit unwittingly, in his conversation with visitors who were not very familiar to him after his injury (cousins). FZ had commented that many people knew him in the hospital and that almost all of them were women. This self-praise behaviour was not only demonstrated in his talk but also in the intonation used. These actions were met with laughter by his cousin, likely an indication of her awareness that this was an inappropriate behaviour. His continued self-praise despite his conversation partner's responses to indicate the inappropriateness of these actions, as well as despite his mother explaining his account with an alternative explanation (that the ladies he was boasting

about were not his visitors but the staff in the hospital), suggested that he had a reduced ability to pick up social signals from others.

A second pragmatic inappropriateness was borne out of good intentions, again, involving FZ. While trying to thank his helper for her good work, he ended up making her embarrassed because of an extended sequence that involved excessive giving of thanks and also singing an inappropriate song. In FZ's data, the singing episode is inappropriate in two ways: firstly, it was an over-excessive display of thanks that left the recipient (his helper) uncomfortable; secondly, it was a literal interpretation of the first two words in the song lyrics that led to FZ using the song which is inappropriate in that context because it is a love song. The words "*terima kasih*" means thank you, which would have been appropriate for his intention to give thanks to the helper. However, the song actually is parsed differently "*terima kasih sayang*" which means a request to receive the love professed to another person. Hence, in addition to the singing itself that was inappropriate, FZ showed that the choice of song was equally so, and likely added to the helper's embarrassment.

It would be obvious to the reader that most instances of atypical actions came from the data involving FZ. This is likely due to the severity of his injury compared to the other participants. One possibility though, which will be further discussed in the limitations section later, is that there was insufficient data from varied contexts from the other two participants to allow the capturing of such atypical behaviours.

in the second results chapter, two key adaptive behaviours displayed by conversation partners were presented – the conversation partners displaying "teacher-like" talk, and the role of the conversation partner who is a significant other in collaborating with participants in multi-party conversations involving persons with TBI.

One of the most distinct and frequent "teacher-like" talk is the asking of test-questions in conversations between the close conversation partners as well as the therapist and the person with TBI. While it is expected that the therapist engages in such behaviours, test questions from a significant other is not common in typical conversations. Test questions were used by significant others to prompt the person with TBI to recall certain key information in their lives.

In FZ's data taken fifteen months post injury, test questions not only orientate him to important information, but also enabled the conversation partner to expand on his turns by asking follow up questions, ensuring continued contribution to the conversation. This is similar to the behaviour of AB's wife, RS, who asked test questions in order to orientate AB to prospective events before continuing to seek his input on some decision-making related to the event.

Although test questions from a therapist are again used to orientate the person with TBI to information, they appear to take on the form of a hint for the person with TBI to correct a previous erroneous production (e.g. AB gives wrong information, or circumlocuting instead of using a single specific word). Hence, these are true teaching behaviour. However, the therapist also uses test questions to expand on AB's utterances and participate further in the conversation.

Conversation partners adopt distinctive roles within multi-party interactions. AB's wife and

FZ's mom take on the role of the significant other in these interactions involving persons who are less familiar conversation partners. The significant others assist the person with TBI to communicate information to a third party, and clarify, both for the person with TBI and the less familiar conversation partner when problems arise.

In this study's data, we observe FZ's mother clarifying his utterances to make it understandable for the other conversation partners who are less familiar with him and the content of what he is sharing. For example, when FZ produces an utterance without context, his mother will rephrase and include the context.

Other than clarifying for the conversation partners, FZ's mother also had to clarify questions posed by the conversation partners so that FZ can understand them. One example was when FZ and his cousins were speaking at cross purposes about the people who had come to visit him, FZ's mother had to enter the conversation, reformulate the question that was originally asked by the cousin. Only then did FZ manage to answer the question.

Once again, a possible relationship between TBI severity and degree of adaptation required of the conversation partner was inferred from this study's data. Despite the large amount of evidence from the two more severe participants (AB and FZ), there were no data from SS for any of the themes identified above. This highlights the fact that adaptive behaviours might only be necessary if the person with TBI is unable to function in conversations independently.

In the last results chapter on code-switching, both quantitative and qualitative methods were used. The transcripts that were studied demonstrated that there was equal proportion of turns between the person with TBI and their conversation partners. Comparison to a small sample of neurotypical dyads demonstrated this was indeed typical for normal conversations.

The amount of code-switching occurring in the data varied across different dyads depending on the dominant language of the pair. It was found that those who were English-dominant tended to code-switch less, whereas those who were Malay-dominant code-switched more, regardless of whether they were neurotypical or with TBI. This is a result of multiple English word intrusions into Malay-dominant conversations. This is commonly seen in the general Singapore Malay-English bilingual population as well.

Similar to Friedland and Miller's (1999) findings in persons with AD, the severity of TBI in our data appear to have no relationship to the amount of code-switching observed. Code-switching was observed most predominantly in the data of FZ (most severe TBI) and SS (least severe TBI), in fairly equal amounts (29% and 26% respectively). However, unlike Friedland & Miller's (1999) findings that the person with aphasia would code-switch more than their neurotypical partner, both the neurotypical dyads and dyads involving a person with TBI demonstrated symmetry in the amount of code-switching produced by each participant.

In the neurotypical dyads, code-switching was used for these functions: 1) when the lexical form in the other language is more specific; 2) as a compensatory strategy during a word-search situation; 3) to emphasise a point; 4) to neutralize a tense situation; 5) as a form of pragmatic competence – to reciprocate the code-switching displayed by the conversation

partner; and 6) when it is contextually relevant to do so (e.g. speaking about medical terms).

In their conversation with a person with TBI, the function of code-switching was more restricted, namely: 1) when the lexical form in the other language is more specific; 2) to emphasise a point; 3) when it is contextually relevant to do so (e.g. speaking about medical terms). In addition to the above three which is the same as that observed in the neurotypical dyads, the conversation partners of persons with TBI has an additional function for code-switching, which is as a form of scaffolding or teaching technique to be used with the person with TBI during repair sequences.

The data collected in this study showed three patterns of code-switching behaviour in persons with TBI: 1) using code-switching at the basic level; 2) using code-switching for a more sophisticated function; 3) inappropriate code-switching.

What was interesting is the finding that SS, who was the least severely injured, demonstrated an evolution of code-switching behaviour to demonstrate more sophisticated use of it in conversations when recorded 5 months post injury. SS used code-switching: 1) to signal a change in topic; 2) as a form of repair; and 3) for the action of requesting. These may indicate a metacognitive awareness that allows SS to negotiate conversations using code-switching.

In the data of the two more severely injured participants (FZ & AB), we see examples of inappropriate code-switching i.e. using a language that the other person does not know. All five occurrences happened in multi-party conversations and were directed towards a conversation partner who was less familiar to the person with TBI. The difference in FZ & AB's data was that FZ's conversation partner highlighted that the inappropriate code-switching was a trouble source via an other Initiation of repair, whereas AB's conversation partner did not. This was likely due to the fact that AB's conversation partner was a Speech Therapist who did not want to disrupt the conversation and had interpreted the word within the context of the overall sentence produced.

With the above summary of the key findings in this study, I will next describe the theoretical and clinical implications of these findings.

7.3 Theoretical and clinical implications

With the development of CA work in communication disorders, clinicians now have an extremely powerful tool to understand the communication profiles of persons with communication deficits while having conversations, in a more systematic and thorough manner. Although CA has been widely applied in studies involving people with aphasia and dementia (among other disorders), there are not a lot of CA studies on persons with TBI. Hence, the key contribution this study makes to TBI and CA literature is empirical evidence of TBI's impact on conversation, not only to the person who has the injury, but the conversation partners who are non-injured.

All of the studies presented in the literature review section on CA work in TBI are on monolingual speakers of English. This study, to my best knowledge, is the first done on a bilingual population, and definitely the first putting a spotlight on Malay speakers. The contribution to code-switching research in a disordered population, specifically TBI, would

be one of the key theoretical contributions of this study.

In the next two sections, I will highlight the theoretical and clinical implications based on the analyses of the conversations collected in this study.

7.3.1 Theoretical implications

There are findings in this study that replicate previous findings in the area of TBI, but many of the findings are new to the field and these are the key contributions this study makes to the study of TBI conversations. Where findings are new in the field of TBI but have been observed in other communication disorders, the implications of such findings will also be discussed.

7.3.1.1 Replication of previous findings in the TBI literature

Atypical actions

Denman & Wilkinson (2011) had previously examined touching behaviour in a person with TBI and found that these behaviours were not related to physical opportunities but as a response to difficulties responding to the conversation partner. Likewise, for FZ, physically inappropriate actions occurred when he had difficulties responding to his mother (unable to explain why he almost got onto the wrong bus and the possible implications of his actions).

Azios & Archer (2017) described their patient's singing behaviour as both appropriate (on the occasions that the lyrics were related to what was being discussed) and inappropriate (when the singing and the lyrics were unrelated to what was being discussed). Likewise, in FZ's data where he was profusely thanking his helper and breaking into a song, it was both appropriate (on the surface) and inappropriate at the same time. The first two words of the song appeared to match his intention to thank the helper. However, if we listen to the full lyrics of the first verse, it actually means something different, a love song, and is inappropriate to be directed towards his helper. The helper appeared to be aware of this and seemed to be embarrassed by the action.

Self-initiation of repair in response to language deficits resulting in TCU progressivity

In this study, we have seen examples of short SIR and repair attempts as a result of word finding difficulty (AB) as well as long extended sequences evident in FZ's data. Findings from this study mirror those found by several other researchers looking at both aphasia (Laakso & Klippi, 1999; Laakso & Godt, 2016; Lindsay & Wilkinson, 1999) and TBI (Friedland & Miller, 1998) who identified long "hint and guess" and repair sequences were necessary to establish shared understanding between people with communication deficits and their conversation partners, resulting in issues with understandability and sequence progressivity.

Understandability problems resulting from agrammatism and poor recipient design

As a result of the person with TBI's language and cognitive deficits, their utterances may be poorly designed in terms of syntactic structure as well as lacking in context, resulting in difficulties on the part of the conversation partner in understanding them. This finding

mirrors non-CA literature about the impact of language and cognition in contributing to socially unskilled behaviour (Ylvisaker, Szekeres & Feeney, 2008) and being less competent conversationalists (Tucker & Hanlon, 1998). Poor recipient design observed in CA literature has been shown to result in other problems such as perseveration in the talk of persons with TBI (Frankel & Penn, 2007), repetitiveness in the talk of persons with Alzheimer's Dementia (Wilkinson, 2019), and delusional talk in persons with schizophrenia (Palmer, 2000).

Teacher-like behaviour

Previous studies have demonstrated that "test questions" are not always helpful to persons with TBI. Barnes (2012) found that test questions could be used in "planning talk", and perhaps inadvertently, resulted in a restrictive possible set of responses that the TBI person could give in their next turn. Mann et al., (2015) also found that test questions could result in lesser participation than asking questions with the goal of seeking information (e.g. "So you think Laz's party on Friday night was different to what he normally would be like?").

Beeke et al. (2013) recognises that test questions are a double-edged sword in that although it removes the potential difficulty of the conversation partner understanding the PWA, it also reduces the content and structure of the turns of the PWA. In the dementia literature, the use of test questions have been discussed as having a role in enabling the PWD to contribute the current talk (Mikesell, 2009).

Beeke et al.'s (2013) and Mikesell's (2009) findings resonate well with what was observed in this study. Test questions were useful in ensuring that the person with TBI was oriented to the topic of talk and hence could participate further in the talk sequence. At the same time, however, the type and structure of the response was often restricted. However, just like persons with dementia, the cognitive deficits of persons with TBI may benefit from the use of test questions to help them participate in conversations.

Scaffolding by the conversation partner is widely seen in the conversations analysed in this study. This is not new both in the CA literature (Barnes, 2012; Mann et al., 2015) as well as non-CA literature (Togher, Hand & Code, 1997; Tu, Togher & Power, 2011). It has been shown that conversation partners who are able to support the adult with TBI in conversation by asking appropriate questions, requesting information, or scaffolding the interaction also had a more positive communicative experience with adults with TBI. Likewise, this study found that adaptive behaviour such as scaffolding enabled the person with TBI to be oriented and ready to participate further in conversations.

What is common across this study and the previously published ones is that not one adaptive/collaborative style fits all persons with TBI. The adaptation has to be tailored specifically to the needs of the person with TBI. What was a unique finding in this study was that unfamiliar conversation partners are also quick to mirror the adapted behaviour displayed by familiar conversation partners during multiparty conversations.

7.3.1.2 New findings in the TBI literature

Atypical actions

The self-praise behaviour displayed by FZ with unfamiliar conversation partners was met with laughter by his cousin, a response to the inappropriateness of the behaviour. It is interesting that laughing in this instance was observed in the conversation partner of a person with TBI. Previous research (Lindholm, 2008; Wilson, Muller & Damico, 2007) using CA in persons with dementia (PWD) has found laughter used in response to trouble sources within the conversation by the PWD. Hence, it is possible that laughter is used by the person with a communication deficit or their conversation partners, when faced with difficulties reacting to a problem. What makes this behaviour further atypical is that FZ was not able to pick up the social signals from his conversation partners and continued with the self-praise despite the laughter response as well as his mother's alternative account of what he was self-praising about.

Another behaviour that was observed in our data and has not been reported before in the literature involving persons with communication disorders is reduced insight towards suggestions or proposed activities that were inappropriate because they were not possible. This was observed in AB's data where he suggested going to the movies while he was supposed to rest at home because of his dengue fever. AB's reduced insight was evidenced by two failed other-initiations of repair (OIR) produced by RS in order to highlight the inappropriateness of his suggestion.

Understandability problems as a result of reduced memory and cognitive capacity

Problems with understandability on the part of the person with TBI could be hypothesized to be at least in part a result of cognitive deficits. In FZ, the problem was more severe in view of his poor short-term memory, resulting in difficulties remembering information that was previously given, hence halting the progress of the conversation. As a result of not remembering what was talked about or the information exchanged earlier, FZ had difficulties answering questions. FZ's findings were similar to those found in the dementia literature (Wilkinson, 2019). For AB, whose cognitive deficits were less severe, the difficulties arose when there was a high cognitive load required of him. This was often when he had to recall more than one piece of information in order to answer the conversation partner. This finding has yet to be reported in the current communication disorders CA literature.

Teacher-like behaviour

"Correct production sequences" was first described in the aphasia literature (Booth & Perkins, 1999; Lindsay & Wilkinson 1999; Lock et al., 2001; Wilkinson et al.,1998) and occurs in response to an item in the talk which has been mis-produced by the aphasic speaker, with the error usually being phonemic. In this study, it is shown that such sequences also exist in TBI participants with concurrent aphasia. Evidence of this appears in the data of AB and FZ both of whom have language deficits. It is very unlikely for a "correct production sequence" to occur in the conversations of persons with pure cognitive deficits resulting from TBI without any language disorder purely based on the fact that phonemic errors need to occur for a correct production sequence to happen.

Teaching and hinting at errors via OIRs occur widely in the conversations analysed. Although other conversation partner behaviours have earlier been discussed to contribute to better participation of persons with TBI and aphasia, teaching and hinting at errors have not been detailed as one of the strategies before. It is expected that teaching and hinting behaviours should be observed in aphasia and dementia literature in view of the need to correct erroneous word production or orientate to information and personal, temporal, spatial details respectively. It is possible that this has not been described in detail despite being present in the conversations studied previously.

Collaborative behaviour in multi-party conversations

Multi-party conversations have not been studied in detail in the TBI literature. Studies on multi-party conversations exist in aphasia literature (Goodwin, 1995; Klippi, 1996). In these studies, the co-construction of talk between the PWA and the other participants – close conversation partner and healthcare worker in Goodwin (1995) and with other PWAs in an aphasia group in Klippi (1996) are described. Goodwin (1995) specifically talks about how the PWA is the centre of the conversation and the role of the other two participants is to assist him in understanding and following the conversation.

Likewise, in this study, the conversation partners, especially the significant other plays an important role in ensuring that the person with TBI follows the conversation and participates actively and accurately. The behaviours demonstrated in this study include assisting in answering questions, clarifying, both for the person with TBI and also for the non-familiar conversation partner. These ensured successful multi-party conversation in this study.

Code-switching

Code-switching (CS) in persons with TBI has not been studied in detail previously. Hence, in this study, it was important to establish what normal code-switching behaviour is outside of classroom contexts that are widely studied. This in itself, although limited in the amount of data obtained, is an important contribution to the CS literature.

To my knowledge, this is the first study that analysed CS behaviour in detail in persons with TBI, as well as that in their neurotypical conversation partners. Similar to Friedland and Miller's (1999) findings in persons with AD, the severity of TBI in our data appeared to have no relationship to the amount of code-switching observed. Code-switching was observed most predominantly in the data of FZ (most severe TBI) and SS (least severe TBI), in fairly equal amounts (29% and 26% respectively). However, unlike Friedland & Miller's (1999) findings that the person with aphasia would code-switch more than their neurotypical partners, both the neurotypical dyads and dyads involving a person with TBI demonstrated symmetry in the amount of code-switching produced by each participant.

In the data of the two more severely injured participants (FZ & AB), we saw examples of inappropriate code-switching – using a language that the other person does not know. These inappropriate code-switching findings mirror those found in persons with Alzheimer's Dementia (AD) by Friedland & Miller (1999). In their study, it was found that persons with AD showed difficulties inhibiting the use of their dominant language when speaking in the less dominant language.

What differentiates this study from Friedland & Miller (1999) is the more detailed description of qualitative aspects, namely the function of code-switching for neurotypical bilingual dyads, neurotypical conversation partners of persons with TBI, and for the person with TBI themselves. The atypical form of code-switching secondary to difficulties inhibiting the dominant language again replicates Friedland & Miller's (1999) findings in persons with AD.

Another unique contribution this study has made to the CS literature is the evolution of code-switching behaviour to demonstrate the more sophisticated use of it in conversations when recorded 5 months post injury. This was present in SS's data. It appears that an improved metacognitive awareness allowed SS to negotiate conversations using code-switching in a different more sophisticated manner compared to in the earlier phases: 1) to signal a change in topic; 2) as a form of repair; and 3) for the action of requesting.

7.3.2 Clinical implications

This study has also shown that using CA, an in depth examination of a person with TBI's conversation with their conversation partners can be done, and this allows for the identification of facilitators and barriers in these conversations. This would be a very useful additional information on top of paper and pen assessments looking at language and cognitive impairments, resulting in a holistic assessment of the person with TBI both at the impairment and at the participation level (WHO ICF, 2001).

The application of CA as a form of assessment for persons with communication difficulties is definitely lacking amongst clinicians in Singapore currently. There are several barriers to this. Firstly, there is insufficient exposure and opportunities to apply such an approach in the pre-qualification academic and clinical training. Secondly, there is a preconceived idea that such an approach is time consuming, hence unsuitable for the fast paced clinical setting in Singapore where most persons with communication difficulties receive treatment in the acute hospital's outpatient setting and sessions last typically between 30 to 45 minutes. Thirdly, there are currently no pioneer clinicians using and educating others about the utility of such an approach. Lastly, local clients are not exposed to such an approach and hence prefer face-to-face tabletop sessions with a clinician. The involvement of significant others in therapy also often meets resistance. This was evident in my attempts to recruit participants for the study and while explaining the data collection methods of the study. Most potential participants and their significant others decline participation because they thought it would be too time consuming and also expressed their concerns over invasion of privacy through these recordings.

However, this study has demonstrated that it is possible to collect conversation samples from persons with TBI in their naturalistic setting, once their familiar conversation partners have been taught discrete recording of conversations, and after familiarizing the conversation partner to what it feels like being recorded. It is thus my responsibility to share the ease of use as well as the numerous benefits of applying CA in the clinical setting with fellow clinicians.

In the upcoming Singapore Allied Health Conference 2021, I will be presenting a poster on the methodology of CA applied to the clinical setting and sharing some of the key findings from this study that would have otherwise not been possible using other assessment approaches. This, I hope is a first step to encouraging fellow clinicians to take the leap and

use CA in their clinical practice. As a lecturer in the local Masters programme for speech and language pathology, I hope to share with the students my journey with CA, teaching them CA methods that can be applied to the clinical setting, and garnering interest in the approach by encouraging them to apply CA to conversations they collect in placements as part of their assessment with clients.
Several of the communication partner training (CPT) programmes outlined earlier in the literature review chapter could also be applied to the management of patients with TBI locally. In the local context, persons with TBI are most often cared by a close family member, a paid carer or in a residential home. Behn et al. (2012)'s CPT programme for paid carers could be referenced to develop a locally-relevant programme. For close communication partners, there are many programmes developed by Leanne and Togher and colleagues that can be referenced to (Togher, Power, McDonald, Tate & Rietdijk, 2009; Togher, McDonald, Tate, Power, Ylvisaker & Rietdijk, 2010; Togher, Power, Rietdjik, McDonald & Tate, 2012; Togher, McDonald, Tate, Power & Rietdjik, 2013). A telehealth option has also been studied (Rietdijk, Power, Brunner & Togher, 2019).

However, there is no one size fits all training programme for persons with TBI and their conversation partners. This study shows the potential of using CA as a clinical tool to evaluate conversations and set goals for intervention to allow TBI persons to communicate more effectively. The identification of key trouble sources and adaptive strategies adopted by conversation partners to maximize the participation of the person with TBI are useful information for clinicians working with bilinguals with TBI.

As highlighted by previous formal interventions for PWAs borne out of CA research (e.g. BCA; Beeke et al., 2013; and SPPARC; Lock et al., 2001), using CA to examine barriers and facilitators to conversations of each individual person with communication difficulties-conversation partner dyad is essential in identifying the key strategies that are required to enhance their conversations, and the decision of what is appropriate and what is not is ultimately up to the dyad to decide (Wilkinson et al., 1998; Booth & Perkins, 1999; Beeke et al., 2015).

7.4 Strengths and limitations

In this section, I will describe the strengths and limitations of this study, which will then lead up to the last section on future direction for similar research in the area of conversations in persons with TBI.

7.4.1 Strengths

A key strength of this study was the use of CA approach to study conversations of persons with TBI. This allowed for an unbiased examination of the conversation, via the description of turn-by-turn unfolding of talk between the person with TBI and their conversation partners. As a result, an in-depth analysis of TBI as a whole was possible including from the TBI person's perspective, the conversation partners, and a macro view of code-switching behaviour.

Another strength was that the conversations analysed in this study consisted of the person with TBI speaking to a familiar conversation partner. Some of the previous literature described were of persons with TBI conversing with healthcare providers. In this study, the person with TBI was given the choice of which conversation partner to collect the audio

recordings with (if they were able to make that decision ie. SS and AB). Both participants chose their closest significant others (SS's mom and best friends; AB's wife). Examining the conversations between the person with TBI and the conversation partners that matter most to them was an important decision, because of the potential value it would add to the daily lives and conversations of the person with TBI.

A third strength was allowing the conversation dyad to self-record the audio recordings in the absence of the researcher. This was made most obvious in FZ's data, which made up the bulk of this study's data. FZ's mother was asked to collect her own audio recordings in the absence of the researcher, and hence she had the ability to capture spontaneous moments including multi-party conversations that would not have otherwise been possible if there was a need to wait for the researcher to be present to do the recording. Also, it allowed for the recordings to be done very naturally in the absence of an unfamiliar person. The presence of the researcher might have affected how the person with TBI and the conversation partner behaved.

7.4.2 Limitations

The limitations highlighted here explain why this study is not the final word on the topic of conversations in bilingual persons with TBI.

Firstly, the data set is relatively small and the participants were heterogeneous in terms of the severity of their injuries. The TBI data came up to about 95 minutes of recorded conversations in total, and two-thirds of it was contributed by FZ. In the Methods section, I have already explained the reasons why AB and SS's data were so limited. The imbalance between the contribution of data from AB and SS and that provided by FZ meant that certain comparisons could not be made. For example, it was earlier highlighted that severity of TBI could be a contributing factor that explains the observed differences in the nature and amount of atypical actions, problems with understandability, disruptions in TCU and sequence progressivity, and adaptive behaviour by conversation partners identified in the data. However, it could also be the case that there was insufficient data from the less impaired participants.

Secondly, this is the first study of its kind hence there were no other comparisons to be made in terms of similarities in findings for this population. Although I have highlighted some of the areas replicated in from the monolingual literature, the additional key findings arising from studying code-switching in bilinguals could not be compared to other studies other than those involving a similar population (e.g. Alzheimer's Disease). Even then, studies of code-switching behaviour in AD are also limited in number.

Thirdly, while most recent CA studies have incorporated video recordings to supplement findings on verbal actions with analyses of gaze and interaction with the physical environment, this was not achieved in this study. The participants' apprehension towards being video-recorded was explained in the Methods chapter. However, to circumvent this problem, I had used secondary interview data to help gather as much information as I could from the audio recordings.

When FZ's mother submitted an audio recording, I would listen to it immediately and then look out for areas that I wanted to clarify. For example, in the data involving FZ kissing his mother's hand and asking her to touch his arms, I had asked FZ's mother to describe what

FZ's actions were. From her description, I was able to identify that the hand kissing was not the traditional Malay "*salam*" which is done with nose in contact with the recipient's back of hands but a kiss with his lips touching his mother's back of hand, which was more like the western style. This way, although not all the data was captured objectively using video recording, I could still be privy to the non-verbal actions that had occurred in the conversations recorded.

7.5 Future directions

Conducting this study has made me excited about the future possibilities of research in the area of conversations in bilinguals with TBI. I will summarise this in two key areas: firstly, to improve on the design and methodology used in this study, and secondly to emabark in other areas related to the findings from this research (assessment and intervention for persons with TBI).

7.5.1 Improvements in study design and methodology

Two hypotheses were derived from analysing the results of this study: 1) that the severity of the TBI influences the severity and nature of difficulties found in conversation; and 2) that there is a recovery period between acute and chronic TBI which allows for a change in conversation behaviour, especially code-switching.

Preliminary evidence from the data for the first hypothesis are as follows. Interactional problems demonstrated in this study's data came largely from the most severe participant (FZ) especially with regards to the display of atypical actions of touching and singing, problems with understanding conversation partners as well as conversation partners' difficulties understanding him. The participant with less severe injury, AB, contributed to a lesser extent, and the repair sequences as a result of these interactional problems were less lengthy. There were minimal evidence of interactional problems displayed by SS. In fact, the few that were present were all reported in the results section.

The need for the conversation partner to adapt their talk to accommodate the person with TBI was also more evident for FZ and AB. There were many instances from these two participants for the need of the conversation partner to use test questions to teach and orientate, to clarify their talk for less familiar conversation partners and vice versa during multiparty conversations.

Preliminary evidence from the data for the second hypothesis arise mostly from the analysis of code-switching data. It was also more obvious in the data from the least severe participant (SS). A comparison of his code-switch behaviour at one month post injury and six months post injury shows that he was able to use code-switching in a more sophisticated manner, to signal changes in topic, as a form of repair and for the action of requesting.

Preliminary evidence for the second hypothesis could also be found in the most severe participant (FZ). In the data collected at 15 months post injury where he had just begun to have conversations with others, there was a high need for adaptation by his conversation partners including the use of test questions to orientate him, clarifying his talk for less familiar conversation partners. Evidence for this reduced in the data collected more than six months after these initial data.

However, given that the severity and timeline of data collection could not be systematically controlled in this study, we are unable to make conclusive statements about these two hypotheses. In order to test these hypotheses, the design of the study needs to be improved.

To test the first hypothesis, data should be collected from a few participants representing each main level of TBI severity (mild/moderate/severe). In this way, we would be able to identify similarities between participants with the same TBI severity, and make comparisons of these common similarities to those of different TBI severity. At the same time, more data should be collected from each participant in order to give equal opportunities of observing a phenomenon across participants.

The second hypothesis derived was that the behaviour of the persons with TBI in conversation might show evolution to a more normalized behaviour at the later or chronic stages of TBI. It would be interesting to follow up participants over a period of a year or more to track the changes in their conversation patterns as neurological recovery happens. For now, we only have SS's data, showing that 5 months post injury, he was able to demonstrate a more sophisticated use of code-switching in conversations (e.g. for repair or negotiation).

A good mixture of dyadic and multi-party interactions could be encouraged when participants are instructed to record their conversations. This is due to the interesting observations made on the limited number of multi-party interactions in this study, including the unfamiliar conversation partner mimicking the adaptive behaviour demonstrated by the significant other, and to also study other phenomenon such as overlaps.

Where possible, video recordings would be encouraged so that primary data can be collected on the non-verbal behaviours of persons with TBI and their conversation partners during conversation. However, although this idea seems to be ideal, we should take noted that if video-recording was the only form of data collected, some of the naturalistic conversations between FZ and his mother might not have been recorded, because it often involved just two of them, with no one to record the video component. Some important data that arose from audio recording using small discrete instruments (handphone or digital audio recorder) while the participants were on the go included the conversation at the bus stop where we observed two atypical actions displayed by FZ, and also the conversation where FZ accompanied his mother back home from the bus stop.

7.5.2 Follow-up work from current study

CA studies in aphasia and dementia have evolved to the point where researchers are currently using CA methodology to set directions for assessment and intervention.

Developing assessment resources to make CA more accessible and achievable to non-CA clinicians would be a necessary first step. CA can be daunting for first time users as it requires effort and time to collect these data, transcribe and interpret them. A simple and easy-to-follow resource guide would encourage more clinicians to supplement their paper and pen impairment-based assessments with a naturalistic and functional approach like CA.

At an individual dyad level, clinicians can use CA to help conversation partners identify behaviours that are barriers and facilitators to their conversations, identify the areas that they want to change, and teach as well as rehearse scaffolding strategies. Examples of intervention programmes developed for people with aphasia include SPPARC (Lock et al., 2001) and BCA (Beeke et al., 2013).

The development of a structured programme with easy access to resources by persons with TBI and their conversation partners such as what is done for PWAs via BCA (Beeke et al., 2013) would be the next step. These conversation partners can be their familiar partners (family and friends as per this study) or other paid carers/conversation partners (such as helper, nurses, therapists, doctors).

With these efforts, hopefully we can reduce the frustration faced by persons with TBI and their conversation partners and improve their quality of life.

REFERENCES

Abbeduto, L., & Rosenberg, S. (1980). The communicative competence of mildly retarded adults 1. *Applied Psycholinguistics*, *1*(4), 405-426.

Abutalebi, J., & Green, D. W. (2007). Bilingual language production: the neurocognition of language representation and control. *Journal of Neurolinguistics, 20*, 242–275.

Abutalebi, J., & Green, D. W. (2008). Control mechanisms in bilingual language production: neural evidence from language switching studies. *Language and Cognitive Processes, 23,* 557–582.

Abdullah, K., & Ayyub, B. J. M. (2005). Malay language issues and trends. In S. Gopinathan et al. (Eds.)*, Language, Society and Education in Singapore*. Singapore: Federal Publications.

Adamovich, B. B., & Henderson, J. A. (1992). *Scales of Cognitive Ability for Traumatic Brain Injury.* Pro-Ed.

Alfonzetti, G. (1998). The conversational dimension in code-switching between Italian and dialect in Sicily. In P. Auer (Ed.) *Code-Switching in Conversation: Language, Interaction and Identity*. London: Routledge.

Allerdings, M. D., & Alfano, D. P. (2006). Neuropsychological correlates of impaired emotion recognition following traumatic brain injury. *Brain and Cognition*, *60*(2), 193–194.

Allwood, R., Pilnick, A., O'Brien, R., Goldberg, S., Harwood, R. H., & Beeke, S. (2017). Should I stay or should I go? How healthcare professionals close encounters with people with dementia in the acute hospital setting. *Social Science & Medicine, 191,* 212-225.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th edition).* Washington, DC: American Psychiatric Association.

American Speech-Language-Hearing Association (n.d.). *Traumatic Brain Injury in Adults* (Practice Portal). Retrieved February 10 2021, from www.asha.org/Practice-Portal/Clinical-Topics/Traumatic-Brain-Injury-in-Adults/.

Anderson, M. I., Parmenter, T. R., & Mok, M. (2002). The relationship between neurobehavioural problems of severe traumatic brain injury (TBI), family functioning and the psychological well-being of the spouse/caregiver: path model analysis. *Brain Injury, 16*, 743–757.

Angeleri, R., Bosco, F. M., Zettin, M., Sacco, K., Colle, L., & Bara, B. G. (2008). Communicative impairment in traumatic brain injury: a complete pragmatic assessment. *Brain & Language, 107,* 229-245.

Annegers, J. F., Grabow, J. D. Kurland, L. T. et al. (1980). The incidence, causes, and secular trends of head trauma in Olmsted County, Minnesota. *Neurology, 30,* 912-919.

Antaki, C. (2013). Recipient-side test questions. *Discourse Studies, 15(1)*, 3–18.

Antaki, C., & Wilkinson, R. (2013). Conversation analysis and the study of atypical populations. In J. Sidnell & T. Stivers (Eds.) *Handbook of conversation analysis*. Oxford, England: Blackwell-Wiley.

Armstrong, E., Fox, S., & Wilkinson, R. (2013). Mild aphasia: Is this the place for an argument? *American Journal of Speech-Language Pathology, 22,* S268-278*.*

Aye, D. K. K. (2005). Bazaar *Malay: History, grammar and contact.* Singapore: National University of Singapore doctoral dissertation.

Auer, P. (1995). The pragmatics of code-switching: A sequential approach. In L. Milroy and P. Muysken (Eds.) *One speaker, two languages: Cross-disciplinary perspectives on code-switching*. Cambridge: Cambridge University Press.

Auer, P. (1998). Introduction: Bilingual conversation revisited. In P. Auer (Ed.) *Code-switching in conversation: Language, interaction and identity*. London: Routledge.

Auer, P. (2005). A postscript: code-switching and social identity. *Journal of Pragmatics, 37*, 403–410.

Avramović, P., Kenny, B., Power, E., McDonald, S., Tate, R., Hunt, L., MacDonald, S., Heard, R., & Togher, L. (2017). Exploring the relationship between cognition and functional verbal reasoning in adults with severe traumatic brain injury at six months post injury. *Brain Injury, 31(4),* 502–516.

Azios, J. H., & Archer, B. (2017). Singing behaviour in a client with traumatic brain injury: a conversation analysis investigation. *Aphasiology, 32(8),* 944-966.

Babbage, D., Yim, J., Zupan, B., Neumann, D., Tomita, M., & Willer, B. (2011). Meta-analysis of facial affect recognition dif culties after traumatic brain injury. *Neuropsychology*, *25*, 277–285.

Bain, B., & Yu, A. (2000). Toward a fuller appreciation of codeswitching. *Journal of Pragmatics*, *32,* 1405-1411.

Barnes, S. E. (2012). 'Planning' talk and traumatic brain injury: an expoloratory application of conversation analysis. *Journal of Interactional Research in Communication Disorders, 3(2),* 115-140.

Barnes, S. E., Candlin, C. N., & Ferguson, A. (2013). Aphasia and topic initiation in conversation: a case study. *International Journal of Language and Communication Disorders, 48(1),* 102-114.

Barnes, S. E., & Ferguson, A. (2012). Speakership asymmetry during topic talk involving a person with aphasia. *Journal of Interactional Research in Communication Disorders, 3,* 27-46.

Barnes, S. E., & Ferguson, A. (2015). Conversation partner responses to problematic talk produced by people with aphasia: some alternatives to initiating, completing, or pursuing repair. *Aphasiology,*

Bauer, A., & Kulke, F. (2004). Language exercises for dinner: aspects of aphasia management in family settings. *Aphasiology, 18(12),* 1135-1160.

Bayles, K. A., & Tomoeda, C. K. (2013). *MCI and Alzheimer's Dementia: Clinical essentials for assessment and treatment of cognitive communication disorders*. San Diego: Plural Publications.

Beeke, S. (2003). 'I suppose' as a resource for the construction of turns at talk in agrammatic aphasia. *Clinical Linguistics & Phonetics, 17(4-5),* 291-298.

Beeke, S., Beckley, F., Best, W., Johnson, F., Edwards, S., & Maxim, J. (2013). Extended turn construction and test question sequences in the conversations of three speakers with agrammatic aphasia. *Clinical Linguistics & Phonetics, Early Online,* 1-21.

Beeke, S., Beckley, F., Johnson, F., Heilemann, C., Edwards, S., Maxim, J., & Best, W. (2015). Conversation focused aphasia therapy: investigation the adoption of strategies by people with agrammatism. *Aphasiology, 29(3),* 355-377.

Beeke, S., Maxim, J., Best, W., & Cooper, F. (2011). Redesigning therapy for agrammatism: initial findings from the ongoing evaluation of a conversation-based intervention study. *Journal of Neurolinguistics, 24,* 222-236.

Beeke, S., Sirman, N., Beckley, F., Maxim, J., Edwards, S., Swinburn, K., & Best, W. (2013). Better Conversations with Aphasia: an e-learning resource. Available at: https://extend.ucl.ac.uk/

Beeke, S., Wilkinson, R., & Maxim, J. (2007). Grammar without sentence structure: A conversation analytic investigation of agrammatism. Aphasiology, 21(3/4), 256–282.

Beeke, S., Wilkinson, R., & Maxim, J. (2009). Prosody as a compensatory strategy in the conversations of people with agrammatism. *Clinical Linguistics & Phonetics, 23(2),* 133-155.

Behn, N., Togher, L., Power, E., & Heard, R. (2012). Evaluating communication training for paid carers of people with traumatic brain injury. *Brain Injury, 26(13-14),* 1702-1715.

Behn, N., Francis, J., Togher, L., Hatch, E., Moss, B., & Hilari, K. (2021). Description and effectiveness of communication partner training in TBI: A systematic review. *Journal of Head Trauma Rehabilitation, 36,* 56-71.

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,* 1069-1078.

Bercaw, E. L., Hanks, R. A., Millis, S. R., & Gola, T. J. (2011). Changes in neuropsychological performance after traumatic brain injury from inpatient rehabilitation to 1-year

follow-up in predicting 2-year functional outcomes. *Clinical Neuropsychology, 25*(1), 72–89.

Best, W., Grassly, J., Greenwood, A., Herbert, R., Hickin, J. and Howard, D. (2011). A controlled study of change in conversation following aphasia therapy for anomia. *Disability and Rehabilitation*, *33(3),* 229–242.

Best, W., Maxim, J., Heilemann, C., Beckley, F., Johnson, F., Edwards, S. I., Howard, D., & Beeke, S. (2016) Conversation Therapy with People with Aphasia and Conversation Partners using Video Feedback: A Group and Case Series Investigation of Changes in Interaction. *Frontiers in Human Neuroscience, 10*, 562.

Bialystok, E., Craik, F. I. M., & Ruocco, A. C. (2006). Dual-modality monitoring in a classification task: The effects of bilingualism and ageing. *Quarterly Journal of Experimental Psychology, 59(11)*, 1968–1983.

Bialystok, E., & Depape, A. M. (2009). Musical training, bilingualism, and executive functioning. *Journal of Experimental Psychology: Human Perception and Performance, 35,* 565-574.

Bialystok, E., & Martin, M. M. (2004). Attention and inhibition in bilingual children: Evidence from the dimensional change card sort task. *Developmental Science, 7(3),* 325–339.

Bialystok, E., & Shapero, D. (2005). Ambiguous benefits: The effect of bilingualism on reversing ambiguous figures. *Developmental Science, 8(6)*, 595–604.

Biddle, K. R., McCabe, A., & Bliss, L. S. (1996). Narrative skills following traumatic brain injury in children and adults. *Journal of Communication Disorders, 29,* 447-469.

Bishara, F. M., Partridge, F. M., Godfrey, H. P., Knight, R. G. (1992). Post-traumatic amnesia and Glasgow Coma Scale related to outcome in survivors in a consecutive series of patients with severe closed-head injury. *Brain Injury, 6*, 373-80.

Bloch, S. (2005). Co-constructing meaning in dysarthria: Word and letter repetition in the construction of turns. In K. Richards & P. Seedhouse (Eds.), *Applying conversation analysis* (pp. 38–55). Basingstoke, England: Palgrave Macmillan.

Bloch, S., & Beeke, S. (2008). Co-constructed talk in the conversations of people with dysarthria and aphasia. *Clinical Linguistics & Phonetics, 22(12),* 974–990.

Bloch, S., & Wilkinson, R. (2009). Acquired dysarthria in conversation: Identifying sources of understanding problems. *International Journal of Language and Communication Disorders, 44(5)*, 769–783.

Body, R., Muskett, T., Perkins, M., & Parker, M. (2013). Your injury, my accident: talking at cross-purposes in rehabilitation after traumatic brain injury. *Brain Injury, 27(12),* 1356-1363.

Body. R., & Parker, M. (2005). Topic repetitiveness after traumatic brain injury: an emergent, jointly managed behaviour. *Clinical Linguistics and Phonetics, 19(5),* 379-392.

Body, R., & Perkins, M. R. (2006). Terminology and methodology in the assessment of cognitive-linguistic disorders. *Brain Impairment, 7(3),* 212-222.

Bogart, E., Togher, L., Power, E., & Docking, K. (2012). Casual conversations between individuals with traumatic brain injury and their friends. *Brain Injury, 26(3),* 221-233.

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.

Booth, S., & Perkins, L. (1999). The use of conversation analysis to guide individualized advice to carers and evaluate change in aphasia: a case study. *Aphasiology, 13(4-5),* 283-303.

Bosco, F. M., Angeleri, R., Sacco, K., & Bara, B. G. (2015). Explaining pragmatic performance in traumatic brain injury: A process perspective on communicative errors. *International Journal of Language and Communication Disorders, 50*, 63–83.

Bottema-Beutel, K., Oliveira, G., Cohen, S. R., & Miguel, J. (2020). Question-response-evaluation sequences in the home interactions of a bilingual child with autism spectrum disorder. *International Journal of Language and Communication Disorders, 55(2),* 216-230.

Bracy, C., & Douglas, J. (1997). Marital dyad perception of injured partners' communication following severe traumatic brain injury. *Brain Impairment, 6*, 1–12.

Brassel, S., Kenny, B., Power, E., Elbourn, E., McDonald, S., Tate, R., MacWhinney, B., Turkstra, L., Holland, A., & Togher, L. (2016). Conversational topics discussed by individuals with severe traumatic brain injury and their communication partners during sub-acute recover. *Brain Injury, 30(11),* 1329-1342.

Brookshire, R. H. (2015). *Introduction to neurogenic communication disorders* (8th edition). St Louis: Elsevier.

Brown-Schmidt, S. (2018). The study of language processing in human conversation. In M. F. Schober, D. N. Rapp, & M. A. Britt (Eds.) *The Routledge Handbook of Discourse Processes (2nd Ed.).* New York: Routledge.

Byom, L. J., & Turkstra, L. (2012). Effects of social cognitive demand on Theory of Mind in conversations of adults with traumatic brain injury. *International Journal of Language and Communication Disorders, 47(3),* 310-321.

Calder, A. J., Lawrence, A. D., & Young, A. W. (2001). Neuropsychology of fear and loathing. *Nature Reviews Neuroscience*, *2*, 352–363.

Cannizzaro, M., Allen, E. M., & Prelock, P. (2011). Perceptions of communicative competence after traumatic brain injury: Implications for ecologically-driven intervention targets. *International Journal of Speech-Language Pathology, 13(6),* 549-559.

Carroll, L. J., Cassidy, J. D., Peloso, P. M., Borg, J. von Holst, H., Holm, L., Paniak, C., & Pepin, M. (2004). Prognosis for mild traumatic brain injury: Results of the WHO collaborating centre task force on mild traumatic brain injury. *Journal of Rehabilitation Medicine, 43*(Suppl), 84–105.

Cavallaro, F., & Serwe, S. K. (2010). Language use and language shift among Malays in Singapore. *Applied Linguistics Review, 1,* 129-170.

Cetty, L., Abdin, E., Vaingankar, J. A., Jeyagurunathan, A., Chua, B. Y., Picco, L., Prince, M., Clahong, S. A., & Subramaniam, M. (2017). Prevalence and correlates of traumatic brain injury in older adults: results from the Well-being of the Singapore Elderly (WiSE) study. *International Psychogeriatrics, 29(11),* 1899-1907.

Chevignard, M. P., & Lind, K. (2014). Long-term outcome of abusive head trauma. *Pediatric Radiology, 44(s4),* S548-558.

Chia, A. A., Power, E., Kenny, B., Elbourn, E., McDonald, S., Tate, R., MacWhinney, B., Turkstra, L., Holland, A., & Togher, L. Patterns of early conversational recovery for people with traumatic brain injury and their communication partners. *Brain Injury, 33(5),* 690-698.

Choi, S. C., Narayan, R. K., Anderson, R. L., & Ward, J. D. (1988). Enhanced specificity of prognosis in severe brain injury. *Journal of Neurosurgery, 69,* 381-385.

Christensen, B. K., Colella, B., Inness, E., Herbert, D., Monette, G., Bayley, M., & Green, R. (2008). Recovery of cognitive function after traumatic brain injury: A multi- level modeling analysis of Canadian outcomes. *Archives of Physical Medicine and Rehabilitation, 89*(12 Suppl), S3–S15.

Chua, K. S. G., Ng, Y. S., Yap, S. G. M., & Bok, C. W. (2007). Review of traumatic brain injury rehabilitation. *Annals Academy of Medicine, 36(1),* 31-42.

Cifu, D. X., Keyser-Marcus, L., Lopez, E., Wehman, P., Kreutzer, J. S., Englander, J., & High, W. (1997). Acute predictors of suc- cessful return to work 1 year after traumatic brain injury: A multicenter analysis. *Archives of Physical Medicine and Rehabilitation, 78*(2), 125–131.

Coelho, C. A. (2007). Management of discourse deficits following traumatic brain injury: progress caveats and needs. *Seminars in Speech and Language, 28,* 122–135.

Coelho, C. A., Youse, K. M., & Le, K. N. (2002). Conversational discourse in close-head-injured and non-brain-injured adults. *Aphasiology, 16,* 659-672.

Coggins, P. E., Kennedy, T. J., & Armstrong, T. A. (2004). Bilingual corpus callosum variability. *Brain and Language, 89(1),* 69–75.

Collins, R. L., Combs, H. L., Miles, S. R., Pastorek, N. J., Tharp, A. T., & Kent, T. A. (2020). Behavioural and psychiatric comorbidities of TBI. In J. W. Tsao (Ed.) *Traumatic brain injury: A clinician's guide to diagnosis, management, and rehabilitation (2nd Edition)*. Switzerland: Springer.

Collins, A. M., & Loftus, E. F. (1975). A spreading-activation theory of semantic processing. *Psychological Review, 82,* 407-428.

Corrigan, J. D., Bogner, J. A., Mysiw, W. J., Clinchot, D., & Fugate, L. (2001). Life satisfaction after traumatic brain injury. *The Journal of Head Trauma Rehabilitation, 16(6),* 543-555.

Corrigan, J. D., Smith-Knapp, K., & Granger, C. V. (1998). Outcomes in the first 5 years after traumatic brain injury. *Archives of Physical Medicine and Rehabilitation, 79*(3), 298–305.

Craik, F. I. M., & Bialystok, E. (2006). Cognition through the lifespan: Mechanisms of change. *Trends in Cognitive Sciences, 10(3)*, 131–138.

Davis, L., Spencer, E., & Ferguson, A. (2011). A case study on the communication of older adolescents. *Clinical Linguistics & Phonetics, 25(11-12),* 1044-1051.

Denman, A., & Wilkinson, R. (2011). Applying conversational analysis to traumatic brain injury: investigating touching another person in everyday social interaction. *Disability and Rehabilitation, 33(3),* 243-252.

Dennis, M., Purvis, K., Barnes, M. A., Wilkinson, M., & Winner, E. (2001). Understanding of literal truth, ironic criticism, and deceptive praise following childhood head injury. *Brain and Language, 78*, 1–16.

De Santi, S., Obler, L., Sabo-Abramson, H., & Goldberger, J. (1990). Discourse abilities and deficits in multilingual dementia. In Y. Joanette & H. Brownell (Eds.). *Discourse ability and brain damage.* New York: Springer Verlag.

Dijkstra, K., Bourgeois, M. S., Allen, R. S., & Burgio, L. D. (2004). Conversational coherence: Discourse analysis of older adults with and without dementia. *Journal of Neurolinguistics*, *17*(4), 263-283.

Dikmen, S. S., Corrigan, J. D., Levin, H. S., Machamer, J. Stiers, W., & Weisskopf, M. G. (2009). Cognitive outcome following traumatic brain injury. *The Journal of Head Trauma Rehabilitation, 24*(6), 430–438.

Dikmen, S. S., Machamer, J. E., Powell, J. M., & Temkin, N. R., (2003). Outcome 3 to 5 years after moderate to severe traumatic brain injury. *Archives of Physical Medicine and Rehabilitation, 84*(10), 1449–1457.

Dikmen, S., Temkin, N., McLean, A., Wyler, A., & Machamer, J. (1988). Memory and head injury severity. Journal of neurology, neurosurgery, and psychiatry. 50. 1613-8.

Doctor, J. N., Castro, J., Temkin, N. R., Fraser, R. T., Machamer, J. E., & Dikmen, S. S. (2005). Workers' risk of unem- ployment after traumatic brain injury: A normed comparison. *Journal of International Neuropsychological Society, 11(6),* 747-752.

Dolitsky, M. (2000). Codeswitching in a child's monologues. *Journal of Pragmatics*, 32, 1387-1403.

Drevets, W. C. (2000). Neuroimaging studies of mood disorders. *Biological Psychiatry*, *48*, 813–829.

Drew, P. (2013). Turn design. In J. Sidnell & T. Stivers (Eds.) *The handbook of conversation analysis*. West Sussex: Blackwell Publishings.

Eckert, P. (1996). (ay) goes to the city: exploring the expressive use of variation. In G. R. Guy, C. Feagin, D. Schiffrin & J. Baugh (Eds.), *Towards a Social Science of Language. Volume 1. Variation and change in language and society*. Amsterdam: Benjamins.

Ekberg, K., Hickson, L., & Grenness, C. (2017). Conversation breakdowns in the audiology clinic: The importance of mutual gaze. *International Journal of Language and Communication Disorders, 52(3)*, 346–355.

Egbert, M., & Deppermann, A. (2012). *Hearing aids communication: Integrating social interaction, audiology and user centered design to improve communication with hearing loss and hearing technologies*. Verlag für Gesprächsforschung.

Eisikovits, E. 1991. Variation in subject–verb agreement in Inner Sydney English. In J. Cheshire (Ed.), *English Around the World: sociolinguistic perspectives*. Cambridge: Cambridge University Press, 227–234.

Elbourn, E., Togher, L., Kenny, B., & Power, E. (2017). Strengthening the quality of longitudinal research into cognitive-communication recovery after traumatic brain injury: a systematic review. *International Journal of Speech-Language Pathology, 19,* 1-16.

Elsey, C., Drew, P., Jones, D., Blackburn, D., Wakefield, S., Harkness, K., Venneri, A., & Reuber, M. (2015). Towards diagnostic conversational profiles of patients presenting with dementia or functional memory disorders to memory clinics. *Patient Education and Counselling, 98,* 1071-1077.

Eng, N., & Obler, L. K. (2002). Acquired Dyslexia in a Biscript Reader Following Traumatic Brain Injury: A Second Case. *Topics of Language Disorders, 22,* 5-19.

Evans, K., & Hux, K. (2011). Comprehension of indirect requests by adults with severe traumatic brain injury: Contributions of gestural and verbal information. *Brain Injury, 25(7-8),* 767–776.

Evans, C. C., Sherer, M., Nick, T. G., Nakase-Richardson, R., & Yablon, S. A. (2005). Early impaired self-awareness, depression, and subjective well-being following traumatic brain injury. *The Journal of Head Trauma Rehabilitation, 20*(6), 488–500.

Faul, M., Xu, L., Walkd, M. M., & Coronado, V. (2010). Traumatic brain injury in the United states: emergency department visits, hospitalisations and deaths, 2002-2006. In Centers for Disease Control and Prevention, National Center for Injury Prevention and Control Atlanta, Georgia.

Felmingham, K. L., Baguley, I. J., & Green, A. M. (2004). Effects of diffuse axonal injury on speed of information processing following severe traumatic brain injury. *Neuropsychology, 18*(3), 564–571.

Ferguson, A. (1992). Interpersonal aspects of aphasic conversation. *Journal of Neurolinguistics*, *7*(4), 277-294.

Ferguson, R., & Harper, A. (2010). Contributions to the talk of individuals with aphasia in multiparty interactions. *Aphasiology, 24(12),* 1605-1620.

Ferguson, R. J., Mittenberg. W., Barone, D. F., & Schneider, B. (1999). Postconcussion syndrome following sports-related head injury: Expectation as etiology. *Neuropsychology, 13*(4), 582–589.

Finlayson, M. A. J., & Garner, S. H. (1994). Challenges in rehabilitation of individuals with acquired brain injury. In M. Allen, M. A. J. Finlayson & S. H. Garner (Eds.), *Brain injury rehabilitation: clinical considerations.* Baltimore: Williamson & Wilkins.

Fleminger, S. (2012). Why do some patients after head injury deteriorate over the long term? *Journal of Neurology, Neurosurgery and Psychiatry, 83,* 1036.

Francis, D. & Hester, S. (2004). *An invitation to ethnomethodology: Language, society and social interaction*. London: Sage Publications.

Frankel, T., & Penn, C. (2007). Perseveration and conversation in TBI: Response to pharmacological intervention. *Aphasiology, 21(10/11)*, 1039–1078.

Friedland, D., & Miller, N. (1998). Conversation analysis of communication breakdown after closed head injury. *Brain Injury, 12(1),* 1-14.

Friedland, D., & Miller, N. (1999). Language mixing in bilingual patients with Alzheimer's dementia: a conversational analysis approach. *Aphasiology, 13,* 427-444.

Gafaranga, J. (1999). Language choice as a significant aspect of talk organization: The orderliness of language alternation. *Text, 19(2),* 201–225.

Gafaranga, J. (2009). The conversation analytic model of code-switching. In B. E. Bullock & A. J. Toribio (Eds.) *The Cambridge handbook of linguistic code-switching*. Cambridge: Cambridge University Press.

Gafaranga, J., & Torras M. C. (2001). Language versus medium in the study of bilingual conversation. *International Journal of Bilingualism, 5(2),* 195–219.

Garcia, A. C. (2012). Medical problems where talk is the problem: Current trends in conversation analytic research on aphasia, autism spectrum disorder, intellectual disability, and Alzheimer's. *Sociology Compass, 6(4)*, 351–364.

Gardner-Chloros, P. (2009). *Code-switching*. Chapters 1 and 4. Cambridge: Cambridge University Press.

Gardner-Chloros, P., Charles, R., & Cheshire, J. (2000). Parallel patterns? A comparison of monolingual speech and bilingual codeswitching discourse. *Journal of Pragmatics, 32(9)*, 1305-1341.

Gardner-Chloros, P., & Finnis, K. (2004). How code-switching mediates politeness: gender-related speech among London Greek-Cyproits. *Estudios de Sociolinguística. Special Issue: Language and Gender: An interdisciplinary perspective, 4(2)*, 505–533.

Gauthier, S., LeBlanc, J., Seresova, A., Laberge-Poirier, A., Correa, J. A., Alturki, A. Y., Marcoux, J., Maleki, M., Feyz, M., & de Guise, E. (2018). Acute prediction of outcome and cognitive-communication impairments following traumatic brain injury: the influence of age, education and site of lesion. *Journal of Communication Disorders, 73,* 77-90.

Glenn, P. J. (1995). Laughing at and laughing with: Negotiations of participant alignments through conversational laughter. *Situated order: Studies in the social organization of talk and embodied activities*, 43-56.

Godfrey, H. P. D, & Knight, R. (1991). The relationship between social skill and family problem solving following very severe closed head injury. *Brain Injury, 5,* 207–211

Godfrey, H. P. D., Knight, R., Marsh, N., Moroney, B., & Bishara, B. (1989). Social interaction and speed of information processing following very severe head injury. *Psychological Medicine, 19*, 175–182

Gollan, T. H., Li, C., Stsenko, A., & Salmon, D. P. (2020). Intact reversed language-dominance but exaggerated cognate effects in reading aloud of language switches in bilingual Alzheimer's Disease. *Neuropsychology, 34(1),* 88-106.

Goodwin, C. (1995). Co-constructing meaning in conversations with an aphasic man. *Research on Language and Social Interaction, 28,* 233-260.

Goodwin, C. (2001). Practices of seeing visual analysis: an ethnomethodological approach. In T. V. Leeuwen & C. Jewitt (Eds.) *The handbook of visual analysis.* London: Sage Publications.

Goodwin, C. & Goodwin, M. H. (1996). Seeing as a situated activity: formulating planes. In Y. Engestrom & D. Middleton (Eds.) Cognition and communication at work. Cambridge: Cambridge University Press.

Goral, M., Norvik, M., & Jensen, B. U. (2019). Variation in language mixing in multilingual aphasia. *Clinical Linguistics & Phonetics, 33(10-11),* 915-929.

Green, D. W. (1998). Mental control of the bilingual lexico-semantic system. *Bilingualism, Language and Cognition, 1,* 67-81.

Green, D. W. (2011). Language control in different contexts: the behavioural ecology of bilingual speakers. *Frontiers in Psychology, 2,* 103.

Green, D. W., & Abutalebi, J. (2013). Language control in bilinguals: The adaptive control hypothesis. *Journal of Cognitive Psychology, 25(5),* 515-530.

Griffen, J., & Hanks, R. (2014). Cognitive and behavioural outcomes from traumatic brain injury. In M. Sherer & A. M. Sanders (Eds.) *Handbook on the neuropsychology of traumatic brain injury.* New York: Springer.

Griffiths, S., Barnes, R., Britten, N., & Wilkinson, R. (2015). Multiple repair sequences in everyday conversations involving people with Parkinson's disease. *International Journal of Language and Communication Disorders, 50(6),* 814–829.

Gruen, A. K., Frankle, B. C., & Schwartz, R. (1990). Word fluency generation skills of head-injured patients in an acute trauma center. *Journal of Communication Disorders, 23,* 163-170.

Hall, K., Lind, C., Young, J. A., Okell, E., & van Steenbrugge, W. (2018). Familiar communication partners' facilitation of topic management in conversations with individuals with dementia. *International Journal of Language and Communication Disorders, 53(3),* 564-575.

Hanks, R. A., Millis, S. R., Ricker, J. H., Giacino, J. T., Nakese-Richardson, R., Frol, A. B., Novack, T. A., Kalmar, K., Sherer, M., & Gordon, W. A. (2008). The predictive validity of a brief inpatient neuropsychologic battery for per- sons with traumatic brain injury. *Archives of Physical Medicine and Rehabilitation, 89*(5), 950–957.

Harwood, R. H., O'Brien, R., Goldberg, S. E., Allwood, R., Pilnick, A., Beeke, S., Thomson, L., Murray, M, Parry, R., Kearney, F., Baxendale, B., Sartain, K., & Schneider, J. (2018). A staff training intervention to improve communication between people living with dementia and health-care professionals in hospital: the VOICE mixed-methods development and evaluation study. *Health Services and Delivery Research, 6(41),* 1-134.

Heath, C. (1986). Body movement and speech in medical interaction. Cambridge: Cambridge University Press.

Heath, C. & Luff, P. (2000). *Technology in action.* Cambridge: Cambridge University Press.

Heeschen, C., & Schegloff, E. A. (1999). Agrammatism, adaptation theory, conversation analysis: On the role of so-called telegraphic style in talk-in-interaction. *Aphasiology, 13(4/5),* 365–406.

Heeschen, C., & Schegloff, E. A. (2003). Aphasic agrammatism as interactional artifact and achievement. In C. Goodwin (Ed.) *Conversation and brain damage*. New York: Oxford University Press.

Heitger, M. H., Jones, R. D., Dalrymple-Alford, J. C., Frampton, C. M., Ardagh, M. W., & Anderson, T. J. (2006). Motor deficits and recovery during the first year following mild closed head injury. *Brain Injury, 20(8),* 807–824.

Heritage, J. (1989). Current developments in conversation analysis. In D. Roger, & P. Bull (Eds.) *Conversation: An interdisciplinary perspective*. Clevedon; Philadelphia: Multilingual Matters.

Heritage, J. (2005). Conversation analysis and institutional talk. In K. L. Fitch & R. E. Sanders (Eds.) Handbook of language and social interaction. New Jersey: Lawrence Erlbaum Associates, Inc.

Hibbard, M. R., Uysal, S., Kepler, K., Bogdany, J., & Silver, J. (1998). Axis I psychopathology in individuals with traumatic brain injury. *Journal of Head Trauma Rehabilitation, 13(4),* 24-39.

Holtgraves, T. (1997). Styles of language use: Individual and cultural variability in conversational indirectness. *Journal of personality and social psychology*, *73*(3), 624.

Holmes, J. 1995. *Women, Men and Politeness*. Harlow: Longman.

Hooson, J. M., Coetzer, R., Stew, G., & Moore, A. (2012). Patients' experience of return to work rehabilitation following traumatic brain injury: a phenomenological study. *Neuropsychological Rehabilitation, 23*, 19–44.

Horner, M. D., Selassie, A. W., Lineberry, L., Ferguson, P. L., & Labbate, L. A. (2008). Predictors of psychological symptoms 1 year after traumatic brain injury: a population-based epidemiological study. *Journal of Head Trauma Rehabilitation, 23,* 74-83.

Horton, W. S. (2018). Theories and approaches to the study of conversation and interactive discourse. In M. F. Schober, D. N. Rapp, & M. A. Britt (Eds.) *The Routledge Handbook of Discourse Processes (2nd Ed.).* New York: Routledge.

Hwang, S. Y., Ong, J. W., Ng, Z. M., Foo, C. Y., Chua, S. Z., Sri, D., Lee, J. H., & Chong, S. L. (2019). Long-term outcomes in children with moderate to severe traumatic brain injury: a single-centre retrospective study. *Brain Injury, 33(11)*, 1420-1424.

Hyder, A. A., Wunderlich, C. A., Puvanachandra, P., Gururaj, G., Kobusingye, O. C. (2007). The impact of traumatic brain injuries: a global perspective. *NeuroRehabilitation, 22,* 341-353.

Hyltenstam, K. (1995). The code switching behaviour of adults with language disorders – with special reference to aphasia and dementia. In L. Milroy and P. Musken (Eds.) *One speaker, two languages: Cross disciplinary perspectives on code-swtiching.* Cambridge: Cambridge University Press.

Ijalba, E., Obler, L. K., & Chengappa, S. (2006). Bilingual aphasia. In T. K. Bhatia & W. H. Ritchie (eds) *The Handbook of Bilingualism*. UK: Blackwell Publishing.

Iverson, G. L., Lange, R. T., Brooks, B. L., & Rennison, V. L. (2010). “Good old days” bias following mild traumatic brain injury. *Clinical Neuropsychology, 24*(1), 17–37.

Jalil, S. B., Rickard Liow, S. J., & Keng, T. S. (2011). Semantic assessment battery for Malay-speaking adults with aphasia. *Aphasiology*, *25*(4), 415-433.

Jansson, G. (2016). ‘You’re doing everything just fine’: praise in residential care settings. *Discourse Studies*, *18*, 64–86.

Jefferson, G. (1974). Error correction as an interactional resource. *Language in society*, 181-199.

Jefferson, G., & Schenkein, J. (1978). Some sequential negotiations in conversation: Unexpanded and expanded versions of projected action sequences. In *Studies in the organization of conversational interaction* (pp. 155-172). Academic Press.

Joaquin, A. D. L. (2010). Frontotemporal dementia, sociality, and identity: Comparing adult-child and caregiver-frontotemporal dementia interactions. *Discourse Studies, 12*, 443–464.

Johnson, R., & Balleny, H. (1996). Behaviour problems after brain injury: incidence and need for treatment. *Clinical Rehabilitation, 10,* 173–181.

Jones, D., Drew, P., Elsey, C., Blackburn, D., Wakefield, S., Harkness, K., & Reuber, M. (2016). Conversational assessment in memory clinic encounters: interactional profiling for differentiating dementia from functional memory disorders. *Aging & Mental Health, 20(5),* 500-509.

Jones, M. N., & Dye, M. W. (2018). Big data approaches to studying discourse processes. In M. F. Schober, D. N. Rapp, & M. A. Britt (Eds.) *The Routledge Handbook of Discourse Processes (2nd Ed.).* New York: Routledge.

Jorge, R. E., Robinson, R. G., Starkstein, S. E., Arndt, S. V., Forrester, A. W., & Geisler, F. H. (1993). Secondary mania following traumatic brain injury. *American Journal of Pscyhiatry, 150,* 916-921.

Jorgensen, M., & Togher, L. (2009). Narrative after traumatic brain injury: a comparison of monologic and jointly-produced discourse. *Brain Injury, 23(9),* 727-740.

Kay, J., Lesser, R., & Coltheart, M. (1996). Psycholinguistic assessments of language processing in aphasia (PALPA): An introduction. *Aphasiology, 10(2),* 159-180.

Kendrick, K. H., & Torreira, F. (2015). The timing and construction of preference: A quantitative study. *Discourse Processes*, *52*(4), 255-289.

Kersel, D. A., Marsh, N. V., Havill, J. H., & Sleigh, J. W. (2001). Neuropsychological functioning during the year following severe trau- matic brain injury. *Brain Injury, 15*(4), 283–296.

Khan, A., Prince, M., Brayne, C., & Prina, A. M. (2015). Lifetime prevalence and factors associated with head injury among older people in low and middle income countries: a 10/66 study. *PLoS One, 10,* 1-14.

Kindell, J., Sage, K., Keady, J., & Wilkinson, R. (2013). Adapting to conversation with semantic dementia: using enactment as a compensatory strategy in everyday social interaction. *International Journal of Language & Communication Disorders, 48(5),* 497-507.

Kitzinger, C. (2013). Repair. In J. Sidnell & T. Stivers (Eds.) *The handbook of conversation analysis*. West Sussex: Blackwell Publishings.

Klippi, A. (1996). *Conversation as an achievement in aphasics*. Helsinki: Suomalaisen Kirjallisuuden Seura.

Koshik, I. (2002). Designedly incomplete utterances: a pedagogical practices for eliciting knowledge displays in error correction sequences. *Research on Language and Social Interaction, 35(3),* 277-309.

Kroll, J. F., Bobb, S. C., & Wodniecka, Z. (2006). Language selectivity is the exception, not the rule: Arguments against a fixed locus of language selection in bilingual speech. *Bilingualism: Language and Cognition, 9*, 119-135.

Kroll, J. F., & Stewart, E. (1994). Category interference in translation and picture naming: Evidence for asymmetric connections between bilingual memory representations. *Journal of Memory and Language, 33,* 149-174.

Krummhuer, A. (2016). Performing an action one cannot do: Participation, scaffolding and embodied interaction. *Journal of Interactional Research in Communication Disorders, 6(2),* 187-210.

Kurby, C. A. (2018). Neuroscientific methods to study discourse processes. In M. F. Schober, D. N. Rapp, & M. A. Britt (Eds.) *The Routledge Handbook of Discourse Processes (2nd Ed.).* New York: Routledge.

Kutas, M., Moreno, E., & Wicha, N. (2009). In B. E. Bullock & A. J. Toribio (Eds.) *The Cambridge handbook of linguistic code-switching*. Cambridge: Cambridge University Press.

Laakso, M. (1997). Self-initiated repair by fluent aphasic speakers in conversation.

Laakso, M., & Godt, S. (2016). Recipient participation in conversations involving participants with fluent or non-fluent aphasia. *Clinical Linguistics and Phonetics, 30(10),* 770–789.

Laakso, M., & Klippi, A. (1999). A closer look at the 'hint and guess' sequences in aphasic conversation. *Aphasiology, 13,* 345-363.

Larkins, B. (2007). The application of the ICF in cognitive-communication disorders following traumatic brain injury. *Seminars in Speech and Language, 28(4),* 334-342.

Lee, H. N., Ai, P.L., & Hiroki, N. (2009). Colloquial Singapore English got: Functions and substratal influences. *World Englishes, 28(3),* 293–318.

Leimgruber, J. R. E. (2011). Singapore English. *Language and Linguistics Compass, 5,* 47-62.

Lerner, G. H. (1992). Assisted storytelling: Deploying shared knowledge as a practical matter. *Qualitative sociology*, *15*(3), 247-271.

Levinson, S. C. (1992). Activity types and language. In P. Drew & J. Heritage (Eds.), *Talk at work*. Cambridge: Cambridge University Press.

Lezak, M. D. (1978). Living with the characterologically altered brain injury patients. *Journal of Clinical Psychiatry, 39*, 592–598.

Li, W. (1994). *Three generations, two languages, one family: Language choice and language shift in a Chinese community in Britain*. Clevedon: Multilingual Matters.

Li, W. (1998). Banana split? Variations in language choice and code-switching patterns of two groups of British-born Chinese in Tyneside. In R. Jacobson (Ed.) *Codeswitching Worldwide.* Berlin: Mouton de Gruyter.

Li, W. (1998). The "why" and "how" questions in the analysis of conversational code-switching. In P. Auer (Ed.) *Code-switching in conversation: Language, interaction and identity*. London and New York: Routledge.

Li, W. (2005). "How can you tell?" Towards a common sense explanation of conversational code-switching. *Journal of Pragmatics 37(3)*, 375–389.

Liew, T. Y. S., Ng, J. X., Chan, J. H. Z., Ragupathi, T., Teo, C. K. A., & Yeo, T. T. (2019). Changing demographic profiles of patients with traumatic brain injury: an aging concern. *Frontiers in surgery, 6:37.*

Lim, L., & Rickard Liow, S. J. (2012). *Singapore Reception of Grammar Test (English)*. Unpublished masters thesis. National University of Singapore.

Lind, C., Hickson, L., & Erber, N. (2006). Conversation repair and adult cochlear implantation: A qualitative case study. *Cochlear Implants International, 7,* 33–48.

Lindholm, C. (2008). Laughter, communication problems and dementia. *Communication and Medicine*, *5*, 3–14.

Lindholm, C. (2014). Comprehension in interaction: communication at a day-care center. In L. C. Hyden, H. Lindemann and J. Brockmeier (Eds.) *Beyond Loss: Dementia, Identity, Personhood.* New York: Oxford University Press.

Lindholm, C. (2015). Parallel realities: The interactional management of confabulation in dementia care encounters. *Research on Language and Social Interaction, 48(2)*, 176–199.

Lindsay, J., & Wilkinson, R. (1999). Repair sequences in aphasic talk: a comparison of aphasic-speech and language therapist and aphasic-spouse conversations. *Aphasiology, 13(4-5),* 305-325.

Llamzon, T. D. (1978). English and the national languages in Malaysia, Singapore and the Philippines: A sociolinguistic comparison. *Cross Currents, 5(1),* 87– 104.

Loca, J., & Wootton, T. (1995). Interactional and phonetic aspects of immediate echolalia in autism: A case study. *Clinical Linguistics & Phonetics*, *9*(2), 155-184.

Lock, S., Wilkinson, R., Bryan, K., Maxim, J., Edmundson, A., Bruce, C., & Moir, D. (2001). Supporting partners of people with aphasia in relationships and conversation (SPPARC). *International Journal of Language & Communication Disorders, 36(s1),* 25-30.

Lowenberg, P. (1988). Malay in Indonesia, Malaysia, and Singapore: Three faces of a national language. In F. Coulmas (Ed.), *With forked tongues: What are national languages good for?*. Ann Arbor: Karoma Publishers.

Lubinski, R., Duchan, J., & Weitzner-Lin, B. (1980). Analysis of breakdowns and repairs in aphasic adult communication. In *Clinical Aphasiology: Proceedings of the Conference 1980* (pp. 111-116). BRK Publishers.

Luderus, L. (1995). *Language choice and language separation in bilingual Alzheimer patients.* Amsterdam: IFOTT.

Lui, S. K., Fook-Chong, S. M. C., & Teo, Q. Q. (2020). Demographics of traumatic brain injury and outcomes of continuous chain of early rehabilitation in Singapore. *Proceedings of Singapore Healthcare, 29(1),* 33-41.

Lui, S. K., Ng, Y. S., Nalanga, A. J., Tan, Y. L., & Bok, C. W. (2014). Pilot project of early integrated traumatic brain injury rehabilitation in Singapore. *Rehabilitation Research and Practice, Vol2014,* Article ID 950183.

Psathas, G. (1995). Talk and social structure" and "studies of work. *Human studies*, *18*(2-3), 139-155.

Maas, A. I. R., Menon, D. K., Adelson, P. D., Andelic, N., Bell, M. J., Belli, A., … & Franconi, G. (2017). Traumatic brain injury – integrated approaches to improving clinical care and research. *The Lancet Neurology, 16*, 987-1048.

Machamer, J., Temkin, N., Fraser, R., Doctor, J. N., & Dikmen, S. (2005). Stability of employment after traumatic brain injury. *Journal of International Neuropsychological Society, 11*(7), 807–816.

Majlesi, A. R., & Ekstrom, A. (2016). Baking together – the coordination of actions in activities involving people with dementia. *Journal of Aging Studies, 38,* 37-46.

Mann, K., Power, E., Barnes, S., & Togher, L. (2015). Questioning in conversations before and after communication partner training for individuals with traumatic brain injury. *Aphasiology, 29(9),* 1082-1109.

Marini, A., Zettin, M., & Galetto, V. (2014). Cognitive correlates of narrative impairment in moderate traumatic brain injury. *Neuropsychologia, 64*, 282–288

Mates, A. W., Mikesell, L., & Smith, M. S. (Eds.). (2010). *Language, interaction and frontotemporal dementia: Reverse engineering the social mind*. Equinox Pub.

Mathias, J. L., & Wheaton, P. (2007). Changes in attention and information-processing speed follow- ing severe traumatic brain injury: A meta-analytic review. *Neuropsychology, 21*(2), 212–223.

McDonald, S. (1993). Viewing the brain sideways? Right hemisphere versus anterior models of non-aphasic language disorders. *Aphasiology, 7,* 535–549.

McDonald, S. (1999). Exploring the process of inference generation in sarcasm: A review of normal and clinical studies. *Brain and Language, 68(3),* 486–506.

McDonald, S., Fisher, A., & Flanagan, S. (2016). When diplomacy fails: Difficulty understanding hints following severe traumatic brain injury. *Aphasiology, 30(7),* 801-814.

McDonald, S., Flanagan, S., Rollins, J., & Kinch, J.. (2003). TASIT: a new clinical tool for assessing social perception after traumatic brain injury. *Journal of Head Trauma Rehabilitation, 18,* 219–238.

McDonald, S., & Van Sommers, P. (1993). Pragmatic language skills after closed head injury: Ability to negotiate requests. *Cognitive Neuropsychology, 10,* 297–315.

McKinley, W. W., & Watkins, A. J. (1999). Cognitive and behavioural effects of brain injury. In M. Rosenthal et al. (Eds.), *Rehabilitation of the adult and child with traumatic brain injury* (pp. 74–86). Philadelphia, PA: Davis.

McIlvenny, P. (1995). Seeing conversations: Analysing sign language talk. In *Situated order: Studies in the social organisation of talk and embodied activities* (pp. 129-150). University Press of America.

McNamara, P., & Albert, M. L. (2004). Neuropharmacology of verbal perseveration. *Seminars in Speech and Language, 25(4),* 309–321.

Mechelli, A., Crinion, J. T., Noppeney, U., O'Doherty, J., Ashburner, J., Frackowiak, R. S., & Price, C. J. (2004). Structural plasticity in the bilingual brain: Proficiency in a second language and age at acquisition affect grey-matter density. *Nature, 431*, 757.

Menon, D. K., Schwa, K., Wright, D. W., & Maas, A. I. (2010). Position statement: Definition of Traumatic Brain Injury. *Archives of physical medicine and rehabilitation, 91,* 1637-1640.

Mikesell, L. (2009). Conversational practices of a frontotemporal dementia patient and his interlocutors. *Research on Language and Social Interaction, 42,* 135-162.

Milligan, K., Astington, J.W., & Dack, L.A. (2007). Language and Theory of Mind: Meta-analysis of the relation between language ability and false-belief understanding. *Child Development*, *78*(2), 622 –646.

Millis, S. R., Rosenthal, M., Novack, T. A., Sherer, M., Nick, T. G., Kreutzer, J. S., High, W. M. J., & Ricker, J. H. (2001). Long-term neuropsycho- logical outcome after traumatic brain injury. *The Journal of Head Trauma Rehabilitation, 16*(4), 343–355.

Milroy, L., & Perkins, L. (1992). Repair strategies in aphasic discourse; towards a collaborative model. *Clinical linguistics & phonetics*, *6*(1-2), 27-40.

Milton, S. B., Prutting, C. A., & Binder, G. M. (1984). Appraisal of communicative competence in head injured adults. In *Clinical Aphasiology: Proceedings of the Conference 1984* (pp. 114-123). BRK Publishers.

Munoz, M. L., Marquardt, T. P., & Copeland, G. (1999). A comparison of the code-switching patterns of aphasic and neurologically normal bilingual speakers of English and Spanish. *Brain and Language, 66,* 249-274.

Myers-Scotton, C. (1993). *Social Motivations for Code-switching: evidence from Africa*. Oxford: Oxford University Press.

Myers-Scotton, C. (1998). A theoretical introduction to the markedness model. In C. Myers-Scotton (Ed.). Codes and consequences: choosing linguistic varieties. Oxford: Oxford University Press.

Nasreddine, Z. S., Phillips, N. A., Bédirian, V., Charbonneau, S., Whitehead, V., Collin, I., ... & Chertkow, H. (2005). The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment. *Journal of the American Geriatrics Society*, *53*(4), 695-699.

Nomoto, H. & Soh, H. L. (2019). Malay. In A. Vitrani & J. Watkins (Eds.) *The mainland southeast asia linguistic area*. Boston: De Gruyter Mouton.

Palmer, D. (2000). Identifying delusional discourse: Issues of rationality, reality and power. *Sociology of Health and Illness, 22(5)*, 661–678.

Penn, C., & Cleary, J. (1988). Compensatory strategies in the language of closed head injured patients. *Brain Injury, 2*, 3–17.

Penn, C., Frankel, T., & Wilkinson, R. (2015). Problems with the understandability of aphasic talk: Mentions of persons as a trouble source in interaction. *Aphasiology*, *29*(3), 291-314.

Perkins, M., Body, R., & Parker, M. (1995). Closed head injury: assessment and remediation of topic bias and repetitiveness. In M. Perkins & S. Howard (Eds.) *Case studies in clinical linguistics.* London: Whurr Publishers.

Pillet-Shore, D. (2017). Preference organization. In J. Nussbaum (Ed.) *Oxford research encyclopedia of communication (online version).* Oxford, England: Oxford University Press.

Plejert, C., Samuelsson, C., & Anward, J. (2016). Enhanced patient involvement in Swedish aphasia intervention. *Clinical Linguistics & Phonetics, 30(10,* 730-748.

Polczynska-Fiszer, M. (2007). Acquisition of the second language by patients with brain injury after prolonged coma. *Poznan Studies in Contemporary Linguistics, 43,* 113-127.

Pomerantz, A. (1978). Compliment responses: Notes on the co-operation of multiple constraints. In *Studies in the organization of conversational interaction* (pp. 79-112). Academic Press.

Pomerantz, A. (2005). Using participants' video-stimulated comments to complement analyses of interactional practices. In H. te Molder & J. Potter (Eds.) *Conversation and cognition*. Cambridge: Cambridge University Press.

Ponsford, J. L., Olver, J. H., & Curran, C. (1995). A profile of outcome: 2 years after traumatic brain injury. *Brain Injury, 9*, 1–10.

Ponsford, J. L., Olver, J., Ponsford, M., & Nelms, R. (2003). Long term adjustment of families following traumatic brain injury where comprehensive rehabilitation has been provided. *Brain Injury, 17(6),* 453–468

Pope, C. (2013). Positioning and membership categorization in monoracial and interracial interactions of persons with dementia. In B. H. Davis & J. Guendouzi (Eds.) *Pragmatics in Dementia Discourse.* UK: Cambridge Scholars Publishing.

Potter, J., & Edwards, D. (1990). Nigel Lawson's tent: Discourse analysis, attribution theory and the social psychology of fact. *European Journal of Social Psychology, 20*, 405-424.

Pierce, C. A., & Hanks, R. A. (2006). Life satisfaction after traumatic brain injury and the World Health Organization model of disability. *American Journal of Physical Medicine and Rehabilitation, 85*(11), 889–898.

Popescu, M., Hughes, J. D., Popescu, E. A., Mikola, J., Merrifield, W., DeGraba, M., Riedy, G., & DeGraba, T. J. (2017). Activation of dominant hemisphere association cortex during naming as a function of cognitive performance in mild traumatic brain injury: Insights into mechanisms of lexical access. *Clinical, 15,* 741-752.

Price-Williams, D., & Sabsay, S. (1979). Communicative competence among severely retarded persons. *Semiotica*, *26*(1-2), 35-64.

Purves, B. A. (2009). The complexities of speaking for another. *Aphasiology, 23(7-8),* 914-925.

Prutting, C. A., & Kirschner, D. M. (1987). A clinical appraisal of the pragmatic aspects of language. *Journal of Speech & Hearing Disorders, 52*, 105–119.

Rape, R. N., Bush, J. P., & Slavin, L. A. (1992). Toward a conceptualization of the family's adaptation to a member's head injury: A critique of developmental stage models. *Rehabilitation Psychology, 37*(1), 3–22.

Raymond, C. W. (2014). Conveying information in the interpreter-mediated medical visit: The case of epistemic brokering. *Patient Education and Counselling, 97,* 38-46.

Rees, R. J., & Bellon, M. L. (2002). The acquisition of communication skills by people with brain injury: Some comparisons with children with autism. *International Journal of Disability, Development and Education. 49*, 175-189.

Reiterer, S., Berger, M. I., Hemmelmann, C., & Rappelsberger, P. (2005). Decreased EEG coherence between prefrontal electrodes: A correlate of high language proficiency? *Experimental Brain Research, 163(1),* 109–113.

Rietdijk, R., Power, E., Brunner, M., Togher, L. (2019). A single case experimental design study on improving social communication skills after traumatic brain injury using communication partner telehealth training. *Brain Injury, 33(1),* 94-104.

Rietdijk, R., Simpson, G., Togher, L., Power, E., & Gillett, L. (2013). An exploratory prospective study of the association between communication skills and employment outcomes after severe traumatic brain injury. *Brain Injury, 27,* 812–818.

Robinson, J. D. (2006). Managing trouble responsibility and relationships during conversational repair. *Communication Monographs, 73(2*), 137–161.

Robinson, J. D., & Bolden, G. B. (2010). Preference organization of sequence-initiating actions: The case of explicit account solicitations. *Discourse Studies*, *12*(4), 501-533.

Rohrer, J. D., Knight, W. D., Warren, J. E., Fox, N. C., Rossor, M. N., & Warren, J. D. (2008). Word-finding difficulty: a clinical analysis of the progressive aphasias. *Brain*, *131(1),* 8–38.

Roozenbeek, B., Maas, A. I. R., & Menon, D. K. (2013). Changing patterns in the epidemiology of traumatic brain injury. *Nature Reviews Neurology, 9,* 231-236.

Rosenthal, M., Christensen, B. K., & Ross, T. P. (1998). Depression following traumatic brain injury. *Archives of Physical Medical Rehabilitation, 79(1),* 90–103.

Sacks, H. (2004). An initial characterization of the organization of speaker turn-taking in conversation. In G. H. Lerner (Ed.) *Conversation analysis: studies from the first generation.* Amsterdam/Philadelphia: John Benjamins Publishing Company.

Schegloff, E. A. (1992). Repair after next turn: The last structurally provided defense of intersubjectivity in conversation. *American journal of sociology*, *97*(5), 1295-1345.

Schegloff, E. A. (2007). *Sequence organization in interaction.* Cambridge: Cambridge University Press.

Schegloff, E. A., Jefferson, G., & Sacks, H. (1977). The preference for self-correction in the organization of repair for conversation. Language, 53, 361–382.

Schegloff, E. A., & Lerner, G. H. (2009). Beginning to respond: Well-prefaced responses to wh-questions. *Research on language and social interaction*, *42*(2), 91-115.

Searle, J. R. (1969). *Speech acts: An essay in the philosophy of language*. Cambridge: Cambridge University Press.

Shiffrin, D., Tannen, D., & Hamilton, H. E. (Eds.) (2001). *The handbook of discourse analyses.* Oxford: Blackwell Publishers.

Shorland, J. & Douglas, J. M. (2010). Understanding the role of communication in maintaining and forming friendships following traumatic brain injury. *Brain Injury, 24*, 569–580.

Sidnell, J., & Stivers, T. (2013). *The handbook of conversation analysis*. West Sussex: Blackwell Publishings.

Sifianou, M. (1992). *Politeness Phenomena in England and Greece. A cross-cultural perspective*. Oxford: Oxford University Press.

Simpson, F. (2006). *Mount Wilga High Level Language Test*. 20th Annniversary Revised Edition.

Simpson, G., & Tate, R. (2007). Suicidality in people surviving a traumatic brain injury: prevalence, risk factors and implications for clinical management. *Brain Injury, 21,* 1335–1351.

Singapore Census of Population (2010). Accessed from https://www.singstat.gov.sg/-/media/files/publications/cop2010/census_2010_release1/findings.pdf on 9 March 2021.

Smith, J. L., Magill-Evans, J., & Brintnell, S. (1998). Life satisfaction following traumatic brain injury. *Canadian Journal of Rehabilitation, 11*, 131–140.

Snow, P. (2013). Communication competence following TBI: Assessment and management. In J. Ponsford, S. Sloan & P. Snow (Eds.) *Traumatic brain injury: Rehabilitation for everyday adaptive living (2nd edition).* New York: Psychology Press.

Snow, P., Douglas, J., & Ponsford, J. (1997). Conversational analyses following traumatic brain injury: a comparison between two control groups. *Brain Injury, 11*, 409-429.

Sohlberg, M. M., & Mateer, C. A. (1990). Evaluation and treatment of communication skills. In J. S. Kreutzer & P. Wehman (Eds.), *Community integration following traumatic brain injury* (pp. 67–84). Baltimore, MD: Brookes.

Stivers, T. (2013). Sequence Organization. In J. Sidnell & T. Stivers (Eds.) *The handbook of conversation analysis*. West Sussex: Blackwell Publishings.

Stout, C. E., Yorkston, K. M., & Pimentel, J. I. (2000). Discourse production following mild, moderate, and severe traumatic brain injury: A comparison of two tasks. *Journal of Medical Speech-Language Pathology*, *8,* 15-25.

Su, H. (2009). Code-switching in managing a face-threatening communicative task: Footing and ambiguity in conversational interaction in Taiwan. *Journal of Pragmatics, 41,* 372-392.

Svennevig, J., Hansen, P., Simonsen, H. G., & Landmark, A. M. D. (2019). Code-switching in multilinguals with dementia: patterns across speech contexts. *Clinical Linguistics & Phonetics, 33(10-11),* 1009-1030.

Tare, M., & Gelman, S. A. (2011). Bilingual parents' modeling of pragmatic language use in multiparty interactions. *Applied Psycholinguistics*, *32,* 761-780.

Tavano, A., Galbiati, S., Recla, M., Formica, F., Giordano, F., Genitori, L., & Strazzer, S. (2009). Language and cognition in a bilingual child after traumatic brain injury in infancy: long term plasticity and vulnerability. *Brain Injury, 23,* 167-171.

Temkin, N. R., Corrigan, J. D., Dikmen, S. S., & Machamer, J. (2009). Social functioning after traumatic brain injury. *The Journal of Head Trauma Rehabilitation, 24*(6), 460–467.

ten Have, P. (2011). *Doing conversation analysis: A practical guide (2nd Ed.).* London: Sage.

Togher, L. (2000). Giving information: The importance of context on communicative opportunity for people with traumatic brain injury. *Aphasiology, 14*, 365-390.

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),* 755-770.

Togher, L., & Hand, L. (1999). The macrostructure of the interview: Are traumatic brain injury interactions structured differently to control interactions? *Aphasiology, 13*, 709-723.

Togher, L., Hand, L., & Code, C. (1997). Analysing discourse in the traumatic brain injury population: telephone interactions with different communication partners. *Brain Injury, 11*, 169–189.

Togher, L., McDonald, S., Code, C., & Grant, S. (2004). Training communication partners of people with traumatic brain injury: a randomised controlled trial. *Aphasiology, 18,* 313–335

Togher, L., McDonald, S., Tate, R., Power, E., & Rietdijk, R. (2013). Training communication partners of people with severe traumatic brain injury improves everyday conversations: a multicenter single blind clinical trial. *Journal of Rehabilitation Medicine, 45(7),* 637-645.

Togher, L., McDonald, S., Tate, R., Power, E., Ylviskaker, M., & Rietdijk, R. (2010). TBI express: a social communication training manual for people with traumatic brain injury

(TBI) and their communication partners. Sydney: Australian Society for the Study of Brain Impairment (ASSBI).

Togher, L., Power, E., McDonald, S., Tate, R., & Rietdijk, R. (2009). Training communication partners of people with traumatic brain injury: reporting the protocol for a clinical trial. *Brain Impairment, 10(2),* 188–204.

Togher, L., Power, E., Rietdijk, R., McDonald, S., & Tate, R. (2012). An exploration of participant experience of a communication training program for people with traumatic brain injury and their communication partners. *Disability Rehabilitation, 34(18),* 1562-1574.

Togher, L., Taylor, C., Aird, V., & Grant, S. (2006). The impact of varied speaker role and communication partner on the communicative interactions of a person with traumatic brain injury: A single case study using systemic functional linguistics. *Brain Impairment, 7,* 190-201. .

Tu, L. V., Togher, L., & Power, E. (2011). The impact of communication partner and discourse task on a person with traumatic brain injury: The use of multiple perspectives. *Brain Injury, 25*, 560-580.

Tucker, F. M., & Hanlon, R. E. (1998). Effects of mild traumatic brain injury on narrative discourse production. *Brain Injury, 12(9),* 783–792

Turkstra, L. S. (2008). Conversational-based assessment of social cognition in adults with traumatic brain injury. *Brain Injury, 22*(5), 397–409.

Van Lancker, D. (1985). Hemispheric contributions to language and communication. In Darby, J. K. (Ed.), *Speech and Language Evaluation* in *Neurology: Adult Disorders,* pp. 247-295. New York: Grune & Stratton.

Van Velzen, J. D., Bennekom, C. V., Edelaar, M., Sluiter, J. K., & Frings-Dresen, M. H. W. (2009). How many people return to work after acquired brain injury? A systematic review. *Brain Injury, 23*(6), 473–488.

VanZomeren, A. H., & van den Burg, W. (1985). Residual complaints of patients 2 years after severe head injury. *Journal of Neurology, Neurosurgery & Psychiatry, 48,* 21-28.

Wasserman, L., Shaw, T., Vu, M., Ko, C., Bollegala, D., & Bhalerao, S. (2008). An overview of traumatic brain injury and suicide. *Brain Injury, 22*, 811–819.

Wee, J. Z., Yang, Y. R. J., Lee, Q. Y. R., Cao, K., & Chong, C. T. (2016). Demographic profile and extent of healthcare resource utilitsation of patients with severe traumatic brain injury: still a major public health problem. *Singapore Medical Journal, 57(9),* 491-496.

Wilkinson, R. (2008). Conversation analysis and communication disorders. In M. J. Ball, M. Perkins, N. Müller, & S. Howard (Eds.) *The handbook of clinical linguistics.* Oxford, England: Blackwell.

Wilkinson, R. (2013). Conversation analysis and communication disorders. In C. A. Chapelle (Ed.) *The encyclopedia of applied linguistics*. Malden, MA: Wiley-Blackwell.

Wilkinson, R. (2014). Intervening with conversation analysis in speech and language therapy: improving aphasic conversation. *Research on Language and Social Interaction, 47(3),* 219-238.

Wilkinson, R. (2015). Conversation and aphasia: advances in analysis and intervention. *Aphasiology, 29(3),* 257-268.

Wilkinson, R. (2019). Atypical interaction: conversation analysis and communicative impairments. *Research on Language and Social Interaction, 52(3),* 281-299.

Wilkinson, R. & Beeke, S. (2012) *The Conversation Analysis transcription template and instructions on its use*. Unpublished handout. University of Sheffield.

Wilkinson, R., Bloch, S., & Clarke, M. (2011). On the use of graphic resources in interaction by people with communication disorders. In J. Streeck, C. Goodwin, & C. LeBaron (Eds.) *Embodied interaction: Language and body in the material world*. Cambridge, England: Cambridge University Press.

Wilkinson, R., Bryan, K., Lock, S., Bayley, K., Maxim, J., Bruce, C., Edmundson, A., & Moir, D. (1998). Therapy using conversation analysis: helping couples adapt to aphasia in conversation. *Journal of language and communication disorders, 33, 144-149.*

Wilkinson, R., Gower, M., Beeke, S., & Maxim, J. (2007). Adapting to conversation as a language-impaired speaker: Changes in aphasic turn construction over time. *Communication and Medicine, 4(1),* 79–97.

Wilkinson, R., Lock, S., Bryan, K., & Sage, K. (2011). Interaction-focused intervention for acquired language disorders: facilitating mutual adaptation in couples where one partner has aphasia. *International Journal of Speech-Language Pathology, 13,* 74-87.

Wilson, T., Muller, N., & Damico, J. S. (2007). The use of conversational laughter by an individual with dementia. *Clinical Linguistics & Phonetics, 21(11-12),* 1001-1006.

Wong, W. X., Jalil, S. B., & Rickard Liow, S. J. (2012). *Semantic assessment battery for Mandarin-speaking adults with aphasia*. Unpublished masters thesis, National University of Singapore.

Young, J. A. Lind, C., & van Steenbrugge, W. (2016). A conversation analytic study of patterns of overlapping talk in conversations between individuals with dementia and their frequent communication partners. *International Journal of Language and Communication Disorders, 51,* 745-756.

Ylvisaker, M., & Feeney, T. J. (1998). *Collaborative Brain Injury Intervention, Positive Everyday Routines*. San Diego, CA: Singular.

Ylvisaker, M., Szekeres, S. F., & Feeney, T. J. (1998). Cognitive rehabilitation: Executive functions. In M. Ylvisaker (Ed.), *Traumatic brain injury rehabilitation: Children and adolescents* (p. 221–269). Butterworth-Heinemann.

Ylvisaker, M., Szekeres, S., Henry, K., Sullivan, D., & Wheeler, P. (1987). Topics in cognitive rehabilitation therapy. In M. Ylvisaker & E. Gobble (Eds.), *Community re-entry for head injured adults* (pp. 137–220). Austin, TX: Pro-Ed.

Yngve, V. H. (1970). On getting a word in edgewise. In *Chicago Linguistics Society, 6th Meeting, 1970* (pp. 567-578).

Youse, K. M., & Coelho, C. A. (2005). Working memory and discourse production abilities following closed-head injury. *Brain Injury, 19(12),* 1001–1009.

APPENDIX A
CONSENT FORM FOR PILOT STUDY

Changi
General Hospital

PARTICIPANT INFORMATION SHEET

You are being invited to participate in a research study ("Research Study").

Before you take part in this Research Study, the study must be explained to you and you must be given the chance to ask questions. Please read carefully the information provided here. If you agree to participate, please sign the informed consent form. You will be given a copy of this document to take home with you.

STUDY INFORMATION

Protocol Title:

Conversation Analysis of communication between Malay-English bilingual adults with traumatic brain injury their familiar partners - A pilot study

Principal Investigator:

Sajlia Binte Jalil
Senior Speech Therapist
Rehabilitative Services
Changi General Hospital
2 Simei Street 3
Singapore 529889
6850 2958 (O) / 9825 5401 (HP)

PURPOSE OF THE RESEARCH STUDY

You are being invited to participate in a research studying the patterns of communication (talking and understanding) in Malay-English bilingual adults with Traumatic Brain Injury (TBI – physical changes to the brain, for example bleeding or loss of tissue, as a result of a traumatic incident, for example an accident or fall). We hope to learn about changes (if any) in the way bilingual adults with TBI behave and communicate when having a conversation with familiar partners without a TBI. You were selected as a possible subject in this Research Study because you, or a person you are familiar with, suffered a TBI.

This Research Study will recruit 16 subjects (6 with TBI and 10 without TBI) from Changi General Hospital over a period of ten months.

STUDY PROCEDURES AND VISIT SCHEDULE

If you agree to take part in this Research Study, you will be asked to provide a 20 minute sample of conversation between you and your familiar partner. You will also be asked some questions regarding communication in daily settings. The above will be audio and video recorded to assist us in analysing the sample. If you are a patient with TBI, you will also be asked to undergo a series of language and cognitive

assessments. Your participation in this Research Study will not exceed one session (for participants without TBI) or two sessions held within a week of each other (for participants with TBI). Each session will last no longer than an hour.

YOUR RESPONSIBILITIES IN THIS STUDY

If you agree to participate in this Research Study, you will have to:

- Keep to your study appointments. If it is necessary to miss an appointment, please contact the study staff to reschedule as soon as you know you will miss the appointment.
- Agree to be audio recorded during the 20 minute conversation and discussion with the researcher about communication patterns.

WITHDRAWAL FROM STUDY

You are free to withdraw your consent and discontinue your participation at any time without prejudice to you or effect on your medical care. If you decide to stop taking part in this Research Study, you should tell the Principal Investigator.

WHAT IS NOT STANDARD CARE OR EXPERIMENTAL IN THIS STUDY

The Research Study is being conducted because in-depth analyses of conversations between bilingual adults with TBI and their communication partners have not been part of standard clinical practice in view of time and staffing constraints. Such analyses could potentially lead to a better understanding of communication problems in TBI and how to treat them. In this Research Study, we hope to ascertain the added value of such in-depth assessments and hope to make it part of standard care if found beneficial to patients with TBI.

POSSIBLE RISKS, DISCOMFORTS AND INCONVENIENCES

Participation in this Research Study involves audio recording and could result in some emotional discomfort (e.g. being embarrassed or anxious). Furthermore, sitting for tests of language and cognition could potentially result in stress (if unable to answer the questions) and fatigue (from sitting for the tests for about an hour). If at any time you experience the above, inform the Principal Investigator immediately so that we can terminate your participation and discomfort. If required, you will also be referred to a trauma counselor for emotional support and counseling.

POTENTIAL BENEFITS

If you participate in this Research Study you may reasonably expect to experience direct benefits such as having in-depth analysis of your cognitive and language function in both languages to better inform decisions made regarding intervention approach(es). These in-depth analyses might not be possible due to time and personnel constraints in the usual clinical settings.

Indirectly, results from this Research Study will facilitate evidence-based practice for assessment and intervention of future bilingual patients with TBI.

ALTERNATIVES

If you choose not to take part in this Research Study, the alternative is to have what is considered standard care for your condition. In our institution this would be the assessment and management of your language deficits in one or both of your proficient languages within and after your hospital admission if necessary. The advantage of doing this includes not having to spend additional time engaging in the assessment tasks. The disadvantage is that you will not have a complete picture of your cognitive and communication profile post-TBI.

SUBJECT'S RIGHTS

Your participation in this Research Study is entirely voluntary. Your questions will be answered clearly and to your satisfaction.

In the event of any new information becoming available that may be relevant to your willingness to continue in this Research Study, you or your legal representative will be informed in a timely manner by the Principal Investigator or her representative.

By signing and participating in the Research Study, you do not waive any of your legal rights to revoke your consent and withdraw from the Research Study at any time.

CONFIDENTIALITY OF STUDY AND MEDICAL RECORDS

Information collected for this Research Study will be kept confidential. Your records, to the extent of the applicable laws and regulations, will not be made publicly available. Only your Investigators will have access to the confidential information being collected.

However, Regulatory Agencies, Institution Review Board and Ministry of Health will be granted direct access to your original medical records to check study procedures and data, without making any of your information public. By signing the Informed Consent Form attached, you or your legal representative is authorizing such access to your study and medical records.

Data collected and entered into the case summary form, Language Background Questionnaire and assessment records form are the property of Changi General Hospital. In the event of any publication regarding this Research Study, your identity will remain confidential.

COSTS OF PARTICIPATION

If you are a patient with TBI and taking part in this Research Study, the following will be performed at no charge to you:

- Assessments of cognitive status pertaining to the Research Study
- Assessments of language status pertaining to the Research Study

RESEARCH RELATED INJURY AND COMPENSATION

If there is any injury due to the study medication study device or procedure given under the plan for the Research Study, our institution will provide you with the appropriate medical treatment.

You still have all your legal rights. Nothing said here about treatment or compensation in any way alters your right to recover damages where you can prove negligence.

WHO TO CONTACT IF YOU HAVE QUESTIONS

If you have questions about this Research Study and your rights or in the case of any injuries during the course of this study, you may contact the Principal Investigator (Sajlia Binte Jalil, 6850 2958 (O), 9825 5401 (HP), Sajlia_Jalil@cgh.com.sg (email)).

If you have questions about the study or your rights as a participant, you can call the SingHealth Centralised Institutional Review Board, which is the committee that reviewed and approved this study, the telephone number is 6323 7515 during office hours (8:30 am to 5:30pm).

CONSENT BY RESEARCH SUBJECT

Details of Research Study

Protocol Title:

Conversation Analysis of communication between Malay-English bilingual adults with traumatic brain injury their familiar partners - A pilot study

Principal Investigator:

Sajlia Binte Jalil

Senior Speech Therapist

Rehabilitative Services

Changi General Hospital

2 Simei Street 3

Singapore 529889

6850 2958 (O) / 9825 5401 (HP)

Subject's Particulars

Name: NRIC No.:

Address:

Sex: Female/Male Date of birth _____

dd/mm/yyyY

Race: Chinese/ Malay/ Indian /Others (please specify) _____

Part I

I,_____(NRIC/Passport No._____)
(Name of patient)

agree to participate in the research study as described and on the terms set out in the Patient Information Sheet. The nature of my participation in the proposed research study has been explained to me in

_____ by Dr/Mr/Ms _____
(Language / Dialect) (Name of healthcare worker)

I have fully discussed and understood the purpose and procedures of this study. I have been given the Participant Information Sheet and the opportunity to ask questions about this study and have received satisfactory answers and information.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reasons and without my medical care being affected.

I **agree / do not agree** to have my conversation and discussion required in this study audio-recorded.

I also give permission for information in my medical records to be used for research. In any event of publication, I understand that this information will not bear my name or other identifiers and that due care will be taken to preserve the confidentiality of this information.

_____ _____
[Signature/Thumbprint (Right / Left) of participant] (Date of signing)

Part II – to be filled by parent / legal guardian / legal representative, where applicable

I, _____ hereby give consent for the above participant to
(parent / legal guardian)
participate in the proposed research study. The nature, risks and benefits of the study have been explained clearly to me and I fully understand them.

_____ _____
[Signature/Thumbprint (Right / Left) of parent /legal guardian] (Date of signing)

Part III – to be filled witness, where applicable

An impartial witness should be present during the entire informed consent discussion if a subject or the subject's legally acceptable representative is unable to read. After the written informed consent form and any written information to be provided to subjects, is read and explained to the subject or the subject's legally acceptable representative, and after the subject or the subject's legally representative has orally consented to the subject's participation in the study and, if capable of doing so, has signed and personally dated the consent form, the witness should sign and personally date the consent form.

Witnessed by:_____ _____
(Name of witness) (Designation of witness)

_____ _____
(Signature of witness) (Date of signing)

Part IV– Investigator's Statement

I, the undersigned, certify to the best of my knowledge that the patient/patient's legally acceptable representative signing this informed consent form had the study fully explained and clearly understands the nature, risks and benefits of his/her / his ward's / her ward's participation in the study.

_____ _____ _____
Name of Investigator Signature Date

INFORMED CONSENT BY PARTICIPANT FORM

Details of Research Study

Protocol Title:

Conversation Analysis of communication between Malay-English bilingual adults with traumatic brain injury their familiar partners - A pilot study

Principal Investigator:

Sajlia Binte Jalil
Senior Speech Therapist
Rehabilitative Services
Changi General Hospital
2 Simei Street 3
Singapore 529889
6850 2958 (O) / 9825 5401 (HP)

Participant's Name:

Part I – Participant's Statement

I, the undersigned, have read and understood the contents set out in the RESEARCH INFORMATION & PARTICIPANT INFORMED CONSENT FORM and agree to participate in the *R*esearch *S*tudy as described therein.

I have fully discussed and understood the purpose and procedures of the Research Study. I have been given the Research Study Information Participant Information & Consent Form and the opportunity to ask questions about the Research Study including the possible risks, discomforts and inconveniences and potential benefits and have received satisfactory answers and information. I agree to everything explained above.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reasons and without my future medical care being affected.

I **agree / do not agree** to have my conversation and discussion required in this study-recorded.

I also give permission for information in my medical records to be used for research. In any event of publication, I understand that this information will not bear my name or other identifiers and that due care will be taken to preserve the confidentiality of this information.

_____	_____	_____
Name of Participant	Signature/Thumbprint (Right / Left)	Date

Part II – Participant's Parent / Legally Acceptable Representative (LAR) Statement, where applicable

I, the undersigned, warrant and represent I am duly authorised to legally represent the above Participant and hereby give consent for the above Participant to participate in the Research Study. The nature, risks and benefits of the Research Study have been explained clearly to me and I fully understand them.

Name of Participant's Parent / LAR	Signature / Thumbprint (Right / Left)	Date
_____	_____	_____

Translator information - where applicable

The Research Study has been explained to the above Participant / Legally Acceptable Representative in _____ (language) by _____ (name of translator).

Name of Translator	Signature	Date
_____	_____	_____

Part III – Witness Statement, where applicable

I, the undersigned, certify to the best of my knowledge that the above Participant signing this Informed Consent by Participant Form had the Research Study fully explained in a language understood by him / her and clearly understands the nature, risks and benefits of his / her participation in the Research Study.

Name of Witness	Signature	Date
_____	_____	_____

Part IV – Investigator Statement

I, the undersigned, certify to the best of my knowledge that the above Participant/Participant's Legally Acceptable Representative signing this Informed Consent by Participant form had the Research Study fully explained and clearly understands the nature, risks and benefits of the Research Study.

Name of Investigator	Signature	Date
_____	_____	_____

APPENDIX B
CONSENT FORM FOR MAIN STUDY

Changi General Hospital

PARTICIPANT INFORMATION SHEET

You are being invited to participate in a research study ("Research Study").

Before you take part in this Research Study, the study must be explained to you and you must be given the chance to ask questions. Please read carefully the information provided here. If you agree to participate, please sign the informed consent form. You will be given a copy of this document to take home with you.

STUDY INFORMATION

Protocol Title:

Conversation Analysis of communication between Malay-English bilingual adults with traumatic brain injury their familiar partners - Main study

Principal Investigator:

Sajlia Binte Jalil
Senior Speech Therapist
Rehabilitative Services
Changi General Hospital
2 Simei Street 3
Singapore 529889
6850 2958 (O) / 9825 5401 (HP)

PURPOSE OF THE RESEARCH STUDY

You are being invited to participate in a research studying the patterns of communication (talking and understanding) in Malay-English bilingual adults with Traumatic Brain Injury (TBI – physical changes to the brain, for example bleeding or loss of tissue, as a result of a traumatic incident, for example an accident or fall). We hope to learn about changes (if any) in the way bilingual adults with TBI behave and communicate when having a conversation with familiar partners without a TBI. You were selected as a possible subject in this Research Study because you, or a person you are familiar with, suffered a TBI.

This Research Study will recruit 6 persons with TBI and their close communication partners from Changi General Hospital over a period of ten months.

STUDY PROCEDURES AND VISIT SCHEDULE

If you agree to take part in this Research Study, you will be asked to provide up to 60 minutes sample of conversation between you and your familiar partner. You will also be asked some questions regarding communication in daily settings. The above will be audio recorded to assist us in analysing the sample. If you are a person with TBI, you will also be asked to undergo a series of language and cognitive assessments.

Your participation in this Research Study will not be time bound.

YOUR RESPONSIBILITIES IN THIS STUDY

If you agree to participate in this Research Study, you will have to:

- Undergo a series of language and cognitive assessments (if you are a person with TBI)
- Provide audio recording of up to 60 minutes worth of conversations
- Discuss with the researcher about your audio recordings

WITHDRAWAL FROM STUDY

You are free to withdraw your consent and discontinue your participation at any time without prejudice to you or effect on your medical care. If you decide to stop taking part in this Research Study, you should tell the Principal Investigator.

WHAT IS NOT STANDARD CARE OR EXPERIMENTAL IN THIS STUDY

The Research Study is being conducted because in-depth analyses of conversations between bilingual adults with TBI and their communication partners have not been part of standard clinical practice in view of time and staffing constraints. Such analyses could potentially lead to a better understanding of communication problems in TBI and how to treat them. In this Research Study, we hope to ascertain the added value of such in-depth assessments and hope to make it part of standard care if found beneficial to patients with TBI.

POSSIBLE RISKS, DISCOMFORTS AND INCONVENIENCES

Participation in this Research Study involves audio recording and could result in some emotional discomfort (e.g. being embarrassed or anxious). Furthermore, sitting for tests of language and cognition could potentially result in stress (if unable to answer the questions) and fatigue (from sitting for the tests for about an hour). If at any time you experience the above, inform the Principal Investigator immediately so that we can terminate your participation and discomfort. If required, you will also be referred to a trauma counselor for emotional support and counseling.

POTENTIAL BENEFITS

If you participate in this Research Study you may reasonably expect to experience direct benefits such as having in-depth analysis of your cognitive and language function in both languages to better inform decisions made regarding intervention approach(es). These in-depth analyses might not be possible due to time and personnel constraints in the usual clinical settings.

Indirectly, results from this Research Study will facilitate evidence-based practice for assessment and intervention of future bilingual patients with TBI.

ALTERNATIVES

If you choose not to take part in this Research Study, the alternative is to have what is considered standard care for your condition. In our institution this would be the

assessment and management of your language deficits in one or both of your proficient languages within and after your hospital admission if necessary. The advantage of doing this includes not having to spend additional time engaging in the assessment tasks. The disadvantage is that you will not have a complete picture of your cognitive and communication profile post-TBI.

SUBJECT'S RIGHTS

Your participation in this Research Study is entirely voluntary. Your questions will be answered clearly and to your satisfaction.

In the event of any new information becoming available that may be relevant to your willingness to continue in this Research Study, you or your legal representative will be informed in a timely manner by the Principal Investigator or her representative.

By signing and participating in the Research Study, you do not waive any of your legal rights to revoke your consent and withdraw from the Research Study at any time.

CONFIDENTIALITY OF STUDY AND MEDICAL RECORDS

Information collected for this Research Study will be kept confidential. Your records, to the extent of the applicable laws and regulations, will not be made publicly available. Only your Investigators will have access to the confidential information being collected.

However, Regulatory Agencies, Institution Review Board and Ministry of Health will be granted direct access to your original medical records to check study procedures and data, without making any of your information public. By signing the Informed Consent Form attached, you or your legal representative is authorizing such access to your study and medical records.

Data collected and entered into the case summary form, Language Background Questionnaire and assessment records form are the property of Changi General Hospital. In the event of any publication regarding this Research Study, your identity will remain confidential.

COSTS OF PARTICIPATION

If you are a patient with TBI and taking part in this Research Study, the following will be performed at no charge to you:

- Assessments of cognitive status pertaining to the Research Study
- Assessments of language status pertaining to the Research Study

RESEARCH RELATED INJURY AND COMPENSATION

If there is any injury due to the study medication study device or procedure given under the plan for the Research Study, our institution will provide you with the appropriate medical treatment.

You still have all your legal rights. Nothing said here about treatment or compensation in any way alters your right to recover damages where you can prove

negligence.

WHO TO CONTACT IF YOU HAVE QUESTIONS

If you have questions about this Research Study and your rights or in the case of any injuries during the course of this study, you may contact the Principal Investigator (Sajlia Binte Jalil, 6850 2958 (O), 9825 5401 (HP), Sajlia_Jalil@cgh.com.sg (email)).

If you have questions about the study or your rights as a participant, you can call the SingHealth Centralised Institutional Review Board, which is the committee that reviewed and approved this study, the telephone number is 6323 7515 during office hours (8:30 am to 5:30pm).

CONSENT BY RESEARCH SUBJECT

Details of Research Study

Protocol Title:

Conversation Analysis of communication between Malay-English bilingual adults with traumatic brain injury their familiar partners - Main study

Principal Investigator:

Sajlia Binte Jalil

Senior Speech Therapist

Rehabilitative Services

Changi General Hospital

2 Simei Street 3

Singapore 529889

6850 2958 (O) / 9825 5401 (HP)

Subject's Particulars

Name: NRIC No.:

Address:

Sex: Female/Male Date of birth _____

dd/mm/yyyY

Race: Chinese/ Malay/ Indian /Others (please specify) _____

Part I

I,_____(NRIC/Passport No._____)
(Name of patient)

agree to participate in the research study as described and on the terms set out in the Patient Information Sheet. The nature of my participation in the proposed research study has been explained to me in

_____ by Dr/Mr/Ms _____
(Language / Dialect) (Name of healthcare worker)

I have fully discussed and understood the purpose and procedures of this study. I have been given the Participant Information Sheet and the opportunity to ask questions about this study and have received satisfactory answers and information.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reasons and without my medical care being affected.

I **agree / do not agree** to have my conversation and discussion required in this study audio-recorded.

I also give permission for information in my medical records to be used for research. In any event of publication, I understand that this information will not bear my name or other identifiers and that due care will be taken to preserve the confidentiality of this information.

_____ _____
[Signature/Thumbprint (Right / Left) of participant] (Date of signing)

Part II – to be filled by parent / legal guardian / legal representative, where applicable

I, _____ hereby give consent for the above participant to
(parent / legal guardian)
participate in the proposed research study. The nature, risks and benefits of the study have been explained clearly to me and I fully understand them.

_____ _____
[Signature/Thumbprint (Right / Left) of parent /legal guardian] (Date of signing)

Part III – to be filled witness, where applicable

An impartial witness should be present during the entire informed consent discussion if a subject or the subject's legally acceptable representative is unable to read. After the written informed consent form and any written information to be provided to subjects, is read and explained to the subject or the subject's legally acceptable representative, and after the subject or the subject's legally representative has orally consented to the subject's participation in the study and, if capable of doing so, has signed and personally dated the consent form, the witness should sign and personally date the consent form.

Witnessed by:_____ _____
(Name of witness) (Designation of witness)

_____ _____
(Signature of witness) (Date of signing)

Part IV– Investigator's Statement

I, the undersigned, certify to the best of my knowledge that the patient/patient's legally acceptable representative signing this informed consent form had the study fully explained and clearly understands the nature, risks and benefits of his/her / his ward's / her ward's participation in the study.

_____ _____ _____
Name of Investigator Signature Date

INFORMED CONSENT BY PARTICIPANT FORM

Details of Research Study

Protocol Title:

Conversation Analysis of communication between Malay-English bilingual adults with traumatic brain injury their familiar partners - Main study

Principal Investigator:

Sajlia Binte Jalil
Senior Speech Therapist
Rehabilitative Services
Changi General Hospital
2 Simei Street 3
Singapore 529889
6850 2958 (O) / 9825 5401 (HP)

Participant's Name:

Part I – Participant's Statement

I, the undersigned, have read and understood the contents set out in the RESEARCH INFORMATION & PARTICIPANT INFORMED CONSENT FORM and agree to participate in the *R*esearch *S*tudy as described therein.

I have fully discussed and understood the purpose and procedures of the Research Study. I have been given the Research Study Information Participant Information & Consent Form and the opportunity to ask questions about the Research Study including the possible risks, discomforts and inconveniences and potential benefits and have received satisfactory answers and information. I agree to everything explained above.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reasons and without my future medical care being affected.

I **agree / do not agree** to have my conversation and discussion required in this study-recorded.

I also give permission for information in my medical records to be used for research. In any event of publication, I understand that this information will not bear my name or other identifiers and that due care will be taken to preserve the confidentiality of this information.

Name of Participant	Signature/Thumbprint (Right / Left)	Date

Part II – Participant's Parent / Legally Acceptable Representative (LAR) Statement, where applicable

I, the undersigned, warrant and represent I am duly authorised to legally represent the above Participant and hereby give consent for the above Participant to participate in the Research Study. The nature, risks and benefits of the Research Study have been explained clearly to me and I fully understand them.

Name of Participant's Parent / LAR	Signature / Thumbprint (Right / Left)	Date
_____	_____	_____

Translator information - where applicable

The Research Study has been explained to the above Participant / Legally Acceptable Representative in _____ (language) by _____ (name of translator).

Name of Translator	Signature	Date
_____	_____	_____

Part III – Witness Statement, where applicable

I, the undersigned, certify to the best of my knowledge that the above Participant signing this Informed Consent by Participant Form had the Research Study fully explained in a language understood by him / her and clearly understands the nature, risks and benefits of his / her participation in the Research Study.

Name of Witness	Signature	Date
_____	_____	_____

Part IV – Investigator Statement

I, the undersigned, certify to the best of my knowledge that the above Participant/Participant's Legally Acceptable Representative signing this Informed Consent by Participant form had the Research Study fully explained and clearly understands the nature, risks and benefits of the Research Study.

Name of Investigator	Signature	Date
_____	_____	_____

APPENDIX C
Transcription convention used in the study
(from Wilkinson & Beeke, 2012)

Symbols

The following symbols can be copied and pasted. Alternatively, they can be found on the keyboard or accessed as follows:- choose *insert* menu: choose *symbol* to access 'symbol' window.

⌈ ⌊ a large left-hand bracket links an ongoing utterance with an overlapping utterance or non-verbal action at the point where the overlap/simultaneous non-verbal action begins

⌉ ⌋ a large right-hand bracket marks where overlapping utterances/simultaneous non-verbal actions stop overlapping

eg. 01 PR how have you been since I last saw ⌈you⌉
02 AM ⌊not ⌋ so ⌈good ⌉
⌊((*AM shakes head*))⌋

= an equals sign marks where there is no interval between adjacent utterances

e.g. 01 DG did he really say that?=
02 FB =yes

(0.6) silences are marked in seconds and tenths of seconds
i.e. (0.6) is six tenths of a second; (1.2) is one second and two tenths of a second

(.) a full stop in single brackets indicates an interval of tenth of a second or less in the stream of talk

oh: a colon indicates an extension of the sound or syllable it follows (more colons prolong the stretch)

. a full stop indicates a stopping fall in tone, *not necessarily the end of a sentence*

, a comma indicates a continuing intonation

? a question mark indicates a rising inflection, *not necessarily a question*

! an exclamation mark indicates an animated tone, *not necessarily an exclamation*

but- a single dash indicates a halting, abrupt cut off to a word or part of a word

↑↓ marked rising and falling shifts in intonation are indicated by upward and downward pointing arrows immediately *prior* to the rise or fall

stress underlining indicates emphasis

°no° degree signs indicate a passage of talk which is *quieter* than surrounding talk

TALK capital letters indicate talk delivered at a *louder volume* than surrounding talk
h,heh indcates discernable aspiration or laughter (the more hs the longer the
hah aspiration/laughter)

fu(h)n an h in single brackets marks discernable aspiration or laughter *within* a word in an utterance

°h discernable inhalation (the more hs the longer the inhalation)

£ pound sign marks smiley voice quality

>talk< greater than signs indicate sections of an utterance delivered at a *greater speed* than the surrounding talk

<talk> lesser than signs indicate sections of an utterance delivered at a *slower speed* than the surrounding talk

⌈yes text in double brackets represents a gloss or description of some non-verbal
⌊((*nods*))aspect of the talk, and is linked to the relevant section of talk with large brackets (see above). Its often done in italics to make it stand out from the talk. You may want to use smaller font (eg font size 9) to get this description in the space available on the transcript.

(1 syllable)
(dog) single brackets containing either a word, phrase, or syllable count (if utterance is very unclear) mark where target item(s) is/are in doubt to the transcriber

/kæt/ transcribe paraphasias and jargon between slashes, using an IPA font.