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A trial of Acceptance and Commitment Therapy to facilitate psychological adjustment after a traumatic brain injury

A thesis submitted in fulfilment of the requirements of the award of the degree

Doctor of Philosophy

From

University of Wollongong

by

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April 2016

Certification

I, Diane Lynn Whiting, declare this thesis which is submitted in fulfilment of the requirements of the award of Doctor of Philosophy, in the School of Psychology University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. This document has not been submitted for qualification at any other academic institution.

Abstract

The adjustment process after a traumatic brain injury (TBI) is complex, individual and results in high levels of psychological distress as the individual comes to accept their post-injury self. This thesis undertakes a series of five studies to investigate whether Acceptance and Commitment Therapy (ACT) can facilitate psychological adjustment after a severe TBI. The first study provides a selective review of cognitive and psychological flexibility in the context of treatment for psychological distress after traumatic brain injury, with a focus on acceptance-based therapies. Cognitive flexibility is a component of executive function that is referred to mostly in the context of neuropsychological research and practice. Psychological flexibility, from a clinical psychology perspective, is linked to health and wellbeing and is an identified treatment outcome for therapies such as Acceptance and Commitment Therapy. People with a TBI often suffer impairments in their cognitive flexibility as a result of damage to areas controlling executive processes but have a positive response to therapies that promote psychological flexibility. Overall, psychological flexibility appears a more overarching construct and cognitive flexibility may be a subcomponent of it but not necessarily a pre-requisite. Study two is a Phase I clinical outcome research involving two case studies. The two men with severe TBI and associated psychological distress jointly engaged in a seven session treatment programme based on ACT principles. The intervention showed benefits with one participant, but was workable and showed acceptability with regard to programme content, measures and delivery mode for both participants. Significant changes pre to post intervention in measures of participation were not indicated. Qualitatively though, both participants engaged in committed action set in accordance with their values. This study suggests that ACT may be feasible in addressing psychological

distress after a severe TBI and permitted the transition to the Phase II clinical trial. Study three reported the protocol for a single centre, two armed, Phase II Randomised Control Trial (RCT) to address the adjustment process following a severe TBI. The publication of the protocol before the trial results are available, addresses fidelity criterion (intervention design) for RCTs, ensures transparency and that it meets the guidelines according to the CONSORT statement. Study four presents preliminary validation data on both the Acceptance and Action Questionnaire – Acquired Brain Injury (AAQ-ABI) and the Acceptance and Action Questionnaire – II (AAQ-II). Data from 150 participants with ABI was subject to exploratory factor analysis on the AAQ-ABI (15 items). A subset of 75 participants with ABI completed a larger battery of measures to test construct validity for the AAQ-ABI and to undertake a confirmatory factor analysis on the AAQ-II (7 items). The results suggest both measures can be used with individuals following an ABI but they index different facets of psychological flexibility. Study five involved the implementation of the RCT reported in study three. A total of 19 participants were randomly allocated to either a seven session ACT or Befriending (active control) intervention. Outcome measures included psychological flexibility, participation and measures of psychological distress. A repeated measures ANOVA indicated significant decreases in levels of both depression and stress when compared to the active control group. The five studies contribute to the clinical outcome research after severe TBI and show initial efficacy for ACT to decrease psychological distress and facilitate psychological adjustment for this client group but the mechanisms of change are undetermined.

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Chapter 1: Introduction

1.1 Rationale for the thesis

Psychological distress is extremely common after a TBI and can include depression, anxiety, trauma and anger. These symptoms can persist for many years after the injury (Hoofien, Gilboa, Vakil, & Donovick, 2001; Whelan-Goodinson, Ponsford, Johnston, & Grant, 2009) resulting in an impoverished life with decreased independence, poorer community engagement (Sander, Clark, & Pappadis, 2010), impaired relationships (Morton & Wehman, 1995; Sander et al., 2002) and poorer employment prospects (Grauwmeijer, Heijenbrok-Kal, Haitsma, & Ribbers, 2012).

Despite the high prevalence and impact of psychological distress after a TBI, the current research is quite limited and often methodologically flawed (Cattelani, Zettin, & Zoccolotti, 2010; Fann, Hart, & Schomer, 2009; Soo & Tate, 2009). Furthermore, outcome measures to establish the efficacy for intervention studies have often not been validated in a TBI population (Whyte & Hart, 2003). There is a need to investigate interventions which will facilitate psychological adjustment and reduce psychological distress.

1.2 Traumatic Brain Injury

"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, p. 1638). The alteration in brain function is described as being any period where there is a decrease or loss of consciousness; a loss of memory before or after the injury; neurological impairments; and any change in mental state. The external force encompasses a number of factors including either being struck or striking an object, blast injuries, being exposed to acceleration/deceleration forces or

penetrating injuries (Menon et al., 2010). Furthermore they are classified as being either an open or closed brain injury.

A closed TBI is caused by either a blow to the head or by the head impacting on a stationary object. When the impact happens a number of biomechanical forces, including rotational and acceleration/deceleration, occur and contribute to diffuse damage to the brain as well as damage from the impact itself. A penetrating TBI or open injury is caused when the head, both the skull and brain, is pierced by an object such as a bullet often resulting in more focal injuries. The impact of the injury can be transient, or range from mild, where symptoms are likely to recover in three months (Schretlen & Shapiro, 2003) to extremely severe, resulting in life long changes and impairments (Hoofien et al., 2001).

Assessment of injury is often categorised in bands of severity and initial assessment is based on both the duration and level of consciousness. Standardised measures include the Glasgow Coma Scale (Teasdale & Jennett, 1974) which evaluates initial depth of consciousness, or a number of standardised measures which determine the length of post-traumatic amnesia (PTA). These include the Galveston Orientation and Amnesia Test (Levin, O'Donnell, & Grossman, 1979) and the Westmead PTA Scale (Shores, Marosszeky, Sandanam, & Batchelor, 1986).

Length of PTA has been reported to be a good indicator of functional outcome following a TBI (Fleming, Tooth, Hassell, & Chan, 1999; Ponsford, Draper, & Schönberger, 2008; Zafonte et al., 1997) and strongly predicts impairments in intelligence (Königs, de Kieviet, & Oosterlaan, 2012). For the purposes of this study severity of injury will be determined by those guidelines recommended by Russell and Smith (1961). The categorisation of injury severity is detailed in

Table 1 and they describe a severe brain injury when the duration of PTA is between 1-7 days.

Table 1. Description of post-traumatic amnesia and injury severity

Severity	PTA Duration
Mild TBI	< 1 hour
Moderate TBI	1-24 hours
Severe TBI	1-7 days
Very Severe TBI	> 7 days[1]

Note. [1](Russell & Smith, 1961)

1.3 Epidemiology of Traumatic Brain Injury

The epidemiology of TBI is quite difficult to portray due to disparities in classification systems and how the injury is defined. In Australia during 2008, the incident rate for severe TBI was of 11.7 cases per 100,000 people (Access Economics, 2009). While in New Zealand, the incident rate for moderate to severe TBI has been assessed as 41 cases per 100,000 people, including both adults and children (Feigin et al., 2013). Across the whole spectrum of TBI severity, incidence rates are even higher, with 558 people per 100,000 identified as incurring a TBI in a USA sample (Leibson et al., 2011). Substantial variation of incidences rates though, occur across countries due to differences in categorisation of TBI and it is proposed that rates are probably underestimated (Roozenbeek, Maas, & Menon, 2013).

The causes of TBI are numerous with the most common being due to vehicular trauma such as motor vehicle accidents followed by falls, assaults, sporting injuries, industrial accidents and gunshot injuries (Myburgh et al, 2008). Demographically, in

an Australian and New Zealand sample and across the spectrum of TBI severity, it was established the average age of a person with a TBI was 41.6 years, the injury was more likely to occur from a motor vehicle accident (61.4%) and men (74.2%), were more likely to sustain an injury than women (Myburgh et al., 2008). Similar demographic patterns have been indicated in other high-income countries such as the USA (Corrigan, Selassie, & Orman, 2010) and across Europe (Andriessen et al., 2011; Anke et al., 2015; Gómez, Castaño-Leon, de-la-Cruz, Lora, & Lagares, 2014; Walder et al., 2013).

Those at highest risk of incurring a TBI fall into three age groups, young children (0-4 years), young adults (15-24 years) and the elderly (over 75 years) (Coronado et al., 2012). Overall though, there is a higher incidence of injury below the age of 40 years (Anke et al., 2015), but recent epidemiological studies have indicated the average age is increasing (Andriessen et al., 2011; Gómez et al., 2014). This appears to be a trend in high-income countries (Roozenbeek et al., 2013) where the increase in average age has been attributed to improved road safety and an aging population who have a tendency to sustain falls (Walder et al., 2013).

TBI is a major cause of death especially among young adults (Maas, Stocchetti, & Bullock, 2008) with mortality rates higher than the general population even after discharge from rehabilitation (Baguley et al., 2012). Despite improvements in treatment and intervention, mortality rates remain high and stable (Roozenbeek et al., 2013). Overall, the high cost and burden of TBI to society is universally recognised (Coronado et al., 2012; Humphreys, Wood, Phillips, & Macey, 2013; Ma, Chan, & Carruthers, 2014).

1.4 TBI Sequelae

The damage which occurs to the brain after a TBI is complex and results in temporary or permanent impairments across a number of domains including physical, cognitive, behavioural, emotional and psychosocial (McAllister, 2011). Following the return to consciousness, the recovery journey is quite variable between individuals depending on the extent of the injury as well as other pre-morbid factors (Brown & Nell, 1992). The majority of people recover well from their physical injuries (Colantonio et al., 2004) but it is proposed the cognitive and psychosocial changes provide the greatest challenge for recovery (Ponsford, Sloan, & Snow, 2013).

1.4.1 Cognitive sequelae

Although, there is an initial phase of confusion after the injury, the length of which is generally determined by the severity of the injury, it is the longer term consequences of cognitive impairment that have the most impact on the individual (Hoofien et al., 2001). As a result of the diffuse injuries incurred from a TBI, which often includes damage to the frontal and temporal lobes, a fairly consistent pattern of deficits emerges (Eslinger, Zappalà, Chakara, & Barrett, 2011). The pattern of these neuropsychological impairments includes attentional difficulties, memory deficits, slower speed of information processing and problems with executive functions including cognitive inflexibility (Eslinger et al., 2011; Rao & Lyketsos, 2000).

The cognitive impairments evident after a TBI, in particular executive dysfunction have a profound and pervasive impact on the individual's ability to function effectively in their everyday life (McDonald, Flashman, & Saykin, 2002). Ongoing

difficulties with independent living, relationships, returning to work, and social re-engagement are common (Cicerone et al., 2000). In addition impaired awareness of deficits impacts on the recovery process (Ownsworth et al., 2007; Prigatano, 2005; Toglia & Kirk, 2000). Further discussion around these issues will be provided in Chapter 2.

1.4.2 Psychological/psychiatric sequelae

The components contributing to psychological distress after a TBI are a combination of premorbid factors (e.g. genetic vulnerability or a psychiatric history), the actual physical damage to the brain (e.g. location and severity of the injury) and psychosocial factors (e.g., social support) in the recovery period (Jorge & Arciniegas, 2014). Receiving a psychiatric diagnosis after a TBI is very common. In the first three months after their injury, 45.8% of those with a TBI, were identified as having a psychiatric diagnosis (Gould, Ponsford, Johnston, & Schönberger, 2011) and 49% had a neuropsychiatric diagnosis in the first year after a moderate to severe TBI (Vaishnavi, Rao, & Fann, 2009).

Depression is the most common psychiatric presentation after a TBI with estimates ranging from 33% to 40% (Guillamondegui et al., 2011; Kreutzer, Seel, & Gourley, 2001). In a sample of 66 people in the first year after a TBI, 42.4% were diagnosed with major depressive disorder (MDD) (Jorge et al., 1993) while another study, looking at an outpatient service, found only 26% currently had a diagnosis of MDD but 28% had previously been diagnosed but were no longer symptomatic (Fann, Katon, Uomoto, & Esselman, 1995). Those diagnosed with depression after a TBI have poorer psychosocial and functional outcomes and are more likely to over emphasise their cognitive deficits (Fann et al., 1995). In the acute phases following

TBI it is proposed depression results mainly from the organic damage to the brain but as recovery progresses, psychosocial factors such as relationship difficulties or poor employment prospects have a greater impact (Jorge & Arciniegas, 2014). Overall, depressive symptoms are pervasive and long lasting (Jorge et al., 1993), resulting in reduced quality of life (Bombardier et al., 2010) and impacting on functional improvement (Anke et al., 2015).

Anxiety is also high after TBI with rates reported in the literature ranging between 18% and 60% (Bryant et al., 2010; Fann et al., 1995; Hibbard, Uysal, Kepler, Bogdany, & Silver, 1998; Whelan-Goodinson, Ponsford, Johnston, et al., 2009). In the first year alone, rates of anxiety have been reported to be as high as 44.1% (Gould et al., 2011) and remain at similar rates at five years after the injury (Whelan-Goodinson, Ponsford, Johnston, et al., 2009). Anxiety can manifest in all forms after a TBI with generalised anxiety disorder and posttraumatic stress disorder (PTSD) being the most prevalent (Hiott & Labbate, 2002). Although PTSD tends to be prevalent after a mild TBI, with moderate to severe TBI most patients have limited or no ability to recall the traumatic event (Bombardier et al., 2006). Anxiety results in avoidance behaviour impacting on recovery and reengagement after the injury (Whelan-Goodinson, Ponsford, Johnston, et al., 2009).

Many individuals also present with problematic or challenging behaviours after a TBI. In a large multicentre study the three most common challenging behaviours included inappropriate social behaviour at 33.3%, aggression at 31.9% and adynamia at 23.1% (Sabaz et al., 2014). These high levels of challenging behaviours have been confirmed in other samples that assessed aggressive behaviour (25%) (Baguley, Cooper, & Felmingham, 2006) and apathy (61.4%) (van Reekum, Stuss, &

Ostrander, 2005). Such challenging behaviours provide barriers to recovery and community reintegration (Winkler, Unsworth, & Sloan, 2006). These factors all contribute to a difficult journey for the individual after a TBI as they come to adjust and accept the post-injury changes.

1.5 Psychological Adjustment after a TBI

The adjustment process after a TBI is highly individual (Schönberger et al., 2014) as individuals struggle to incorporate a new sense of self. There is often a profound sense of loss and grief after the injury which contributes to the post-injury difficulties (Carroll & Coetzer, 2011). Acceptance of disability is considered an important factor in reconstructing the self after a TBI as well as learning new skills, learning about their own deficits and abilities, changing their personal narrative and redefining what the person perceives as 'success' (Levack et al., 2010). Often after a TBI, "the self" is perceived quite negatively contributing to increased levels of psychological distress (Beadle, Ownsworth, Fleming, & Shum, 2016). There is a need to investigate therapies which will effectively facilitate this complex adjustment process.

1.6 Treatment for Emotional Distress after TBI

A recent review across the broader spectrum of acquired brain injury rehabilitation randomised controlled trials (RCT), identified 143 published trials from 1980 to 2012 (McIntyre, Janzen, Richardson, Kwok, & Teasell, 2015). Of these RCTs, only 29 had a focus on psychosocial outcomes including depression or anxiety (10), anger (9), substance abuse (4) and independence/social integration (6). Most had small sample sizes (i.e. $n < 50$) and had low scores of methodological quality using a standardised rating scale.

A more comprehensive discussion about treatment for psychological distress after TBI will be covered in the Chapters two, three and five. To summarise, reviews indicate that there is a need to undertake research using more rigorous methodology and explore newer interventions that may alleviate psychological distress and improve adjustment and engagement in rehabilitation. One therapy approach that has promise is Acceptance and Commitment Therapy (ACT) (Hayes, Strosahl, & Wilson, 2003). The subsequent section provides a brief overview of ACT and is followed by a brief section describing potential phases of research setting the context for the present study.

1.7 Acceptance and Commitment Therapy

Acceptance and Commitment Therapy (ACT) is described as a third wave behavioural therapy but is also referred to as a mindfulness-based intervention (Fletcher & Hayes, 2005). ACT aims to promote psychological flexibility by working though and achieving skills in six core processes including acceptance, cognitive defusion, being in the present moment, the self–as-context, values and committed action (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). The model of psychological flexibility is presented diagrammatically as a hexaflex (see Figure 1 in chapter 2) with the therapist moving in a non-linear fashion through the model. A more detailed description of ACT is provided in Chapter two including theoretical underpinnings and a comprehensive description of each component of the model.

There is a growing body of evidence supporting the effectiveness of ACT to address a range of issues and with many different client groups (Hooper & Larssen, 2015; Ruiz, 2010). In addition, there has been increased discussion about the prospect of ACT to promote psychological adjustment after a brain injury (Kangas &

McDonald, 2011; Soo, Tate, & Lane-Brown, 2011) and some preliminary research into its effectiveness with those demonstrating cognitive impairments (Brown & Hooper, 2009; Graham, Gillanders, Stuart, & Gouick, 2015; Sylvester, 2011). The research into the efficacy of ACT with chronic health conditions and its potential for implementation after TBI is comprehensively reviewed in Chapter two.

1.8 Phases of Clinical Outcome Research

There are a number of models of clinical outcome research which describe and recommend the processes and phases of the research needed to develop evidence for a new treatment. The World Health Organisation currently promote a four phase model of clinical research for experimental drugs, treatments, devices or behavioural interventions (World Health Organisation, 2015). The requirements of each phase must be met before progression to the next level. This phased model of clinical trials provides the framework in which the current study is located.

Phase I research is the initial point of introducing a new treatment in order to establish the safety of the treatment, to develop hypotheses and to determine if the treatment leads to improvements. In biomedical clinical trials, the group size at this initial phase is usually estimated to be between 20-80 (World Health Organisation, 2015) but in behaviour research, a Phase I study is usually undertaken with small samples or single cases (Robey & Schultz, 1998). Current research into the use of ACT after a brain injury to address psychological distress and promote adjustment, is still in the Phase I stage of clinical research (Sylvester, 2011). This preliminary research has indicated the potential of ACT with this population group but the participants comprised an adult mixed brain injury sample (including, TBI, CVA,

brain tumour and hypoxic) who acquired their injury before the age of 18 years. Thus, there is a need to undertake further Phase I exploration with participants who have a severe TBI before progressing to Phase II studies.

The objectives of Phase II clinical outcome research include the development and standardisation of intervention protocols, such as developing treatment manuals and validation of measures as well as exploring initial therapeutic effect (Robey, 2004). To date there have been no Phase II clinical outcome research trials implementing ACT with a severe TBI population. Phase III involves a large scale clinical trial to test the efficacy of an intervention and is characterised by a large sample size while Phase IV investigates the effectiveness of the intervention in daily clinical practice (World Health Organisation, 2015). The studies described in the current thesis, include both Phase I and Phase II clinical outcome research. Furthermore, this thesis aims to establish the groundwork for a Phase III clinical trial and provides the possibility for future Phase IV clinical trial research.

1.9 Aims of Thesis

The overall aim of this thesis is to undertake a trial of ACT to facilitate psychological adjustment after a severe TBI. The thesis consists of five studies each of which can be read as individual reports but are all connected under the overall aim. Three studies have been published, one study is currently under review and fifth will be submitted for publication after the thesis is completed. The five studies follow the phases of clinical outcome research by moving from Phase I to Phase II. The specific aims for each of these studies is detailed below:

1.9.1 Study 1

The aim of Study 1 is to investigate the question of whether ACT is appropriate for individuals with a severe TBI due to their cognitive impairments. The study is a selective review of cognitive and psychological flexibility in the context of treatment for psychological distress after traumatic brain injury, with a focus on acceptance-based therapies. Cognitive flexibility is a component of executive function and arises from neuropsychological research. Psychological flexibility, from a clinical psychology perspective, is linked to health and wellbeing and is an identified treatment outcome for therapies such as ACT. People with a TBI often suffer impairments in their cognitive flexibility as a result of damage to areas that control executive processes but they still show positive treatment effects to therapies that promote psychological flexibility. This chapter reviews the definitional, neural basis, clinical implications of impairments for both constructs, and describes how each construct in measured. These factors are discussed in the context of treatment after a severe TBI (Chapter 2).

1.9.2 Study 2

Next, there was a need to investigate the feasibility of ACT to address psychological distress after a *severe* TBI in a Phase I context. This expands on the Phase I clinical outcome research already published (Sylvester, 2011). The goals of the study are to develop and test the delivery method, determine initial effectiveness of the intervention, and then review the treatment protocol, in particular the outcome measures selected. This initial trial of all components of the intervention facilitates progression to a Phase II randomised controlled trial (RCT) (Chapter 3).

1.9.3 Study 3

From the results of the feasibility study, there was a need to develop an intervention protocol prior to moving into the Phase II trial. Therefore, the aim of Study 3 is to report on the protocol for a single centre, two armed, Phase II RCT to address the adjustment process following a severe TBI. The protocol was described (and published) prior to the trial being completed and this protocol description addresses fidelity criterion (intervention design) for RCTs. This ensures transparency in the RCT and that it meets the guidelines according to the CONSORT statement (Chapter 4).

1.9.4 Study 4

Following both the feasibility study and the development of the intervention protocol, the need to validate outcome measures on a TBI population was identified. The selection of appropriate outcome measures has been problematic in TBI research (Whyte & Hart, 2003). The aim of Study 4 is to present preliminary validation data on both the Acceptance and Action Questionnaire – Acquired Brain Injury (AAQ-ABI) and the Acceptance and Action Questionnaire – II (AAQ-II) in an acquired brain injury sample. This study provides validation of the outcome measures for the proposed RCT, specifically measures of psychological flexibility in individuals with a brain injury (Chapter 5).

1.9.5 Study 5

The final stage of the thesis was to conduct a single centre, two armed (ACT and Befriending), Phase II randomised controlled trial in order to evaluate the efficacy of ACT to address psychological adjustment after a severe TBI (Chapter 6).

Chapter 2: Cognitive and psychological flexibility after a traumatic brain injury and the implications for treatment in acceptance-based therapies: A conceptual review

This is an identical version of the accepted manuscript published in full in Neuropsychological Rehabilitation.

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2.1 Introduction

Flexibility in mental processes has been extensively studied and measured from a neuropsychological perspective since the late 1940s (Berg, 1948). More recently, flexibility has become a desired treatment outcome in what has been termed acceptance-based therapies such as acceptance and commitment therapy (ACT; Hayes, Villatte, Levin, & Hildebrandt, 2011). There appears to be similarities in the way psychologists who undertake cognitive assessments and those who use acceptance-based therapies view the construct of mental flexibility. For example, there are definitional overlaps and both groups recognise that impairments in flexibility are strongly associated with psychopathology (e.g., Berman, Wheaton, McGrath, & Abramowitz, 2010; Tchanturia et al., 2004).

Despite these similarities, mental flexibility currently appears to be viewed from two different perspectives within psychology and given separate labels, namely *cognitive* and *psychological* flexibility. However, there has been no formal consideration of the overlapping theoretical features between these perspectives of mental flexibility. The construct of cognitive flexibility (sometimes referred to as mental flexibility) has a long and well-developed history and appears to be well understood and validated. Psychological flexibility has a more recent history arising out of acceptance-based therapies. With an exponential rise in clinical outcome research that assesses these therapies, there is a need to develop an improved understanding of the underlying construct. At the current time, it is unclear whether cognitive and psychological flexibility are identical, overlapping or entirely separate constructs.

The nature of the relationship between cognitive and psychological flexibility may have important clinical implications for interventions that promote psychological flexibility to address adjustment issues after a traumatic brain injury (TBI). Impairments in cognitive flexibility have been well established in populations with a brain injury (e.g., Heled, Hoofien, Margalit, Natovich, & Agranov, 2012; McDonald et al., 2002; Niemeier, Marwitz, Lesher, Walker, & Bushnik, 2007). Therefore if cognitive and psychological flexibility are the same construct or overlapping, the applicability of these acceptance-based therapies after a TBI needs further exploration.

Over the past two decades there has been a growing confidence that psychological therapies can make a significant contribution to the adjustment process after a TBI despite the range of cognitive impairments characteristic of brain-injured populations (Bombardier et al., 2009; Cattelani et al., 2010). Initial work has trialled interventions based on cognitive behavioural therapy (CBT) approaches, which rely on techniques such as cognitive restructuring and improved problem-solving to achieve the therapeutic benefit (e.g., Ashman, Cantor, Tsaousides, Spielman, & Gordon, 2014; Simpson, Tate, Whiting, & Cotter, 2011). Acceptance-based therapies, such as ACT (Hayes et al., 2003), have a different therapeutic target. Namely, helping patients experience difficult thoughts without struggling to change their content, while also persisting with values-consistent behaviour. The fundamental proposition of ACT is that psychological flexibility is a core mechanism of change that directly contributes to psychological well-being (Kashdan & Rottenberg, 2010). Another key change mechanism within ACT involves helping people accept difficult experiences and engage in committed behaviour, in the context of a values-guided life.

There is a growing interest in the potential application of ACT in assisting clients navigate the complex issues influencing recovery following a TBI (Kangas & McDonald, 2011; Soo et al., 2011). For example, ACT might facilitate adaptation and acceptance of changed functioning and life circumstances following a severe TBI (Kangas & McDonald, 2011). However, before utilising ACT to treat psychological distress in individuals with a TBI, the relationship between cognitive flexibility and psychological flexibility, both conceptually and empirically, should be clarified.

Our fundamental question is whether impaired *cognitive* flexibility secondary to TBI, constrains the capacity to develop the *psychological* flexibility required to cope with the emotional impact of the injury. Addressing this question may improve our understanding of current treatments that improve function after TBI and provide additional knowledge of how acceptance-based therapies may be effective for this population.

To address this aim, the literature relating to *cognitive* versus *psychological* flexibility derived from several lines of inquiry will be reviewed. Specifically, we review research identifying the constituent mental processes of flexibility; evidence relating to the neural substrate of flexibility; the clinical implications of inflexibility for psychopathology; methods for assessing flexibility; and treatment approaches aimed at increasing flexibility. The focus of the review is on those with severe TBI (Russell & Smith, 1961) as they are more likely to demonstrate larger and more persistent cognitive impairments than both mild head injury (Salas, Vaughan, Shanker, & Turnbull, 2013) and moderate TBI (Trudel, Tryon, & Purdum, 1998). Furthermore, in severe TBI, impairments can persist for many years after the injury and cause ongoing psychological distress (Hoofien et al., 2001). Interventions

resulting in improved psychological flexibility with a severe TBI population are likely to be generalisable to individuals with less severe injuries but not necessarily vice a versa. However, the literature on severe TBI is limited, therefore evidence for the review will be drawn from studies of broader acquired brain injury (ABI), non-brain damaged clinical groups, as well as healthy adults.

An overall summary of the commonalities and differences will then be provided, as well as findings from the two studies that have sought to investigate the links between cognitive and psychological flexibility. Finally, implications of the findings from the review for the psychological treatment in people with severe TBI will be discussed with a focus on those acceptance-based therapies or interventions that aim to improve psychological flexibility (e.g., ACT, mindfulness).

2.2 Acceptance-based Therapies

Before commencing the review, a brief outline of acceptance-based therapies is needed. The third wave of behavioural therapies has been referred to as acceptance-based cognitive behavioural therapies (Chamberlain, Fineberg, Blackwell, Robbins, & Sahakian, 2006) and includes ACT, as well as mindfulness-based therapies (e.g., Abbate-Daga et al., 2011). Creating or improving psychological flexibility is the main focus of these acceptance-based therapies and they are proposed to be qualitatively different from CBT. Rather than focussing on symptom reduction, they aim to allow individuals to accept difficult internal and external experiences while remaining present in their life and not engaging in an avoidant coping style. Remaining “present” in this context refers to being open and willing to experience these (difficult) thoughts and feelings, which in the domain of acceptance-based therapies is referred to as being more psychologically flexible. Being psychologically

flexible in ACT also includes behavioural activation where despite, or in the presence of these difficult experiences, individuals are encouraged to engage in activity that is consistent with their identified values.

The model underpinning ACT proposes there are six core processes involved in achieving psychological flexibility and these are grouped under two broader categories of either mindfulness or behaviourally based processes. The six core processes are listed and defined in Table 2 and diagrammatically represented by a hexaflex (Hayes et al., 2006) (see Figure 1). A number of therapeutic techniques, including roles plays and metaphors, are used to help target and develop these core processes as the clinician works in a non-linear manner through the hexaflex.

Table 2. Definitions of the components of the ACT hexaflex

Hexaflex component	Definition
Acceptance	The opening up and making room for distressing thoughts, emotions or experiences so that there is no longer an ongoing struggle
Defusion	The process of creating some separation from distressing thoughts, emotions or experiences and changing the function of the thought rather than the content
Self-as-context	Or 'the observing self', seeks to demonstrate that a component of us is always the same, regardless of what is changing with regard to our feelings or experiences
Contact with the present moment	Involves being in the here and now, being more behaviourally flexible and consciously connecting with what is happening in that moment
Values	Are unique to each individual and provide the framework for goal setting and engaging in committed action in line with these personally relevant principles
Committed action	Involves either persisting or altering behaviour that is values based

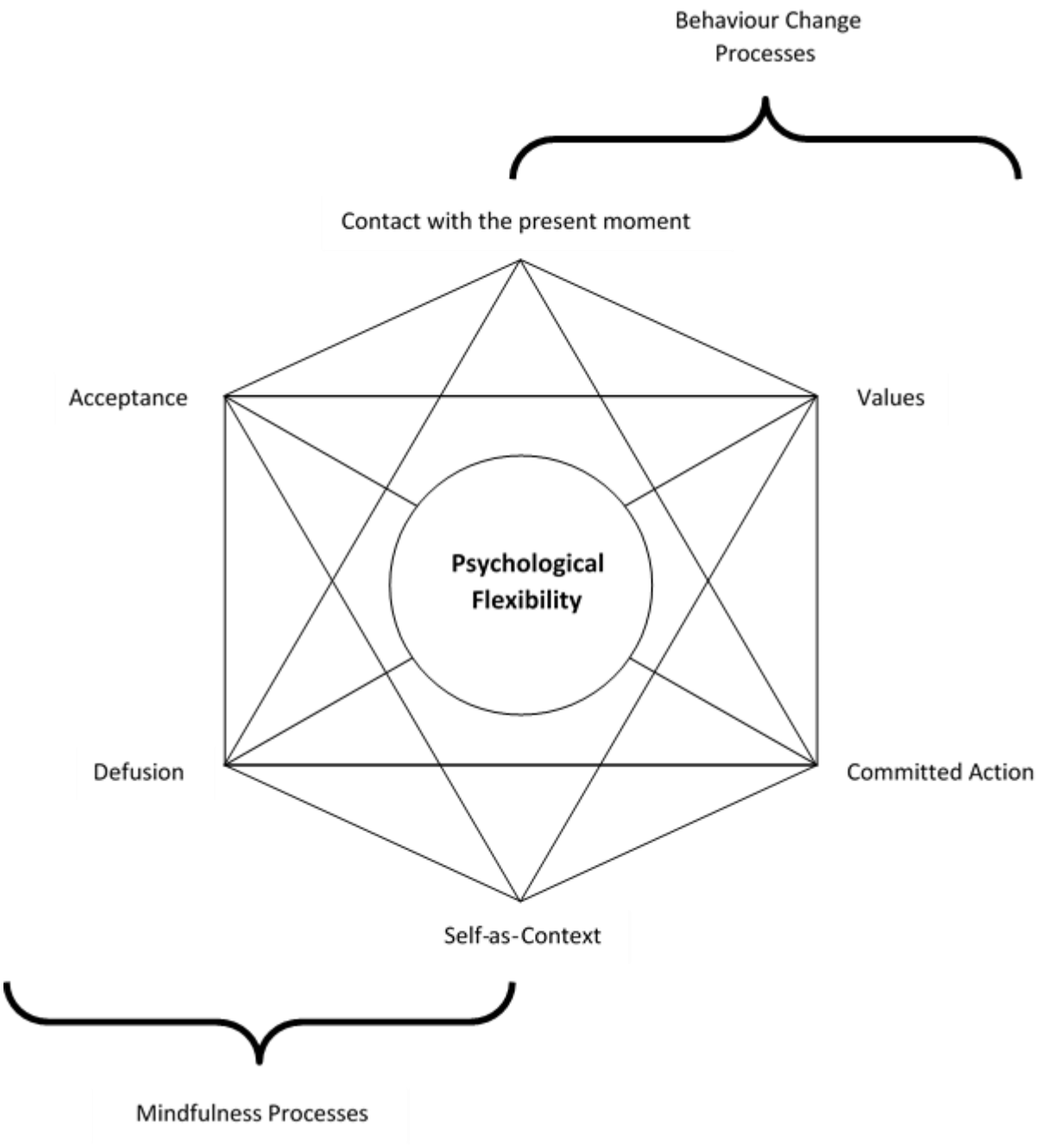

Figure 1. Hexaflex: Model of psychological flexibility.

Experiential avoidance and cognitive fusion can arise when these processes are not implemented and results in psychological inflexibility. Experiential avoidance, as opposed to acceptance, occurs when a person actively attempts to change experiences, both internal and external, that gives rise to difficult thoughts and

emotions. Cognitive fusion is the process which perpetuates experiential avoidance by causing a person to become caught in the content of thoughts rather the context in which they occur.

All six core processes in the hexaflex (or psychological flexibility model) contribute to the development of psychological flexibility but it is not clear what the relative contribution of each process is and how this may differ with each individual. Research indicates that ACT promotes psychological flexibility in a range of contexts and psychological/health conditions (Ruiz, 2010) but the construct appears to be transitioning from the ACT framework and being used more broadly in psychology. A challenge in the interpretation of this research is that aspects of the conceptualisation of the psychological flexibility construct appears to be still evolving and requires further clarification (Tsaousides, Ashman, & Gordon, 2013).

2.3 Current Conceptualisations of Cognitive and Psychological Flexibility

2.3.1 Mental processes involved in cognitive flexibility

In the neuropsychological literature, cognitive flexibility has been defined as the ability to change behaviour such as thoughts or actions in response to situational demands (Cañas, Antoli, Fajardo, & Salmerón, 2005; Lezak, 2004). It is a component of executive functioning, the group of higher order cognitive abilities that include planning, problem solving, goal development and achievement (Anderson, 2002; Burgess & Alderman, 2004; Kocovski, Fleming, & Rector, 2009; Strauss, Sherman, & Spreen, 2006). These abilities are considered to be essential for purposeful human behaviour (Lezak, 2004) and can entail spontaneous and reactive components (Eslinger & Grattan, 1993). The processes underpinning cognitive flexibility are dynamic, involving cycles of thought generation and suppression that

emerge and dissipate as the individual interacts with changing environmental factors such as contextual cues and task demands (Ionescu, 2012). This model proposed by Ionescu (2012) has been described as a "unified framework of cognitive flexibility", involving a number of cognitive components or mechanisms. These include various executive functions, attention, perception, goal parameters and monitoring in conjunction with task demands, contextual cues and sensorimotor input. Hence, the concept of cognitive flexibility encompasses more than simple response switching.

2.3.2 Neural substrate of cognitive flexibility

Damage to the frontal lobes of the brain has traditionally been associated with impairments in the executive functions that are closely linked to the concept of flexibility (Stuss & Alexander, 2000). Although fractionation of the frontal lobe is observed for specific tasks there appears to be a more general distribution of activation across several regions for executive functions (Shigaki, Glass, & Schopp, 2006). In specific studies, the activation of neural networks has been mapped in samples of healthy adults undertaking tasks involving cognitive flexibility. Reviews have indicated that both frontal and non-frontal regions of the brain are activated by tests assessing executive functions (Alvarez & Emory, 2006). As a specific example of the neurological substrates of cognitive flexibility in healthy adults, a switching task such as the Trail Making Test Part B, evokes distinct left-sided activation of the dorsolateral and medial frontal regions of the brain as well as activity in the left middle and superior temporal gyrus (Zakzanis, Mraz, & Graham, 2005). This is consistent with the operation of a central executive network within the brain that subserves this range of behaviours (Bell et al., 2005) but it is apparent that some fractionation of executive functions on a neuroanatomical basis is possible. For

example, while both the frontal lobes and basal ganglia have been implicated in tasks involving response-shifting, the basal ganglia are less implicated in broader cognitive flexibility involving divergent thought and fluency (Eslinger & Grattan, 1993).

Expanding the construct to include highly abstract cognitive switching was found to recruit the anterior pre-frontal cortex (Kim, Johnson, Cilles, & Gold, 2011). Adding language to a cognitive flexibility task, including tasks such as category switching and verbal fluency, implicates an extensive distributed network of brain regions. This includes the frontal, temporal and parietal regions in the left hemisphere and indicates shared neural substrates with working memory, processing speed and language processing (Barbey, Colom, & Grafman, 2013). It would appear that even an activity perceived as relatively simple, such as set shifting, activates a larger network than the frontal lobes and the complexity of the network of activation increases when the task involves a language component.

2.3.3 Mental health implications of impairments in cognitive flexibility

Impairments in cognitive flexibility, as measured by a range of neuropsychological tests, have been identified in a number of psychological disorders and are common after a TBI. For example, people diagnosed with schizophrenia and bipolar disorder (Martinez-Aran et al., 2001), generalised anxiety disorder (Lee & Orsillo, 2014), eating disorders (Abbate-Daga et al., 2011; Barnes-Holmes, Hayes, Barnes-Holmes, & Roche, 2001; Paulus, Rogalsky, Simmons, Feinstein, & Stein, 2003), post-traumatic stress disorder (PTSD; Walter, Palmieri, & Gunstad, 2010) and obsessive compulsive disorder (Chamberlain et al., 2006), all show some disruption of flexibility. This provides strong evidence for the suggestion that inflexibility is a key factor in psychopathology (Hayes, Levin, Plumb-Vilardaga,

Villatte, & Pistorello, 2013). In both eating disorders (Tchanturia et al., 2011) and major depressive disorder (Deveney & Deldin, 2006), it has been shown that poor cognitive flexibility is associated with poor response to treatment. Furthermore, in a small sample of females with PTSD (n=15), improvements in cognitive flexibility accompanied a decrease in PTSD symptoms after trauma-focussed psychological treatment (Walter et al., 2010).

The question of how cognitive inflexibility contributes to the maintenance of symptoms in major depressive disorder was explored by Deveny and Deldin (2006). They found that when individuals with major depressive disorder were exposed to negative stimuli in the form of negative words (e.g., “agony”); they made more perseverative errors on the Wisconsin Card Sorting Test (WCST), indicative of greater inflexibility. The controls made more perseverative errors when they were exposed to positive words (e.g., “admired”). This link between perseverative inflexibility, or becoming stuck on an idea, and psychopathology is also evident in individuals with a tendency to ruminate when dysphoric. Supporting the link between rumination and cognitive flexibility is Davis and Nolen-Hoeksema’s (2000) research showing that ruminators displayed more perseverative errors and had more difficulty in maintaining set on the WCST than did non-ruminators.

In TBI, impairments in cognitive flexibility and executive function, including problem solving, planning and abstract thinking, are common (Heled et al., 2012). Clinically these impairments are often a source of treatment difficulties and results in functional difficulties for many years after the injury (McDonald, et al., 2002). Impairments in cognitive flexibility have also shown an association with both the understanding of emotions (i.e., empathy) and expression of emotions in ABI

samples (Grattan & Eslinger, 1989; Shamary-Tsoory, Tomer, Berger, & Aharon-Peretz, 2003).

The same problems are associated with the presence of psychopathology in the TBI populations. TBI patients diagnosed with major depressive disorder were found to have greater impairments in cognitive flexibility, as measured by neuropsychological tests (WCST and Trail Making Test), than those without a diagnosis of depression (Jorge et al., 2004). Impaired executive function, which included neuropsychological measures of cognitive flexibility (Trail Making Test and Verbal Fluency), has also found to be greater in individuals with a TBI and comorbid anxiety disorder (Gould, Ponsford, & Spitz, 2014). Even though individuals with a TBI often have impaired cognitive flexibility, this inflexibility appears to be even higher if they are suffering from significant levels of psychological distress.

Another clinical implication for impairments in cognitive flexibility after a TBI is the impact of impaired self-awareness. Impaired self-awareness has a complex, multifaceted relationship with the recovery process after TBI involving neurocognitive, psychological and socio-environmental factors (Ownsworth, Clare, & Morris, 2006; Ownsworth et al., 2007; Prigatano, 2005; Toglia & Kirk, 2000). A positive relationship has been established between impaired cognitive flexibility and impaired self-awareness using a range of self-awareness measures and neuropsychological tests of cognitive flexibility (Bivona et al., 2008; Bogod, Mateer, & Macdonald, 2003; Ciurli et al., 2010; Trudel et al., 1998). This association between cognitive flexibility and self-awareness appears noteworthy and will be discussed further in the section titled, “Implications for psychological treatment after TBI”.

From research with both clinical and TBI groups it appears the relationship between impairments in cognitive flexibility and psychopathology is multifaceted. Impaired cognitive flexibility is a perpetuating factor by contributing to symptom maintenance and also appears to be a barrier for treatment in terms of impaired self-awareness. Moreover, the presence of psychopathology and cognitive inflexibility appears to contribute to broader cognitive decline. Data about causality or directionality of the cognitive flexibility-psychopathology relationship is not currently available to help guide clinical interventions. There still needs to be further research to explore whether or not psychopathology is an antecedent to, concomitant with or a consequence of cognitive inflexibility or whether all operate synergistically.

2.3.4 Measuring cognitive flexibility

Measures of cognitive flexibility are divided into task-based objective tests, which require the participant to demonstrate a certain behavioural response, and self-report measures. The most recognised task-based test of cognitive flexibility is the Wisconsin Card Sorting Test (WCST; Heaton, Chelune, Talley, Kay, & Curtiss, 1981). The cognitive processes underlying the WCST are considered to involve the ability to maintain a response, problem solving, cognitive flexibility (Greve et al., 2002) and working memory (Hartman, Steketee, Silva, Lanning, & Andersson, 2003). High numbers of perseverative errors, where the respondent fails to make changes in their behaviour in response to feedback, is indicative of cognitive inflexibility or simply the inability to “shift”, although as previously mentioned cognitive flexibility is recognised as more than just set shifting.

The Alternate Uses Test (Guilford, Christensen, Merrifield, & Wilson, 1978) is proposed to measure spontaneous cognitive flexibility (i.e., a generative ability), providing additional information to the WCST (Bush, Novack, & Schneider, 1999). The test requires participants to generate up to six alternate uses for common objects such as a car tyre. In addition to these tests, components of measures assessing the broader construct of executive function also appear to assess cognitive flexibility. These include the Trail Making Test Part B (Kortte, Horner, & Windham, 2002), the Stroop Test (Strauss et al., 2006) and measures of verbal fluency (Borkowski, Benton, & Spreen, 1967) among others. Ionescu (2012), provides a comprehensive review of task-based measures of cognitive flexibility for both adults and children.

In addition to these neuropsychological measures of cognitive flexibility, there have been self-report measures developed which are described as assessing cognitive flexibility. Their development has arisen from the requirement to quantify cognitive therapy efficacy and appear to have a very different focus than the traditional objective task-based cognitive measures already described. Recent cross validation between neuropsychological measures of cognitive flexibility and self-report measures have indicated predominantly weak relationships between them (Johnco, Wuthrich, & Rapee, 2014), suggesting that they are not measuring the same construct or cognitive process.

Despite the weak association with task-based measures of cognitive flexibility, self-report measures may provide a link to the construct of psychological flexibility as they have been developed from a clinical psychology perspective. These self-report measures include the Cognitive Flexibility Inventory (CFI: Dennis & Vander Wal, 2010) and the Cognitive Flexibility Scales (CFS: Bilgin, 2009; Martin & Rubin, 1995). The CFI has been developed to measure the flexibility required to adequately

challenge unhelpful thought processes as promoted in CBT and has a problem-solving orientation. The CFS for adults encompasses behavioural concepts including "an awareness of options and alternatives, a willingness to be flexible and adapt to the situation and self-efficacy in being flexible" (Martin & Rubin, 1995 p. 623). The CFS for adolescents (Bilgin, 2009) purports to measure the flexibility of adolescents with regard to themselves, others and their environment by having respondents rate opposite adjective pairs (e.g., cowardly/brave; bad/good) on a 5-point Likert scale.

The goal of these self-report measures encompasses a broader spectrum of cognitive flexibility than neuropsychological task-based measures which are reductionist, assessing quite focussed tasks. If both these types of measures are assessing cognitive flexibility, it suggests that the construct is broader than what is implied by the use of traditional task-based cognitive tests alone.

2.3.5 Treating impairments in cognitive flexibility

Treatments targeting impairments in cognitive flexibility are subsumed by the broader treatment of executive dysfunction and both cognitive remediation and pharmacological interventions have yielded improvements in executive function after a TBI (McDonald, et al., 2002). The efficacy of pharmacological interventions are mixed and medications do not target specific cognitive deficits (Schillerstrom, 2009). Although initial findings from cognitive remediation are positive, it is a costly, intensive intervention and requires a high number of treatment sessions (e.g., 40) in order to ensure skill development and behavioural change. Also, skill development from cognitive remediation training has shown limited generalisability to functional real-world settings (Ownsworth & Fleming, 2005).

Looking at studies which included a more heterogeneous sample, improvements in cognitive flexibility were demonstrated in an ABI sample which included a proportion of participants with TBI (n=33/75) (Spikman, Boelen, Lamberts, Brouwer, & Fasotti, 2010). The study investigated various executive functions of which flexibility was one component. Two groups received different types of cognitive training (20-24 one-hour sessions). Both groups demonstrated similar improvements in flexibility over time as measured by the Stroop Test but there were no significant differences found between the two groups.

Shorter treatment programmes (five sessions) though have also been found to be effective in improving executive function after a TBI using a task shifting exercise (Stablum, Umiltà, Mazzoldi, Pastore, & Magon, 2007). A review of treatments to address impairments in cognitive flexibility in other clinical populations (schizophrenia, pathological gambling, anorexia nervosa) indicates that both pharmacological interventions (Grant, Chamberlain, Odlaug, Potenza, & Kim, 2010; Pardo et al., 2011) and cognitive remediation (Delahunty, Morice, & Frost, 1993; Tchanturia, Davies, & Campbell, 2007; Wykes et al., 2007) can be effective.

In summary, there is evidence that cognitive remediation maybe effective for impairments in executive functions (Cicerone et al., 2011). Treatments that specifically target impairments in cognitive flexibility after a TBI need development (Chung, Pollock, Campbell, Durward, & Hagen, 2013) and how this links with psychopathology also merits further investigation.

2.3.6 Mental processes involved in psychological flexibility

Psychological flexibility is defined as the ability to connect with the present moment and experience the thoughts and feelings without unhelpful defence, and to

persist in action that is consistent with values, or change that action when the situation demands (Hayes et al., 2003). This conceptualisation incorporates the behavioural component of committed action, which makes psychological flexibility more comprehensive than just *acceptance* (Bond et al., 2011). It also appears to be independent of other constructs of psychological distress, such as anxiety and depression, as defined by symptom-based self-report measures (Gloster, Klotsche, Chaker, Hummel, & Hoyer, 2011). This definition has two components, acceptance and a behavioural component of committed action. The latter component seems to be consistent with how cognitive flexibility is defined suggesting at a definitional level, cognitive flexibility is a component of psychological flexibility.

Kashdan and Rottenberg (2010), provide a broad conceptualisation of psychological flexibility where they delineate three core components. The first component is executive functioning such as the ability to rapidly shift cognitive set and thereby attention, indicating overlap with the construct of cognitive flexibility. The other two components relate to the individual's ability to achieve a balanced or default state (namely a type of psychological equilibrium) and underlying personality traits such as neuroticism, positive affect, openness to experience and self-control.

Despite psychological flexibility being represented as a multicomponent construct (Figure 1), results from factor analysis of instruments such as the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011), designed to assess the six core processes targeted in ACT, are best explained by a one-factor solution. This outcome supports the premise of a unidimensional, overarching construct of psychological flexibility (Bond et al., 2011). The specific mental processes involved in psychological flexibility are not fully understood but are proposed to involve attention and short-term memory (Kashdan & Rottenberg, 2010). The behavioural

component of psychological flexibility involves goal setting and planning reflecting higher order executive mental processes.

The ACT model of psychological flexibility implicates a number of distinct mental processes. The mindfulness component used in ACT engages processes on the left side of the hexaflex (see Figure 1) such as defusion and contact with the present moment. Mindfulness has been extensively studied in recent years, as the benefits of mindfulness-based psychological treatments have been scrutinised. Mindfulness can be described as a psychological state where an individual regulates their attention to present-moment awareness and adopts a non-judgemental orientation towards those experiences (Ruiz, 2012). The mental processes underlying mindfulness are proposed to include both focussed and selective attention (Shapiro, Carlson, Astin, & Freedman, 2006). The heart of mindfulness is the open awareness and acceptance of ongoing experience in a non-judgemental way (Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008; Hölzel et al., 2011).

2.3.7 Neural substrate of psychological flexibility

Generally, the neural substrate of psychological flexibility has received limited research attention. However, some studies have assessed the practice of mindfulness. Engagement in mindfulness meditation has been shown to decrease activity in the right medial prefrontal cortex (Ives-Deliperi, Solms, & Meintjes, 2011) while activation occurs in the dorsal medial prefrontal cortex and the rostral anterior cingulate cortex (Chiesa & Serretti, 2010; Hölzel et al., 2007; Vago & Silbersweig, 2012). Using different meditative tasks (narrative or experiential), activated different and very complex neural networks (Farb et al., 2007) making it difficult to make generalisations about the neural substrate involved in meditative tasks.

Another component of psychological flexibility that has received some neuroimaging research attention is experiential avoidance, which is the mirror opposite of psychological flexibility. This may provide additional insights into the potential neural basis of psychological flexibility. For example individuals rated high in neuroticism who engaged in higher levels of harm avoidance, displayed greater activation of the right anterior insula when exposed to risk-taking decisions than those lower in neuroticism (Paulus et al., 2003). Avoidance of aversive stimuli (losing money) has been found to activate the medial orbitofrontal cortex (Kim, Shimojo, & O'Doherty, 2006).

The identification of a specific neural mechanism associated with psychological flexibility is complex but it appears to suggest overlap with those associated with cognitive flexibility (e.g., the prefrontal cortex). However, as there are limited studies, that have addressed only components of psychological flexibility, it is difficult to draw strong conclusions about the association with cognitive flexibility. The contextual approach proposed by ACT, where the individuals are viewed within their own environment, suggests a dynamic process which would indicate a wider neural network than is currently reported in the literature. Further research into this area is warranted in order to provide greater clarity of the neural substrate of psychological flexibility.

2.3.8 Mental health implications for impairments in psychological flexibility

Impairments in psychological flexibility have been associated with psychopathology and measures of psychological flexibility are related to a number of self-report measures of psychological distress (Bond et al., 2011). This inverse relationship between self-reported distress and psychological flexibility has also been

established in individuals with an acquired brain injury (ABI; Whiting, Deane, Ciarrochi, McLeod, & Simpson, 2015). Acceptance-based therapies such as ACT have a theoretical foundation in Relational Frame Theory (RFT). Broadly, RFT posits that language and higher cognition is based on the relationships humans build between objects (Barnes-Holmes et al., 2001; Hayes et al., 2003). Rigidity or automaticity (a lack of flexibility) in these relationships can lead to psychopathology (Barnes-Holmes, Barnes-Holmes, McHugh, & Hayes, 2004).

The link between impairments in psychological flexibility and psychopathology has been demonstrated across a number of disorders (Chawla & Ostafin, 2007; Kashdan & Rottenberg, 2010), including depression (D'Antonio, Tsaousides, Spielman, & Gordon, 2013), eating disorders (Fann, Uomoto, & Katon, 2001; Masuda, Price, Anderson, & Wendell, 2010) and anxiety (Bjelland, Dahl, Haug, & Neckelmann, 2002). This reflects similar relationships that have been established between psychopathology and impairments in cognitive flexibility providing further evidence of overlap between the constructs.

2.3.9 Measuring psychological flexibility

The measurement of psychological flexibility is undertaken by self-report measures. It has been suggested this needs to be extended to include observation and implicit measurement, where the participants are not aware of the outcome of the measure, in order to give a more thorough assessment of psychological flexibility (Gloster et al., 2011). Furthermore it is recommended that measures need to cover emotional, cognitive and behavioural aspects in order to fully capture psychological flexibility across all domains (Ben-Itzhak, Bluvstein, & Maor, 2014).

One of the main outcome measures in treatment trials of ACT is the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) which claims to assess psychological flexibility/inflexibility, although indirectly, by measuring processes associated with psychological flexibility (Ciarrochi, Bilich, & Godsell, 2010). Recently, confirmatory factor analysis of the AAQ-II identified psychological flexibility as a unitary construct that is distinct from other psychological constructs such as depression and anxiety. It also explained additional variance in impairment and functionality in a clinical population (Gloster et al., 2011). However, at least one study has raised questions about the ability of the AAQ-II to discriminate between psychological flexibility and measures of psychological well-being (Tsaousides et al., 2013). It was found that the AAQ-II items were more strongly related to other items of distress than items that measured acceptance. Wolgast (2013) suggested this is a problem in how psychological flexibility has been operationalised as it may be a dynamic psychological process that is not easily captured by static, self-report measures. Such views also support the contextual nature of psychological flexibility.

The Avoidance and Fusion Questionnaire (AFQ; Schmalz & Murrell, 2010) is a measure of experiential avoidance which is a major component of psychological inflexibility. The AFQ has been validated in both child and adolescent populations (Greco, Lambert, & Baer, 2008) as well as an adult college sample (Schmalz & Murrell, 2010). In the college sample, the AFQ was moderately negatively correlated with the AAQ-II suggesting they are related but also capture slightly different constructs. The AFQ is thought to be more representative of cognitive fusion and avoidant behaviours while the AAQ-II is considered to be a more general measure of acceptance/avoidance. As such the AFQ has been recommended for use in

conjunction with the AAQ-II as an outcome measure in ACT treatment trials (Schmalz & Murrell, 2010).

Often in ACT research, the measurement of psychological flexibility involves adapting existing questionnaires (e.g., AAQ-II) so that the content is specific to targeted disorders and populations. This enables measurement of the acceptance an individual is experiencing specific to the particular condition or context. In addition to the generic AAQ-II, there are now measures of psychological flexibility for health conditions such as diabetes (Gregg, Callaghan, Hayes, & Glenn-Lawson, 2007) and pain (McCracken, Vowles, & Eccleston, 2004).

A measure for people with an ABI, the Acceptance and Action Questionnaire for Acquired Brain Injury (AAQ-ABI; Whiting, Deane, Ciarrochi, et al., 2015), has recently been validated. The nine item AAQ-ABI poses questions specifically targeted to address acceptance and experiential avoidance associated with reactions about having an ABI. The goal is to assess avoidance and acceptance of thoughts, feelings and behaviours that may arise as a result of incurring a brain injury (e.g., "I stop doing things when I feel scared about my brain injury"). The measure has been developed for people with cognitive impairments and features the use of simplified language and a shorter 5-point Likert scale (as opposed to a 7-point Likert scale on the AAQ-II).

2.3.10 Treating impairments in psychological flexibility

As discussed there is some research into cognitive flexibility after TBI but few studies about psychological flexibility which is still in its preliminary stages (Sylvester, 2011; Whiting, Simpson, Ciarrochi, & McLeod, 2012). ACT treatment trials have a focus on either reducing or increasing a behaviour or emotion within a

specific context and such changes are thought to be indicative of psychological flexibility (Levin, Hildebrandt, Lillis, & Hayes, 2012), for example, a reduction in smoking behaviour (Bricker, Wyszynski, Comstock, & Heffner, 2013).

The limited research in brain injury, includes an ACT intervention that was successfully implemented to increase participation and adaptive functioning in adolescents and adults (aged 15-59 years) who had acquired their brain injury before the age of 18 years (82% TBI) (Sylvester, 2011). Although the study found improvements in psychological flexibility, the self-report measure to assess this outcome had not been validated. In another study, improvements in psychological flexibility (as measured using the AAQ-ABI) were achieved using an ACT intervention with two men with a severe TBI (Whiting, Simpson, Ciarrochi, et al., 2012). Both participants, who displayed impairments in cognitive flexibility (TMT), showed improvements in their psychological flexibility and one participant exhibited significant decreases in psychological distress, while the second reported an increased participation in valued life activities.

Broadening the focus to investigate mindfulness-based therapies after TBI reveals mixed findings. Specifically the treatments used with TBI have included mindfulness-based stress reduction (MBSR) to improve quality of life (Bédard et al., 2003) and to address mental fatigue (Johansson, Bjuhr, & Rönnbäck, 2012), although the latter sample included people who had experienced a stroke (55% of the sample). Mindfulness treatment was found to be ineffective in improving cognitive impairments, specifically improving attentional problems in a TBI population (McMillan, Robertson, Brock, & Chorlton, 2002). The treatment also had no impact on self-reported anxiety or depression levels but it should be noted that all pre-treatment scores across the groups were at or below the cut off for caseness.

A recent randomised controlled trial implemented mindfulness-based cognitive therapy (MBCT) to treat depression after a TBI (Barbey et al., 2013). Significant reductions in self-reported depression and improvements in levels of acceptance as measured on the Philadelphia Mindfulness Scale (Cardaciotto et al., 2008) were found. The generalisability of this research to the TBI population is confounded by the limited description of the participants with regard to their TBI. No measure of cognitive function or severity of the TBI, (e.g., post-traumatic amnesia or Glasgow Coma Scale score), was reported making it unclear whether this therapy mode might be suitable for those suffering severe to extremely severe cognitive impairments.

Due to the limited research in treating impairments in psychological flexibility after a TBI, it is worth drawing on research in other populations in order to clarify its potential benefits with a TBI population. Empirical outcome research using ACT, which promotes psychological flexibility as a treatment outcome, in health/clinical psychology has been growing exponentially. The research has yielded positive results with effect sizes ranging from .20 to 2.91 at follow up (see Ruiz, 2010 for a recent review). Although the early studies comparing ACT and CBT tended to lack experimental rigour (Ost, 2008), a meta-analysis comparing ACT with CBT found that ACT performed better than CBT on outcome measures in 69% (11 out of 16) of the studies in the review (Ruiz, 2012). Other studies have indicated that ACT produced similar outcomes to CBT in anxiety disorders although the mechanisms of change maybe different (Bjelland et al., 2002).

ACT has been used successfully with a range of different populations including psychotic patients (Bach & Hayes, 2002) and chronic pain clients (Dahl, Wilson, & Nilsson, 2004). It has also proved to be efficacious for people presenting with anxiety and depression (Forman, Herbert, Moitra, Yeomans, & Geller, 2007) and

with chronic health problems such as diabetes (Gregg et al., 2007) and tinnitus (Westin, Hayes, & Andersson, 2008). The effectiveness of ACT with chronic health conditions suggests it may be suitable for dealing with the complex adjustment process post-TBI as types of chronic health conditions studies also require acceptance of persistent and uncontrollable symptoms similar to what is required after a TBI.

2.4 Commonalities and Differences between Cognitive and Psychological Flexibility

The review suggests that overall, psychological flexibility is not wholly dependent upon cognitive flexibility (see Table 3 for a summary). The process of refining the construct of psychological flexibility though, is still a work in progress and the conceptualisation may tighten over time. Cognitive flexibility has a much larger and more well-established evidence base than psychological flexibility which, as a construct, has mainly been derived from the ACT movement. Although, Kashdan and Rottenberg (2010) suggest that psychological flexibility has been known about for over 50 decades, but possibly by different names such as ego-resiliency and self-regulation. On an definitional level, psychological flexibility appears to be more abstract but on investigation, cognitive flexibility for functional measurement purposes has been reduced to shift setting but tends to mirror the more abstract definition of psychological flexibility (Ionescu, 2012).

The current literature suggests there were both commonalities and differences in the conceptualisation of the two constructs. Central to both is the notion of behavioural change (whether an action or a thought) in response to environmental changes. A notable conceptual difference between the two constructs appears to be

around the components of acceptance and the self-as-context. Cognitive flexibility involves adapting to changing environmental cues, while psychological flexibility encompasses more. Individuals are also able to see themselves as separate from their experiences and emotions and when it is optimal, are able to sit and accept these experiences rather than engaging in behavioural change or experiential avoidance.

Table 3. A summary of constructs of cognitive and psychological flexibility

Construct	Cognitive Flexibility	Psychological Flexibility
Domain/discipline	Neuropsychology/neuroscience	Clinical psychology
Clinical populations	Studied in brain damaged and other clinical populations	Studied in both clinical, health and nonclinical populations
Definition	Restricted and broad definitions provided	Broader definition – includes *acceptance*
Investigation of neurophysiology	Neuropsychological testing Neuroimaging	Self-report measures Correlational studies Limited neuroimaging
Mental processes	Shifting set, attention, goal identification, using feedback, monitoring, perception and stored knowledge	Limited research but appears to involve, attention, working memory and executive functions
Neural substrate (regions of the brain)	Neural basis well defined activation in prefrontal cortex None in occipital regions	Neural basis less clearly specified Some elements established
Clinical implications for therapy	Well established strong relationships with psychopathology Antecedent, maintaining factor and consequence of psychopathology	Emerging strong relationships with psychopathology and chronic health conditions
Association with psychopathology	Schizophrenia, depression, anxiety, eating disorders, bipolar disorder	Depression, eating disorders and anxiety
How the construct is measured	Objective neuropsychological tasks Self-report measures	Self-report measures
Assessment approaches	Wisconsin Cart Sort Test (WCST)[a] Trail Making Test[b] Similarities (WAIS-IV)[c] Stroop test[d] Cognitive Flexibility Scale (CFS)[e] Cognitive Flexibility Inventory (CFI)[f]	Acceptance and Action Questionnaire (AAQ-II)[g] and variations

[a]Heaton et al. (1981); [b]Reitan (1958); [c]Wechsler (2010); [d]Strauss et al. (2006); [e]Martin and Rubin (1995); [f]Dennis and Vander Wal (2010); [g]Bond et al. (2011).

There is also overlap in the constituent mental processes (e.g., attention), however, initial research indicates that psychological flexibility appears to involve a broader range of mental processes. Also, more research has investigated the neural substrate of cognitive flexibility, with key areas of the frontal lobes and the complex connections involved activating a wider network with increased complexity of the task. Initial work done in the areas of psychological flexibility suggests that various processes are distributed quite widely over the brain, activating additional areas to those identified in cognitive flexibility. This may mean that acceptance-based therapies such as ACT are lower in cognitive demand as they rely less heavily on cognitive functions commonly affected by the brain injury such as shifting response set and adapting to feedback (Heled et al., 2012; McDonald et al., 2002; Niemeier et al., 2007).

In terms of assessment, investigations into cognitive flexibility have rested on objective measures, although questions about the ecological validity of such measures in their prediction of functioning outside the testing environment have been raised (Burgess et al., 2006). Operationalising cognitive flexibility from these task-related measures that have used a reductionist approach, fails to take into account the broader context in which the behaviour occurs. The self-report measures of cognitive flexibility are confined to specific applications in the area of cognitive therapy and have limited overlap with objective measures of the construct (Johnco et al., 2014). Psychological flexibility self-report measures are contextually based but are often focussed on flexibility around a specific issue or disorder and no objective ways to measure psychological flexibility have been developed to date.

Other commonalities between the two constructs, arises from the mental health implications of impairment in either domain. There is a strong association between psychopathology and impairments in either domain which has been well documented across a range of disorders. Interventions that address impairments in these areas indicate some differences. Cognitive remediation and pharmacological interventions have been found to be effective in treating impairments in cognitive flexibility while psychological flexibility is increased through psychotherapy interventions, specifically acceptance-base therapies. There is no research into how psychopathology and impairments in both domains interact or, whether ACT interventions to treat psychopathology result in increased cognitive flexibility. Both areas are in need of further investigation.

Finally, there are a small number of studies that have explored the association between the two constructs. One study found cognitive inflexibility (measured by self-report) was positively related to experiential avoidance (measured by the Acceptance and Action Questionnaire) in a sample of young women suffering from interpersonal victimisation (Palm & Follette, 2011). Experiential avoidance fully mediated the relationship between cognitive flexibility and measures of psychological distress. The authors suggested that an inability to think flexibly resulted in higher levels of psychological distress through increased experiential avoidance. Although this study found an association between the two constructs, the measure of cognitive flexibility utilised was the Cognitive Flexibility Scale (CFS; Martin & Rubin, 1995). The CFS assesses a person's awareness of thoughts and behaviours for a given situation and the willingness to consider alternatives. A recent validation of the CFS found a weak or no relationship with neuropsychological measures of cognitive flexibility (Johnco et al., 2014). This raises questions about

whether the task-related or the self-report measures of cognitive flexibility are adequately capturing cognitive flexibility.

Other research providing some tenuous links between cognitive and psychological flexibility involves implementing mindfulness to improve cognitive ability. When studied in healthy populations, mindfulness has been associated with improved executive control (Teper & Inzlicht, 2013) and increased cognitive flexibility, as measured by Stroop tasks (Moore & Malinowski, 2009). Specifically, individuals who engaged in meditation made fewer errors on the Stroop and path analysis showed that this effect was mediated by increased emotional acceptance (Teper & Inzlicht, 2013). Although attention has been found to improve after undertaking short-term mindfulness training, other components of executive control, such as cognitive flexibility (as measured by task-based tests), did not significantly improve (Semple, 2010). In a systematic review encompassing 23 studies, it was concluded that there is some support that the regular practice of mindfulness enhances cognitive function but specific domains such as cognitive flexibility were not described (Chiesa, Calati, & Serretti, 2011).

The link between mindfulness, psychopathology and cognitive flexibility has recently been reported (Lee & Orsillo, 2014). Partial improvements in cognitive flexibility (as assessed by the Stroop Test) were found after practising mindfulness or focussed relaxation with individuals diagnosed with generalised anxiety disorder (GAD). In addition state anxiety also decreased after the intervention (in both mindfulness and relaxation groups) and this was significantly different to those individuals with GAD who engaged in a thought wandering task.

Although direct comparisons of cognitive and psychological flexibility are rare, available studies suggest associations between component processes of psychological

flexibility with aspects of cognitive flexibility. There is still a need to further quantify this relationship in healthy, clinical and TBI populations. The implications of impairments in cognitive and psychological flexibility in implementing acceptance-based therapies with individuals with a TBI will now be explored and discussed.

2.5 Implications for treatment after TBI

Impaired cognitive and psychological flexibility after a TBI often results in the use of ineffective coping strategies to manage the post-injury changes (Krpan, Levine, Stuss, & Dawson, 2007). Impaired flexibility can contribute to behavioural problems, emotional difficulties and provide challenges in returning to pre-injury functioning (Lillis, Hayes, Bunting, & Masuda, 2009). The impact of psychological distress after a TBI in conjunction with cognitive impairments can create challenges for recovery. It has been proposed that people need to redefine themselves after their TBI by incorporating both their cognitive and physical limitations (Whitehouse, 1994).

Treatments to address psychological distress after a TBI have included CBT and although reviews have shown mixed results overall CBT is considered efficacious (Cattelani et al., 2010; Fann et al., 2009; Tsaousides et al., 2013). There has been recent evidence that CBT can successfully be modified to account for the cognitive impairments after a severe TBI (Simpson et al., 2011). One criticism of CBT for individuals with cognitive impairment is the requirement to engage in cognitive restructuring that involves challenging unhelpful thought processes (Kinney, 2001). This process requires individuals simultaneously to hold the thought in their head, seek alternative thoughts, and reason and rationalise in order to generate a more appropriate response. These strategies are particularly difficult to implement for

those with cognitive impairments (Anson & Ponsford, 2006b). This process also involves cognitive defusion, an important mediator of change identified for both CBT and ACT, albeit in a non-TBI populations (Forman et al., 2012; Ylvisaker, 1998). Cognitive defusion is a way of allowing individuals to change the function of their thoughts rather than the content or meaning (Hayes et al., 2003). The mechanisms by which CBT and ACT implement cognitive defusion are theorised to be different and these differences particularly from an ACT perspective, offer opportunities for individuals to be able to compensate for cognitive impairments (Fleming, Winnington, McGillivray, Tatarevic, & Ownsworth, 2006).

In ACT, the approach to cognitive defusion removes the need for intellectualising and reasoning. It allows individuals to create distance from their thoughts without engaging in them and the processes used can be quite concrete. Examples exercises include the repetition of a word over and over again (e.g., Milk, milk, milk exercise) or saying the word aloud using a silly voice. These exercises demonstrate how the impact and perceptions of particular language can be changed helping people recognise the possibility of modifying the emotional valence of language.

Individuals with a severe TBI are likely to be quite concrete in their thinking and have difficulty understanding abstract concepts (Salas et al., 2013). Other strategies involve creating a physical or concrete presence for the thought, “physicalising the thought”, where the person is asked to give the thought physical attributes such as shape, colour and texture. The use of metaphors also allows the therapist to move the abstract to the concrete in order to create defusion. An example is the “Passengers on a bus” metaphor which is used to demonstrate how thoughts, memories and past experiences can cause you to detour from moving towards what you value. The individual is represented by the bus driver, and the internal thoughts, feelings and

past experiences are the passengers who become increasingly vocal when you move towards your valued direction. When you detour or turn away from the valued direction, the voices quieten. Both pictorial representations of the metaphor can be presented to the client, or it can be role played in small groups. This multimodal approach to therapy allows the therapist to make modifications to account for individual differences in cognitive impairment.

Another area where ACT may be useful after a TBI is the process of accepting difficult thoughts and emotions. The thoughts experienced by people with a severe TBI may not be irrational or be appropriate for challenging in the context of them having undergone a significant event which will have a lasting impact on the rest of their lives (deGuise et al., 2008). ACT shows people how to sit with distressing thoughts and emotions but still engage in values-based behaviour, this particular facet of ACT has been used successfully with chronic, unchangeable health conditions such as diabetes and fibromyalgia (Makvand Hoseini, Rezaei, & Azadi, 2014; Shapiro et al., 2006).

There are a number of similarities between ACT and other therapy modalities that have proved efficacious after TBI, providing additional evidence that ACT is likely to be appropriate for this population group. Ingredients of motivational interviewing, which has been successfully used with a TBI sample (Hsieh, Ponsford, Wong, Schönberger, et al., 2012), include a focus on values-guided behaviour and are ACT-consistent (Stuss, 2011). Similarly, other key therapy components including behavioural activation, building of awareness and experiential acceptance are common across a number of therapy modalities including ACT and have been shown to be an effective component for change (Chiesa & Serretti, 2010; Farb et al., 2007; Forman et al., 2012; Vago & Silbersweig, 2012; Ylvisaker, 1998).

Investigations of individual components of ACT further, suggest that it is consistent with the post-TBI adjustment process. Post-TBI adjustment has been described as involving emotional acceptance of the impairments into the patient's self-concept in addition to adaptations to behaviour and successful social reintegration (Antonak, Livneh, & Antonak, 1993). This adjustment seems to reflect components of psychological flexibility, specifically the acceptance and "self–as-context" processes of the psychological flexibility model (Hayes et al., 2006). Self-as-context requires a person to distinguish themselves as separate from their thoughts or feelings, which helps to create awareness and reduce the attachment to the conceptualised self. A person may have a conceptualised self as being "the comedian" in social situations, always making people laugh. After the injury, due to their cognitive impairments, they are no longer able to play this role resulting in avoidance of social situations with increased feelings of sadness and loss. Thus, impairments to self-concept commonly seen following TBI would require this element of psychological flexibility to increase awareness and further facilitate adjustment post-injury as individuals come to terms with their post-injury self. These components of psychological flexibility may be the defining differences from cognitive flexibility and indicate why psychological interventions can be effective after a TBI.

Self-awareness may also be an important consideration in the relationship between cognitive and psychological flexibility. Impairments in awareness after a TBI are not consistent across all domains with lack of awareness being more evident in emotional/behavioural and cognitive domains (Fann et al., 2009). Impaired self-awareness impacts on engagement in rehabilitation (Fischer, Gauggel, & Trexler, 2004), improves over time after sustaining an injury (Hart, Seignourel, & Sherer,

2009; Ownsworth, Desbois, Grant, Fleming, & Strong, 2006; Sabaz et al., 2014), and is related to severity of injury (Morton & Barker, 2010). Increased self-awareness after a TBI leads to more favourable rehabilitation outcomes (Ownsworth & Clare, 2006), such as improved participation and social integration (Fleming et al., 2006) despite often resulting in increased emotional distress (Chervinsky et al., 1998; Hart et al., 2009; McBrinn et al., 2008; Sabaz et al., 2014). Improvement in behavioural domains in the presence of emotional distress is suggestive of psychological flexibility. Individuals are able to engage in meaningful behaviour such as participation in valued activities despite being aware of and distressed by their post-TBI impairments. As self-awareness increases, individuals are able to accept and incorporate their impairments into their new identity and eventually move on with their lives.

Although a relationship between psychological flexibility and self-awareness is theoretically probable, no specific research was identified that had directly investigated these associations. The practice of mindfulness, used to engage core processes in ACT, is proposed to facilitate self-awareness (Vago & Silbersweig, 2012) but this relationship has yet to be explored in a sample with TBI. There are several possibilities about how the relationship between self-awareness and psychological flexibility might manifest itself.

The most likely relationship seems to be that lower self-awareness would be associated with lower psychological flexibility (as indirectly evidenced by the relationship between cognitive flexibility and self-awareness). Is it possible that some individuals could have low self-awareness and low cognitive flexibility but still be able to develop psychological flexibility? By way of example, an individual may have low awareness of their increased irritability and anger following TBI despite it

being apparent to family and friends. This behaviour is associated with low cognitive flexibility, reflected in their difficulty with changing perspectives (or set) and coming up with alternative ways of addressing problems. However, the person may be open to observing his or her emotions and sitting with them more thoughtfully despite having impaired cognitive flexibility. There is potential to learn new ways to do this (perhaps through mindfulness training). Under these circumstances there is currently low self-awareness of emotional responding, low cognitive flexibility in being able to change perspectives or come up with alternatives to problems (which might elicit angry responses), but an openness to internal experiences with the potential for these skills to improve further (psychological flexibility).

In summary, in a TBI population, it appears that impaired cognitive flexibility can lead to poor problem solving and the inability to shift to alternative solutions. Impaired cognitive flexibility is also associated with poor awareness of the deficits that occur after the brain injury. Poor psychological flexibility is evidenced by responding with the same emotional response (usually negative) to different situations. Improvements in self-awareness results in better social and vocational outcomes but are often accompanied by increased psychological distress secondary to greater awareness of deficits. Despite overlaps in definition and research findings, it is unclear whether those who have impaired cognitive flexibility are able to develop psychological flexibility and whether this is mediated or linked to self-awareness of deficits after a TBI. It is possible that increased psychological flexibility (e.g., acceptance of thoughts and feelings) might mitigate the secondary negative effects of improved self-awareness. It remains for future research to test these potential relationships but the above theoretical and empirical considerations

highlight the probable relationships between self-awareness, cognitive flexibility and psychological flexibility.

2.5.1 Therapy modification to account for cognitive impairments

The use of acceptance-based therapies, specifically ACT, after an ABI has received two comprehensive conceptual evaluations (Kangas & McDonald, 2011; Soo et al., 2011). As a result, recommendations have been made on how to best to delivery ACT to account for the cognitive impairments displayed after a brain injury, although it should be noted that one review was in the context of mild to moderate brain injury (Kangas & McDonald, 2011). A number of these recommendations reflect practical suggestions that also apply to the modification of traditional CBT including provision of memory aids such as written notes, repeating and revising information and involving a family member (Brenner, Hoffberg, Shura, Bahraini, & Wortzel, 2013; Khan-Bourne & Brown, 2003; Ownsworth, Desbois, et al., 2006; Ponsford et al., 2013; Whitehouse, 1994). Table 4 provides an outline of existing recommendations for therapy modifications for both cognitive therapy and CBT. A more comprehensive review of cognitive impairments commonly displayed after brain injury with corresponding strategies and therapy adaptations is provided by Ownsworth (2014).

Therapy modifications that are more specific to ACT (see Table 4) include maintaining a therapy focus on the behavioural change processes (see Figure 1) such as identification of values and committed action (Soo et al., 2011). ACT excels at transforming the abstract into the concrete. There is an extensive library of metaphors available, enabling the opportunity to select metaphors that are both tangible and personally meaningful for the individual. A number of metaphors have

been captured in pictures or created into short videos by members of the ACT community, making them readily accessible for therapists. It is also recommended that therapists using ACT demonstrate flexibility by allowing individuals with a TBI to develop their own meaning from the metaphor.

Table 4. Suggested therapy modifications to account for cognitive impairments

Strategy	Reference
General strategies for CBT and ACT	
Shorten length of the sessions	3, 5, 8
Using memory aids e.g., written notes, cue cards, recordings	2, 3, 4, 6, 7, 8
Simplification of tasks	1, 4, 8
Increased frequency of sessions	5
Summarising and reviewing content regularly	1, 2, 4, 8
Focus on behavioural techniques	1,7
Involve a family member in the therapy process	1, 2, 3, 5, 8
Initial sessions focus on educating, normalising and validating	6, 7
Training to enhance other skills e.g., social skills	7, 8
Concrete examples as opposed to abstract	3, 4, 7, 8
Modelling of assignments by therapist and patient	1
Highly structured session content	2, 8
Repetition and slowed presentation	2, 3, 7, 8
Being directive in the discussions & with therapy	3, 4
ACT specific	
Using personally relevant and concrete metaphors	9
Engaging in experiential exercises including role playing	9
Defusion techniques that are concrete e.g., Physicalising the thought (Hayes et al., 2003)	9
Focus on behavioural activation components	7
Providing tangible ideas e.g., Card sorting task from the Survey of Life Principles 2.2 (Ciarrochi & Bailey, 2008)	9
Promotion of values-based, goal-directed behaviour	9
Shorter mindfulness exercises	10
Allowing client to develop their own meaning from metaphors	

1. Hibbard (2006), 2. Whitehouse (1994), 3. Ponsford et al. (2013), 4. Klonoff (2013), 5. Khan-Bourne and Brown (2003), 6. Kangas and McDonald (2011), 7. Soo et al. (2011), 8. Ownsworth (2013), 9. Whiting, Simpson, McLeod, et al. (2007), 10. Bédard et al. (2013).

2.6 Conclusion

Psychological flexibility appears to be linked to health and well-being and is a goal of treatment for acceptance-based therapies such as ACT. This review has identified an overlap between the constructs of cognitive and psychological flexibility at several levels: (1) There is a significant definitional and conceptual overlap. (2) There is also preliminary evidence of overlap in terms of associations with neurological functioning and the location of brain activity associated with tasks that demand cognitive and psychological flexibility. (3) Impairments in both constructs have demonstrated a complex relationship with psychopathology. (4) Extant measures have some overlap, particularly the self-report measures of cognitive and psychological flexibility but less so the neuropsychological measures. (5) Finally, variables that have been associated with important outcomes following TBI (e.g., self-awareness) have both theoretical and some empirical links to both constructs.

Both cognitive and psychological flexibility ideally lead to a change in behaviour (either a thought or an action) in response to environmental change. When a broader definition of cognitive flexibility is considered, it is more than simply the ability to switch between tasks. It incorporates additional cognitive processes including attention, memory, inhibition and other processes such as perception and previous knowledge which also interact with environmental processes (Ionescu, 2012). This indicates an even closer alignment with the broader definition of psychological flexibility in that it encompasses context, both internal and external to the person, in which the change occurs. This suggests they may be similar constructs but currently being viewed from different psychological perspectives.

It is well established that people with a TBI often suffer from cognitive inflexibility as a result of damage to their executive processes but research also indicates that they respond positively to different forms of psychological therapy (Bombardier et al., 2009; Hodgson, McDonald, Tate, & Gertler, 2005; Hsieh, Ponsford, Wong, Schönberger, et al., 2012; Medd & Tate, 2000; Simpson et al., 2011). If increases in psychological flexibility are central to improvements in such therapy outcomes, this suggests that cognitive flexibility, as measured by task-based neuropsychological tests, may not be a prerequisite for psychological flexibility. Furthermore, performance on the task-based tests currently being used to operationalise cognitive flexibility may not be a good predictor of ability to engage successfully in therapy. This provides additional support for the concerns raised about the poor ecological validity of these types of measures (Burgess et al., 2006).

Preliminary research into therapies, such as ACT which specifically promote psychological flexibility, has shown encouraging results in samples with cognitive impairments (Sylvester, 2011; Whiting, Simpson, Ciarrochi, et al., 2012). Also, acceptance-based therapies appear to be adaptable in order to account for the impairments evident after a severe TBI. Pragmatically, this would suggest that people with a TBI can "accept their negative emotions" and not "avoid them" (indicating psychological flexibility) even though they may have impairments in their cognitive flexibility. The influence of self-awareness may also need to be considered as it is associated with cognitive flexibility, and improved self-awareness appears to be an important factor for active engagement in therapy. This might suggest that increases in self-awareness may be associated with increased psychological flexibility or self-awareness plays a mediating role in the relationship.

Further research into this relationship may also contribute to our understanding of how cognitive and psychological flexibility are related.

Further research into therapies which claim to improve psychological flexibility, such as ACT, need to be undertaken in TBI populations. It may also be beneficial to understand how each component of the ACT hexaflex contributes to the development of psychological flexibility and how the processes interact. Investigations into whether approaches to compensate for impairments in cognitive inflexibility have the ability to promote “acceptance”, an important component of psychological flexibility after TBI, are warranted. Overall, there is a need for research into cognitive rehabilitation or treatment studies addressing impairments into cognitive flexibility and other executive functioning, as there is a paucity of research in this area.

Finally, undertaking further validation studies between both neuropsychological and self-report measures of cognitive flexibility and measures of psychological flexibility may assist in improving our understanding of how these two constructs are related and interact. What we might be seeing is that flexibility in psychology exists not on a continuum but as more of a network. Cognitive flexibility maybe impaired, as measured on neuropsychological tests as well as self-report measures, but the individual is still able to demonstrate psychological flexibility by adapting and responding appropriately in response to both internal and external experiences due to contextual influences.

Chapter 3: The feasibility of using Acceptance and Commitment Therapy to address psychological distress after a severe traumatic brain injury: Two case studies

3.1 Introduction

Psychological distress is common after severe traumatic brain injury (TBI). Symptoms can span depression or anxiety, traumatic stress, anger and other comorbidities (Rogers & Read, 2007), with rates as high as 50% for some types of distress (Anson & Ponsford, 2006a; Bombardier et al., 2010). Cognitive impairment (Spitz, Schönberger, & Ponsford, 2013) and challenging behaviours (Sabaz et al., 2014) also contribute to distress and post injury adjustment difficulties. These issues have been found to persist for many years after the injury, resulting in impaired psychosocial functioning (Hoofien et al., 2001).

Treatment for these various types of psychological stress becomes more clinically challenging due to co-existing cognitive impairments. There is limited evidence of the effectiveness of non-pharmacological therapies to address the complex needs of this population (Fann et al., 2009), although some support has been found for cognitive behavioural therapy (CBT). CBT has a focus on symptom reduction as the treatment outcome and as a result, tends to be disorder specific (for example; Hodgson et al., 2005; Hsieh, Ponsford, Wong, Schönberger, et al., 2012; Medd & Tate, 2000). This provides challenges for the complex psychological distress that accompanies TBI because it is often unclear which of the multiple issues should be addressed first. Treatments are needed that provide the client with skills they can utilise for a range of presenting problems.

Acceptance and Commitment Therapy (ACT) is a “third wave” behaviour therapy that aims to improve participation and engagement in meaningful life activities while accepting that this might involve a level of emotional pain. As opposed to focussing on symptom reduction, ACT seeks to promote psychological flexibility, or persisting

in behaviour in the service of valued ends (Hayes, Strosahl & Wilson, 2003). Rather than eliminating or challenging the content of unhelpful thought processes, the primary therapeutic target of ACT is to assist the individual to engage in valued behaviour in the context of that content. Therapy outcomes are focussed on these behavioural changes. For example, in a non-brain-damaged chronic pain sample, Dahl and colleagues (2004) found ACT was associated with a reduction in sick leave, even though they continued to experience chronic pain. Research into ACT has found that as result of these behavioural changes, there is often a corresponding reduction in psychological distress as a secondary outcome. The delivery of ACT is broader than just a "talking therapy". ACT also uses experiential learning through metaphors and role-plays, providing a variety of potentially useful intervention modalities for people with cognitive impairments.

ACT has proved effective in reducing inflexible behavioural responses across a number of chronic health conditions, including pain (Dahl et al., 2004; McCracken, Sato, & Taylor, 2013), tinnitus (Westin et al., 2008), obesity (Lillis et al., 2009), diabetes (Gregg et al., 2007) as well as general psychological distress (Fledderus, Bohlmeijer, Pieterse, & Schreurs, 2012). Recently, researchers have argued that ACT can be useful in TBI, if modified to account for cognitive impairment (Whiting, Deane, Simpson, McLeod, & Ciarrochi, 2015). These modifications include the provision of written material to enhance retention, the opportunity to practice experiential exercises between treatment sessions (Kangas & McDonald, 2011), and a focus on behavioural components such as committed action in conjunction with values (Soo et al., 2011).

A specific issue that may complicate the use of ACT with those who have severe TBI is its substantial therapeutic focus on psychological flexibility. Psychological flexibility involves the ability to either persist with or refrain from behaviour that moves a person away from their values depending on situational requirements (Hayes et al., 2006). It is proposed that one component of psychological flexibility is cognitive flexibility (Chawla & Ostafin, 2007; Kashdan & Rottenberg, 2010) and this is commonly impaired after a TBI (Heled et al., 2012; McDonald et al., 2002; Niemeier et al., 2007). Although it has been proposed that those with impairments in cognitive flexibility can achieve psychological flexibility (Whiting, Deane, Simpson, et al., 2015) there is a need to test this empirically in order to explore whether ACT can achieve positive treatment outcomes with individuals with a TBI.

To the best of our knowledge, there has only been a single intervention study evaluating the effectiveness of ACT for people with cognitive impairments. Sylvester (2011) reported on outcomes from a manualised programme delivered to a group of adults with ABI of mixed aetiologies who incurred their injury as a child. The intervention resulted in improved participation and decreased psychological distress, providing the first indication that ACT is feasible for individuals with cognitive impairment. A measure of participation was used to operationalise committed action, the Participation objective, participation subjective scale (POPs; Brown et al., 2004). This measure is a broad functional measure covering five domains including domestic activities and may not adequately cover the goals of committed action promoted with ACT. Also, the participants in this study were heterogeneous in both their injury circumstance (TBI, stroke, brain tumour, hypoxic and not specified) and the amount of time since the injury occurred (range 6-40 years). They present a very

different cognitive and psychological profile from individuals who incurred their injury as an adult and where the injury is relatively recent (within two years).

Three other case reports have also suggested the feasibility of employing ACT to treat people with cognitive impairments, including the treatment of post stroke anxiety (Graham et al., 2015), to promote the reduction of anxious and obsessive thoughts for individuals with cognitive impairment due to a developmental disorder (Brown & Hooper, 2009), and to reduce challenging behaviour in a person with developmental delay and psychosis (Pankey & Hayes, 2003). The results from these four studies suggest that individuals with cognitive impairment are able to engage in ACT and achieve the desired treatment outcomes.

Before moving into a clinical trial, Phase I of clinical outcome research aims to investigate whether a therapeutic effect can be detected and is often undertaken by use of case studies (Robey, 2004). This process has already been undertaken by the research previously reported using ACT with individuals with a brain injury (Sylvester, 2011). Phase II level of research is also referred to as a feasibility study and typically include either case studies or small groups (Bowen et al., 2009; Craig et al., 2008; Feeley et al., 2009). Feasibility studies may involve a pilot of the intervention, serving as a precursor to a larger study and providing the opportunity to test whether all the components of a larger trial will work (Arain, Campbell, Cooper, & Lancaster, 2010). Phase III clinical outcome research, involves testing the efficacy of an intervention (Robey & Schultz, 1998).

The proposed study extends Phase I clinical outcome research by providing some components of a Phase II study. This includes exploring a number of research parameters such as the dimensions of the therapeutic effect, refinement of both the

treatment protocol and the outcome construct and also identification of appropriate measurement instruments (Robey, 2004)

The selection of relevant outcome measures is a challenge when trialling novel and complex interventions (Craig et al., 2008). It is important to select instruments from existing tools employed with the target group that will closely measure the identified treatment outcome. It is also useful to include instruments that have been part of the standard outcome battery through which the efficacy of ACT has been previously demonstrated, albeit among other diagnostic groups. Treatment goals of ACT aim to either increase or decrease behaviours that serve an individual's values and often result in a reduction of psychological distress. Outcome measures selected to assess efficacy in ACT interventions include measures of psychological flexibility and measures of behavioural change that reflect committed action (Ruiz, 2010).

Psychological flexibility is a particularly important outcome to assess because many individuals with severe TBI have impairments in their cognitive flexibility which is thought to be a related construct (Chawla & Ostafin, 2007; Kashdan & Rottenberg, 2010). In addition, there is often avoidance of activities and a lack of engagement in rehabilitation after a TBI, due to high levels of psychological distress (Anson & Ponsford, 2006a; Bombardier et al., 2010). This highlights the importance of assessing the committed action components of ACT. A key component of committed action involves motivation to make changes to behaviour (Hoffman et al., 2010). In this study, committed action has been operationalised as both increased motivation to engage in rehabilitation and increased participation in life activities (Chervinsky et al., 1998; Tate, Simpson, Soo, & Lane-Brown, 2011).

The format of how the intervention is delivered can also be reviewed in a Phase II study (Robey, 2004). The best way to deliver therapy after TBI, either by individual or group modalities, has yet to be determined as there appear to be benefits in both delivery methods (Ownsworth, Fleming, Shum, Kuipers, & Strong, 2008). Although a small group format has been used to deliver interventions to address psychological distress after TBI (e.g. Anson & Ponsford, 2006b; Walker et al., 2010), it has been proposed that ACT be delivered in an individual format, as this was the most common delivery method in earlier published studies (Kangas & McDonald, 2011).

One delivery mode which may incorporate some elements of group process but still allow for individualisation of therapy is the use of a dyad (two participants and one therapist). A previous intervention has shown the dyad to be an effective delivery mode for psychological treatment post severe TBI (Simpson et al., 2011). Dyads are simpler than larger groups, they allow for stronger emotional expression and greater interaction (Ashman et al., 2014) but still allow opportunities to utilise a number of group phenomena such as social facilitation (Stalder-Lüthy et al., 2013). An additional benefit in implementing a small group format is the interactions with other group members may allow group members to better define their self (Topolovec-Vranic et al., 2010) which is often a challenging process after a TBI (Myles, 2004).

The main objective of this study is to explore the use of ACT with individuals with a severe TBI to address psychological adjustment. The key goals are to determine: (1) Whether ACT results in improvements in psychological functioning and; (2) To review the programme content, mode of delivery and outcome measures.

3.2 Methods

3.2.1 Design

The feasibility of the intervention was evaluated using a case study approach with two participants engaging in a group treatment programme. The design involved two main assessment points (pre and post intervention) with a subset of the measures being administered at the beginning of each weekly treatment session (sessions 1-7).

3.2.2 Participants

Two participants (P1 and P2) with a severe TBI (post-traumatic amnesia > 24 hours) were recruited from the outpatient service of Liverpool Brain Injury Rehabilitation Unit, Australia. These patients reported psychological distress resulting in a referral for psychological treatment by their Rehabilitation Specialist. The level of distress was determined using the Depression Anxiety and Stress Scale–21 (DASS-21). Participants were required to score in the moderate range or above on any of the three DASS-21 subscales. Additional inclusion criteria were: having incurred a severe TBI between the ages of 18 and 65 years, having adequate English skills to complete the scales, and having sufficient cognitive capacity to meaningfully engage in the treatment programme as determined by their neuropsychological test performance and in consultation with their treating rehabilitation team that included a medical specialist and allied health professionals. Exclusion criteria included, current drug or alcohol dependence or a premorbid psychiatric diagnosis (including schizophrenia or bipolar disorder) which was determined by a number of processes including a review of the medical file, self-report and consultation with their treating rehabilitation team.

3.2.2.1 ***Participant 1***

P1 was a 19 year old man, who had sustained a severe closed head injury (GCS score of 3/15 at the scene improving to 9/15 at hospital arrival) 20 months previously when he fell two metres from a building. An initial CT scan on the day of injury showed a right temporo-occipital and posterior fossa extradural haematoma and left frontal subarachnoid blood. He underwent an emergency right-sided temporal craniotomy to evacuate the extradural haematoma and an intracranial pressure monitor was surgically inserted. A follow-up cerebral CT scan the following day showed a new left frontal epidural haemorrhage, which required a left frontal craniotomy and evacuation. His post-traumatic amnesia (PTA) was between three and five days.

A neuropsychological assessment (see Table 5) undertaken 15-months post injury indicated deficits in attention, working memory, speed of information processing, and memory deficits. However, the assessor noted that his performance may have been hampered by anxiety and depression as he endorsed extremely high levels of psychological distress on the DASS-21. No pre morbid history of psychological problems were identified or reported. At the time of the intervention, P1 was engaged in a graded return to work programme as an apprentice electrician which was supervised by an occupational therapist. He was also involved in assessments regarding his ability to gain his driving licence. His return to work was hampered by symptoms of depression and high levels of anxiety (see Table 8 for baseline DASS-21 scores) resulting in avoidance behaviour both socially and in the work place.

3.2.2.2 ***Participant 2***

P2 was a 29 year old man who sustained his severe head injury when he fell from a moving car. On admission to hospital his GCS was assessed as 13/15 and a cerebral CT scan indicated a large left-sided occipital extradural haematoma extending into the inferior cerebellar tentorium. There was an associated fracture of the left occipital bone which extended into the mastoid and petrous areas of the temporal bone. Signs suggestive of hemotympanum were apparent and there was a widespread, predominantly left-sided subarachnoid haemorrhage. In addition there were contusions within the left temporal lobe and right frontal cortex. Duration of PTA was 17 days and P2 was 17 months post injury at the commencement of treatment.

A neuropsychological assessment was undertaken (16 months post injury) just prior to him commencing the ACT programme. This assessment indicated that P2 had a significant difference between his verbal and nonverbal intellectual abilities. He also demonstrated impairments in processing speed, planning and organisational skills, poor attention and working memory. There were deficits in his verbal ability, specifically in the areas of verbal learning and memory and verbal generativity. At baseline, P2 reported an extremely severe level of anxiety and severe levels of depression and stress on the DASS-21 (see Table 8). Test results for his neuropsychological profile are reported in Table 5. At the time of the injury, P2 was unemployed and prior to the injury had experienced difficulty in maintaining employment. He reported that he had just completed treatment for Hepatitis C and had a past history of illicit drug usage. On commencement of the ACT programme he had not yet returned to job seeking or any other occupational activities. His rehabilitation programme involved social work to support access to services and to

address family issues; physiotherapy to improve his physical tolerance for returning to work; and rehabilitation counselling to identify career goals.

Table 5. Neuropsychological profiles for both participants

Tests	Participant 1 Raw score	Participant 1 Percentile/SS (z-score)	Participant 2 Raw score	Participant 2 Percentile/SS (z-score)
Premorbid Functioning[a]		76 (Borderline)	19	76 (Borderline)
Verbal Memory				
WMS III/IV[b]				
Logical Memory I	38	9	18	7
Logical Memory II	15	7	14	7
RAVLT/CVLT-II[c]				
Immediate recall – Trials 1-5	30	(-4.2)	34	35 (T score)
Short delayed free recall			10	(-0.5)
Long delay free recall	4	(-3.7)	9	(-1.0)
Visual Memory				
WMS III/IV[b]				
Visual Reproduction I	13	84	41	12
Visual Reproduction II	8	25	27	9
Recognition	9	37	7	>75
REY Complex Figure				
Time to copy	138	>16th%ile	198	>16
Immediate	35	>16th %ile	23.5	50
Delay	19	5 (T34)	25	54
Recognition	Correct		21	42
Language skills				
COWAT (FAS)	11	(-2.71)	19	(-2.01)
Animal naming	9	(-2.57)	14	(-1.38)
Executive Skills				
WAIS III/IV[b]				
Similarities	15	7	20	7
Trails A	40	(-2.47)	38	(-1.56)
Trails B	87	(-3.00)	89	(-3.1)
WCST				
No of categories completed	6	>16%	6	>16%
Perseverative errors	5	95%	13	T51
Failure to maintain set	1	>16%	3	2-5%
Zoo Map (BADS)				
Version 1	8		8	
Version 2	8		8	
Profile Score	4 (Excellent)		4 (good)	

[a]Participant 1 WTAR= Wechsler Test of Adult Reading, Participant 2 Simple demographics predictive model, [b]Participant 1 completed the WMS & WAIS III and Participant 2 completed the WMS & WAIS IV. [c] Participant 1 completed RAVLT, Participant 2 completed CVLT-II.

3.2.3 Measures

In order to assess the benefit of the intervention, a battery of eight standardised self-report instruments measuring primary and secondary outcomes were administered as well as one proxy-report measure completed by a significant other. There is a lack of well-validated self-report measures of distress in TBI research (Whyte & Hart, 2003) and differing degrees of sensitivity and specificity has been indicated on these measures with other medical populations (e.g. spinal cord injury: Sakakibara, Miller, Orenczuk, & Wolfe, 2009). Therefore, a large number of outcome measures were selected to compensate for these issues even though there is likely to be some overlap and redundancy between items.

3.2.3.1 ***Primary outcome measures***

3.2.3.1.1 Psychological Flexibility

There were two measures of psychological flexibility administered, a brain injury context specific measure and a well validated, general measure of psychological flexibility. The Acceptance and Action Questionnaire – Acquired Brain Injury (AAQ-ABI) was used to measure both acceptance and avoidance of thoughts that may arise as a result of brain injury (e.g. *"I stop doing things when I feel scared about my brain injury."*, *"I would give up important things in my life if I could make the brain injury so away."*, *"My worries and fears about my brain injury are true."*). The AAQ-ABI uses a 5-point Likert scale (0='not at all true' to 4='very true') with scores ranging from 0 to 36. Higher scores indicate greater psychological inflexibility. The AAQ-ABI correlates highly with the Acceptance and Action

Questionnaire-II (AAQ-II) (r_s= .70, N= 75, p< .01 (Whiting, Deane, Ciarrochi, et al., 2015).

The AAQ-II (Bond et al., 2011) was also administered as it is the most commonly used measure of psychological flexibility in ACT interventions. The AAQ-II is a seven-item questionnaire utilising a 7-point Likert scale with scores ranging from 0 to 49. Higher scores reflect greater psychological inflexibility or experiential avoidance and are associated with higher levels of psychological distress. Satisfactory reliability and validity have been demonstrated across a number of samples (e.g., Cronbach's alpha ranging from 0.78 to 0.88) (Bond et al., 2011). The main difference between the AAQ-ABI and the AAQ-II relates to specific reference to brain injury in the item wording.

3.2.3.2 ***Secondary Outcome Measures***

3.2.3.2.1 Psychological distress

The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) was used to assess psychological distress. The HADS has been recommended as the scale least vulnerable to the confounding effect of somatic symptoms in the measurement of anxiety and depression after TBI and importantly, has demonstrated sensitivity to change in a TBI population (Draper, Ponsford, & Schönberger, 2007). The HADS has two subscales (7-items each) measuring self-reported anxiety and depression over the past 7 days with total scores ranging from 0-21. Scores on the subscales have high internal consistency (Cronbach's alpha = 0.90: Moorey et al., 1991) and high test-retest reliability (r = 0.92; Zigmond & Snaith, 1983).

The DASS-21 (Lovibond & Lovibond, 1995) is a 21 item self-report measure that assesses depression, anxiety and stress over the previous week using a 4-point scale.

It has been found to be sensitive to psychological distress after an acquired brain injury (Ownsworth, Little, Turner, Hawkes, & Shum, 2008) and to be effective in screening for depression and anxiety after TBI (Dahm, Wong, & Ponsford, 2013). The DASS-21 was used for a threshold measure (moderate range or above, Z score > 1) to determine participants' inclusion in the intervention as well as an outcome measure. The measure has good reliability on all three subscales and the existing factor structure was found to be replicated in samples with a severe TBI (Randall, Thomas, & Whiting, 2014).

The Positive and Negative Affect Scales (PANAS) (Watson, Clark, & Tellegen, 1988) was selected because the 20-item measure assesses both positive (10 adjectives) and negative mood (10 adjectives). Respondents are asked to rate the extent they would normally feel each emotion over the prior few weeks using a 5-point scale (where 1 = never and 5 = always). Total scores range from 10 to 50 for each subscale. The PANAS has good internal consistency on both subscales and is sensitive to short-term mood state changes (Watson et al., 1988). A short form version of the PANAS (I-PANAS-SF) that employs five words in each scale of negative and positive affect was used for weekly administration to reduce test burden. Scores on the I-PANAS-SF also have good internal consistency (Cronbach's alpha = 0.78 & 0.76; Thompson, 2007).

The General Health Questionnaire–12 (GHQ-12: Hardy, Shapiro, Haynes, & Rick, 1999) was administered to assess minor psychiatric disorders and distress. It is a self-report questionnaire with a focus on psychological components of health assessing symptoms such as concentration, anxiety, depression and confidence and has been an outcome measure used in previous ACT research (Bond et al., 2011). The GHQ has performed with better sensitivity (81%) than the DASS-D scale (57%)

and higher specificity (82%) than the DASS-A scale (64%), albeit for a different population (Sakakibara et al., 2009). The GHQ-12 uses a 4-point Likert scale with a score range of 0 to 36. The scale shows good reliability (Cronbach's α= 0.89) and test-retest correlation (*r*=0.73) (Hardy et al., 1999) and higher scores have been associated with greater psychological inflexibility (Bond et al., 2011).

3.2.3.2.2 Participation

The Motivation for Traumatic Brain Injury Rehabilitation Questionnaire (MOT-Q: Chervinsky et al., 1998) measures change in the willingness of the participant to engage in rehabilitation. The MOT-Q comprises 31-items assessing attitudes to brain injury rehabilitation using a Likert type response format. There are four subscales, Lack of Denial, Interest in Rehabilitation, Lack of Anger, and Reliance on Professional Help. Internal consistency for the total score as assessed by Cronbach's alpha was 0.91 (Chervinsky et al., 1998).

The Sydney Psychosocial Reintegration Scale-2 (SPRS-2) is a clinician or significant other rated scale of social participation. The SPRS-2 comprises 12 items rated on a 5-point Likert scale giving a global score across three domains of psychosocial outcome (occupation, relationships, independent living). The total score ranges from 0 to 48 with higher scores indicating an increasing level of independence. Internal consistency, test-retest and interrater reliability and concurrent validity have been found to be satisfactory in prior studies (Tate et al., 2011). Increases in scores on the both the MOT-Q and the SPRS-2, reflect increases in participation which is consistent with the committed action construct in ACT.

3.2.3.2.3 Quality of Life

The Short Form Health Survey (SF-12) (Ware Jr, Kosinski, & Keller, 1996) is a 12–item self-report questionnaire designed to measure a person's perceived health status and has also been described as a measure of quality of life. A secondary outcome of ACT interventions has been improved quality of life (Hayes et al., 2006). The SF-12 gives two subscales, mental and physical health with a score from 0 (worst) to 100 (best), standardised to a mean of 50 and a standard deviation of 10 in the general population. It demonstrates good reliability and validity (Ware Jr et al., 1996) and has been used to assess health status with a TBI population in large scale prevalence study (Anstey et al., 2004).

3.2.3.3 ***Weekly measures***

A subset of measures from the larger battery was administered on a weekly basis at the commencement of the therapy session. These included the AAQ-ABI, AAQ-II DASS-21 and PANAS-SF.

3.2.3.4 ***Review of programme content, mode of delivery and measures***

A data protocol was devised comprising behavioural observations, rates of participants' attendance, their ability to complete measures and their engagement in the programme content. A purpose-designed questionnaire was also used to assess homework adherence. Homework adherence is a challenging component of any intervention and reflects compliance to aspects of a programme including participants' commitment, motivation and involvement (Scheel, Hanson, & Razzhavaikina, 2004). Homework adherence provides important information about the participant's engagement and likely acceptability of the treatment content. The

homework questionnaire comprised three items and a checklist of five barriers to completing the homework (e.g., “seemed pointless”, “forgot”). The first two items were administered at the conclusion of each session after the homework tasks were presented. Participants were asked to rate their confidence and motivation to complete the homework on a 5-point Likert-type scale ranging from 1 (*Not at all*) to 5 (*Extremely*). At the beginning of the next session, participants were asked to rate satisfaction about their homework completion using the same 5-point Likert-type scale, and to identify any barriers they faced in completing the homework using the checklist. The measure was completed on six occasions at the beginning of each session (sessions 2 through 7). Session homework scores were calculated for each participant by summing the scores for the three questions covering confidence, motivation and satisfaction (total scores ranging from 3 – 15) and homework barriers, from the checklist, were collated. The measures used in the study were informally reviewed using observation of difficulties in completing measures to estimate burden on the participants. This included observing the time taken to complete the measures, participants’ comments about the measures and whether any assistance was required to complete the measures.

3.2.3.5 ***Treatment Protocol***

The treatment protocol was developed by the authors (DW, JC, and HM) who all have training and experience as ACT practitioners. The protocol was independently reviewed by an ACT therapist who also has expertise in providing ACT to individuals with an acquired brain injury. Each of the seven treatment sessions (1.5 hours per session) focused on one component of the ACT model with values work being incorporated into most sessions to assist with behavioural activation and to

promote committed action (see Table 6 for a summary). A trained clinical psychologist with eight years' experience in TBI (DW) delivered the treatment. The programme was manualised and each participant was issued with a work book covering the content of the sessions which allowed them to record notes from each session in addition to providing information about homework tasks. Session six included a review of all the previous sessions and this was repeated as a relapse prevention measure in session seven (after a one-month break). In-session tasks involved psycho-education, discussion and experiential exercises. Each session concluded with instructions for a home task (see Table 7 for examples) which was required to be completed individually between sessions and was discussed at the commencement of the next session.

Strategies were used to accommodate cognitive impairments as per clinical suggestions (Hibbard, Rendon, Charatz, & Kothera, 2005; Judd & Wilson, 2005; Kangas & McDonald, 2011; Khan-Bourne & Brown, 2003; Soo et al., 2011; Whiting, Deane, Simpson, et al., 2015). Specifically, information was presented in multiple ways, initially through verbal strategies and with visual representations in the workbook. This was reinforced by having participants discuss and feedback their understanding of the content which was then written on a whiteboard by the therapist using examples that were personally relevant to participants. The content was repeated to ensure the material was adequately encoded and then reviewed at the beginning of the following week.

Table 6. Summary of ACT treatment programme

Session No.	Session Title	Content	Experiential Exercises
1	Introduction & confronting the agenda	Group processes and guidelines Confronting the agenda - Identifying individual issues, workability - Introducing concept of homework, homework contract	Mindfulness of the breath
2	Control is the problem	Internal/external sources of control Normalcy of human suffering	Walking while telling yourself you can't Chocolate cake Let suffering get close[a] Passengers on the bus
3	Acceptance and Defusion	Defusion	Milk, milk, milk Physicalise the thought[b] Don't get eaten machine
4	Self as Context - The observing self	Separating self from thoughts/feelings/actions Introduce mindfulness	Observer[c] Chessboard metaphor Mindfulness exercise - Eating a sultana
5	Introduction of values	Difference between goals (committed action) and values	Survey of Life Principles 2.2[b] Funeral metaphor
6	Values and committed action	Engaging in committed action in conjunction with values Recap and review of each session	Recall experiential exercises and the rationale for exercise
7	Relapse prevention	Review of progress over previous 4 weeks Review course content	

Notes. [a](Wilson & DuFrene, 2009), [b](Ciarrochi & Bailey, 2008), [c](Hayes et al., 2003)

Table 7. Homework examples

Homework – Session One (Workability)

Over the next week, monitor anytime you became upset, sad, angry, worried.

1. What happened?
2. What were you thinking about?
3. What did you do to feel better?

What happened?	**What were you thinking?**	**What did you do to feel better?**
Example: Your friend rang you and wanted you to go out that night. You said no.	I will get too tired, they will think I am stupid, I will just slow them down, I will spoil their night. What if I get hurt again	Had a cigarette Yelled at my younger brother Spend the night in my room on the internet

Homework – Session Three (Physicalising the Thought)

Practise thinking about thoughts over the week that you find distressing.
Take that thought, close your eyes and repeat it in your mind

1. Imagine holding the thought in your hands in front of you
2. If it had a shape, what shape would it be
3. What colour is it
4. What does it look like
5. Does it have a smell
6. Is it heavy
7. What about the texture
8. Run your hands over it

Try to undertake this exercise at least 3 times.

3.2.4 Procedure

Following ethical approval from the Sydney South West Local Health District Human Research Ethics Committee, participants were recruited from the existing clinical psychology waiting list of Liverpool Brain Injury Rehabilitation Unit (Tate, Strettles, & Osoteo, 2004). The first two individuals who met the study criteria were offered the opportunity to take part in the programme. Treatment was delivered in a dyad and both pre-treatment measures and weekly measures (AAQ-ABI, AAQ-II, DASS-21 and I-PANAS-SF) were administered by the therapist who delivered the intervention. The post-treatment battery was administered by an independent assessor (graduate psychologist) two weeks after session seven.

3.2.5 Analysis

Aim (1): To determine the benefit of the intervention, the data were entered into a spreadsheet, and subscale scores were analysed by calculating reliable change indices (RCI) on the pre and post measures (Jacobson & Truax, 1991; Perdices, 2005). Validity data from clinical populations was used where possible in the calculation of the RCI and the reliability parameter used was the internal reliability of the scale (Evans, Margison, & Barkham, 1998). Subscale scores from only the weekly measures that demonstrated significant reliable change were graphed to enable a visual inspection of the weekly change for each participant (Kratochwill et al., 2013). Participants' behaviours during the intervention were reviewed to provide qualitative data on committed action undertaken in accordance with values. Aim (2): Data on attendance rates was calculated and behavioural observations of participants' attendance, ability to complete measures and engagement in the session content was

recorded, in addition homework completion was reviewed, discussed and aggregated homework scores calculated.

3.3 Results

3.3.1 Treatment Benefits

The results of pre and post measures with the reliable change indices for both participants are presented in Table 8 and will be reported separately for each case.

Table 8. Reliable Change scores

Measure	Rel	Mean	SD	Participant 1			Participant 2		
				Pre	Post	RCI	Pre	Post	RCI
Primary Outcome Measures									
Psychological Flexibility									
AAQ-ABI[a]	0.92	12.61	9.32	29	23	-1.61	31	21	**-2.68***
AAQ-II[b]	0.90	20.16	10.18	42	36	-1.32	35	37	0.44
Secondary Outcome Measures									
Psychological Distress									
HADS – A[c]	0.89	7.8	4.9	15	11	-1.74	16	10	**-2.61***
HADS – D[c]	0.86	6.1	4.7	14	12	-0.80	11	5	**-2.41***
DASS 21– D[d]	0.90	9.6	10.1	34[ExS]	34[ExS]	0	23[Sev]	16[Mod]	-1.55
DASS 21– A[d]	0.82	7.1	8	22[ExS]	20[ExS]	-0.42	32[ExS]	14[Mod]	**-3.75***
DASS 21– S[d]	0.89	12.1	10.3	24[Mod]	22[Mod]	-0.41	26[Sev]	20[Mod]	-1.24
PANAS – P[e]	0.87	32	7	20	16	-1.12	19	19	0
PANAS – N[e]	0.87	19.5	7	36	19	**-4.76***	34	21	**-3.64***
GHQ – 12[f]	0.89	1.27	0.52	2.5	2.42	-0.33	1.67	1.67	0
Participation									
MOT-Q[g]	0.91	17.4	20.6	26	18	-0.92	24	23	-0.11
SPRS[h]	0.89	26.57	12.45	36	36	0	32	38	1.03
Quality of Life									
SF-12V2 PCS[i]	0.86	50	10	39.5	36.9	-0.50	33.7	45.3	**2.22***
SF-12V2 MCS[i]	0.77	50	10	28.1	31.3	0.48	21.4	46.6	**3.75***

Notes. Reliability, Mean and SD where taken from TBI or clinical populations when available for the calculation of RCI. [a](Whiting, Deane, Ciarrochi, et al., 2015). [b](Bond et al., 2011). [c](Schönberger & Ponsford, 2010). [d](Randall et al., 2014). [e](Watson & Clark, 1999). [f](Hardy et al., 1999). [g](Chervinsky et al., 1998). [h](Tate et al., 2011). [i](Ware Jr et al., 1996). AAQ-ABI: Modified Acceptance and Action Questionnaire – Acquired Brain Injury, AAQ-II: Acceptance and Action Questionnaire-II, HADS: Hospital Anxiety and Depression Scale, DASS-21: Depression Anxiety Stress Scale-21, PANAS: Positive Affect Negative Affect Scale, GHQ-12: General Health Questionnaire-12: MOT-Q: Motivation for Traumatic Brain Injury Rehabilitation Questionnaire, SPRS-2: Sydney Psychosocial Reintegration Scale-2, SF-12V2: Short form Health Survey Version 2 (PCS- Physical health; MCS-Mental Health). DASS-21 Clinical ranges: N – Normal; M – Mild; Mod - Moderate; Sev - Severe; ExS - Extremely Severe.
*RCI > 1.96 is significant at $p < .05$.

3.3.1.1 ***Participant 1***

P1 demonstrated improvements across a number of outcome measures from pre to post intervention but indicated a significant reliable change on only one measure the PANAS – negative affect. During the course of treatment, P1 was involved in a motor vehicle accident (MVA) between sessions four and five, resulting in a four week break due to physical injuries (soft tissue cervical injury). Though, P1 did not show reliable change on either measure of participation, qualitatively, P1 engaged in committed action that had been set in conjunction with his values during the intervention. The identified behaviour was to return to driving after completing a formal driving assessment. This was achieved despite experiencing both elevated levels of anxiety and psychological inflexibility after being involved in a MVA.

A visual description of selected weekly measures including the Anxiety subscale of the DASS-21, the AAQ-ABI and the Negative Affect of the short form PANAS, are presented in Figure 2. Initially, P1 showed movement in the desirable direction on his weekly self-report measures, that is a gradual decrease in psychological distress (DASS-21 A, PANAS –N) and psychological inflexibility (AAQ-ABI). This change was not clinically significant as the movement was still within the same clinical range. For example, the DASS-21 anxiety scale remained within the extremely severe range. After the MVA and a break of four weeks, all weekly measures had an observable but not significant increase. When the intervention resumed the downward trend resumed and this was maintained after the planned four week break but scores did not move into a lower clinical range.

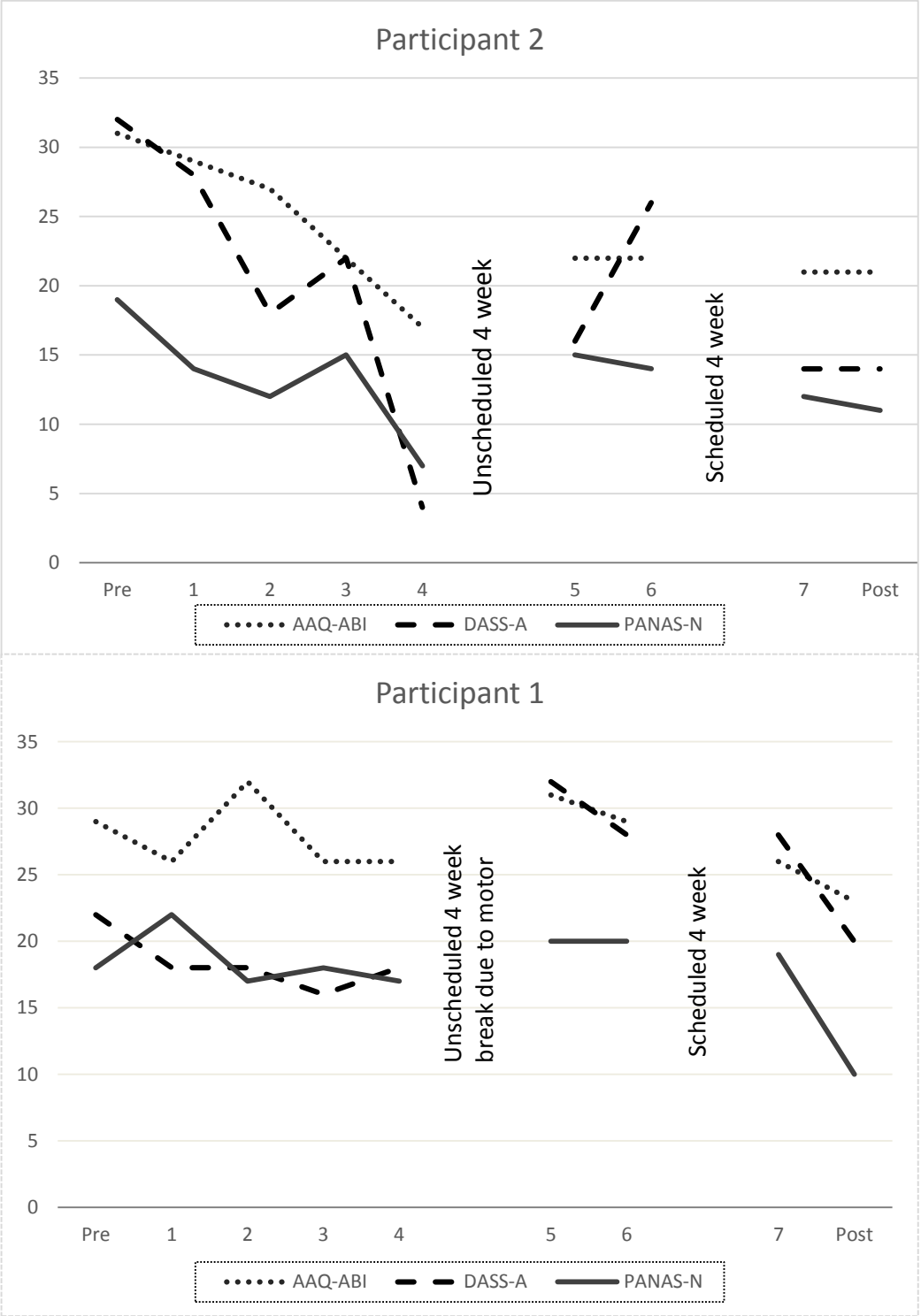

Figure 2. Weekly measures of psychological flexibility and psychological distress

3.3.1.2 ***Participant 2***

P2 reported significant decreases across a number of self report measures. These included psychological inflexibility (AAQ-ABI) and measures of mood (HADS, DASS-21 anxiety, PANAS-N). He also displayed significant increases in both the subscales of quality of life (SF-12) (see Table 8). On the Depression subscale of the HADS, P2 decreased to a score of 5 which fell below the threshold for caseness for depression (a score of 8). He also demonstrated a change in severity classification category on all the subscales of the DASS-21 from the '*extremely severe'* or '*severe*' range to the '*moderate'* range. P2 also showed improved participation with a change in score of 6.9 points on the SPRS, although this failed to reach the criterion for significant reliable change (a change of 8 points). Improved participation was also shown qualitatively as an identified value of P2 was to engage in meaningful work. P2 reported that he wanted to change his career and over the course of the programme enrolled into formal education to improve his qualifications in his chosen field.

A visual inspection of the weekly measures (see Figure 2) indicated a gradual decrease across all plotted measures including DASS-21 anxiety, PANAS negative affect and psychological inflexibility (AAQ-ABI) from baseline to week 4. This movement was clinically significant as DASS-21 anxiety showed movement from the '*extremely severe'* range to the '*mild*' range. An unscheduled four week break occurred due to P1 suffering an injury in a MVA (since participants were completing therapy together as a dyad). P2 was given the option of continuing the therapy individually but elected to resume the treatment intervention with P1. After the break, P2 showed a substantial increase in all the self-report scores but did not return

to baseline levels. The decrease in psychological distress (DASS-21, PANAS-N) and psychological inflexibility (AAQ-ABI) from sessions 5 to 6 was not as dramatic as between sessions 1-4 but reductions in these scores were maintained at session seven (relapse prevention) and at post intervention testing.

Both participants maintained 100% attendance for the programme but this required a number of strategies to compensate for cognitive impairments resulting in memory deficits and poor organisational ability. Weekly phone calls were made to remind each participant about the group and a text message was sent on the day of the session. The length of the session (1.5 hours) appeared appropriate and both participants were able to tolerate and maintain focus for the duration of the session. They were offered the opportunity for a cigarette/coffee break but this was declined each week. Participant 2 forgot his workbook on two occasions and then lost the whole book between sessions three and four. Following week four, the workbook was retained by the therapist and the relevant section including the homework was photocopied at the end of each session for P2 to take home. P1 had no difficulty in remembering his workbook or attending each session as scheduled. Both participants exhibited good engagement in the weekly content although they both experienced some difficulty with skill development during week 4 which involved the mindfulness component.

Ratings of the homework ranged from 6 to 10 for P1 and 6 to 9 for P2 with the mean homework rating being 7.8 for both participants out of a total score of 15 (see Table 9). Week four for both participants, which covered mindfulness, scored the lowest on the homework rating (6/15). In examining the barriers for week four (mindfulness content), P1 wrote ‘didn’t want to do it’ and ‘don’t like doing the

homework exercise because I can't focus', while P2 checked 'too busy'. This suggests that session four may benefit from additional revision of both the content and the homework to improve adherence for participants. Reviewing the barriers for completing the homework for the other sessions, P1 identified 'forgot' on four occasions and endorsed 'didn't want to do it' twice. P2 endorsed 'too busy' for three of the weeks, no comments on two sessions, 'forgot' for one session and 'did it but not good example' after week five. Overall 'forgot' was the most frequently rated homework barrier with a combined incidence (for both participants) across the weeks of 42%.

The relevance of the measures was also qualitatively reviewed. Both participants appeared to tolerate the measures and were able to complete them without assistance. For all self-report measures, no individual items were missed but P2 omitted answering the whole AAQ-II at the beginning of week 3. The weekly self-report measures were able to be completed promptly at the beginning of each session (time taken 10-15 minutes).

The use of a dyad structure for therapy contributed to high levels of engagement of each participant with the therapist. Each participant made suggestions for the other and provided prompts at times when the other participant had forgotten something. They also expressed feeling less isolated by being able to share experiences with another person experiencing a severe TBI. Thus, the advantages of social support and modelling by having another participant with similar experiences were apparent but the potential disadvantages of a larger group that might reduce individual focus or provide too much information coming from multiple sources were avoided.

Table 9. Homework activities and rating of individual homework performance

	Homework Activity	Participant 1 Rating	Participant 1 Barriers	Participant 2 Rating	Participant 2 Barriers
1	Monitoring of mood and coping strategies (see Table 7)	10	Forgot/ "Lazy"	9	Too busy
2	Noticing control behaviours - Setting a valued activity and noticing barriers that occur	10	"Didn't know if I wanted to do it"	8	Nil reported
3	Defusion activity - Physicalising the thought (see Table 7)	8	Forgot	7	Nil Reported
4	Mindfulness activities – mindfully drinking and listening to mindfulness recordings	6	Didn't want to do it, "Don't like doing the homework exercise because I can't focus"	6	Too busy
5	Achieving one small behavioural goal (committed action) in conjunction with an identified value	7	Forgot	8	"Did it but not a good example"
6	Above homework to be undertaken at least three times per week using Daily diary of principles and action[a]	6	Forgot	9	Too busy/Forgot
	Average rating (range 3-15)	**7.8**		**7.8**	

Notes. [a] (Ciarrochi & Bailey, 2008)

3.4 Discussion

The current study found preliminary support for the feasibility of implementing ACT with individuals expressing clinical levels of distress after a severe TBI. The intervention was effective for one participant who demonstrated a significant reliable change between a range of pre and post measures. Visual inspection of weekly measures also revealed clinical change for this participant. A review of the programme content also suggested it was feasible with only minor revisions proposed to the content and the measures. The delivery of therapy in dyads appears to be both feasible and appropriate for people with a severe TBI. This finding builds on previous research with dyads and this population group (Simpson et al., 2011).

The dyad provided ample opportunity for focusing on the individual needs of participants but also provided the potential to capitalise on modelling and mutual support.

The first objective was related to the initial benefits of the intervention, which was assessed both through reliable change and visual inspection of graphs. In operationalising the clinical significance of the extent of reliable change, Jacobson and Truax (1991) proposed a classification of clinical improvement incorporating two ranges: *recovered*, namely reliable change in outcome scores that move into a functional population range; and *improved*, a reliable change in outcome scores that still remains in the dysfunctional population range. Therefore, although reliable change may be achieved on scores, this only becomes clinically significant if there is movement to the range seen in a less severe or more functional population.

On the basis of these criteria, the gains made by P2 could be classed in the '*improved*' range. P2 showed reliable change for both the primary outcome measure of psychological flexibility, as well as secondary measures of psychological distress. Over the course of treatment, P2 showed a reduction in his distress scores moving out of the clinical range on the HADS depression subscale and moving from the '*extremely severe'* range to the '*moderate'* range on the DASS-21 Anxiety subscale. In addition, on both the DASS-21 Depression and Stress subscales P2 moved from the '*severe*' range to the '*moderate*' range meeting criteria for clinically significant change on measures of psychological distress (Tingey, Lambert, Burlingame, & Hansen, 1996). Finally, within the ACT framework, P2's enrolment into a computer course to improve his employment opportunities would be understood as an important therapy outcome reflecting committed action based on values.

In contrast, P1 showed less progress, but did achieve a reliable change with a reduction of negative affect on the PANAS. As clinical ranges are not specified for PANAS scores (Watson, Clark, & Tellegen, 1988), P1's clinical change cannot be assessed using Jacobsen and Truax's criteria (1991). It is unclear whether the lack of progress by P1 was due to his MVA but his anxiety increased to higher than baseline levels following this event (see Figure 2). P1 continued to engage in values based behaviour, returning to work after his MVA, continuing with his apprenticeship and passing his motor vehicle driving competency test in order to have his driver's licence reinstated. Despite the lack of reliable improvement on most measures, there were indications of progress in this specific functional area although the design of the study did not allow us to determine whether these areas of improvement were specifically due to the ACT intervention.

An important treatment target in ACT is to increase committed action consistent with values even in the presence of distress (i.e., acceptance). Both participants were able to increase their meaningful life engagement despite experiencing ongoing psychological distress. This was also reflected in P2's increased psychological flexibility as represented by his score on the AAQ-ABI. Both participants' neuropsychological profile showed impairments in cognitive flexibility (as measured by Trail Making Test – Trails B) but P2 was still able to demonstrate improved psychological flexibility, suggesting individuals who demonstrate cognitive inflexibility may be able to display psychological flexibility. This provides further support for the potential of ACT as an appropriate therapy for individuals with cognitive impairments including cognitive inflexibility and these initial results suggest a larger Phase II trial may be warranted.

With regard to the second aim related to reviewing the content of the intervention, both participants achieved 100% attendance indicating the programme was delivered to the participant's as planned. Furthermore, strategies were implemented to cater for cognitive impairments such as memory problems, executive dysfunction and attention to enhance engagement. The strategies included provision of written resources, having a strong focus on values and committed action (concrete behaviour), repetition and reviewing all material to assist with recall and retention, and minimising complexity by keeping one core theme for each week to reduce cognitive demands.

Despite such strategies the review of homework adherence, indicated a high incidence of 'forgetting' to complete the homework (42%). Adherence to homework has been found to be related to treatment outcome across a number of disorders (Forman et al., 2012; Soo et al., 2011) and is therefore considered an important component of any intervention (Mausbach, Moore, Roesch, Cardenas, & Patterson, 2010). This is particularly relevant for individuals with severe TBI who may have learning impairments. Repetition of the therapy material improves retention, enabling mastery of skills via practice between sessions. The high rate of 'forgetting' reported by participants may mean that additional reminders between sessions might be required to compensate for poor memory and planning. This could include programming reminders into a smart phone and between session prompts via the phone (either by text messaging or voice calls) or electronic mail, or recruiting a family member or carer to assist with prompting and scheduling of homework (Blevins, Roca, & Spencer, 2011).

A more detailed review was undertaken of session four covering mindfulness which scored lowest on homework adherence/acceptability for both participants. Neither participant used the mindfulness CD provided at the end of the session, nor used mindfulness either as homework or as a general strategy. It is proposed that changing the delivery method of this session might improve its reception and translation into action. Specifically, including a small mindfulness exercise at the beginning of each treatment session would assist with skill development, engagement and mastery of regular mindfulness activity.

The measures used to evaluate the outcomes of the case studies were also reviewed. Both participants were able to complete the measures without assistance and the achievement of statistically significant reliable change from pre to post test scores across a number of measures by P2, indicates the measures are likely to have sufficient sensitivity to change to make them suitable in a clinical trial. One issue was identified with the measure of participation which did not appear to be sufficiently sensitive to change. Despite qualitative data suggesting that both participants showed specific examples of committed action there were no significant changes on the participation measure. This may in part have been a function of ceiling effects on the measure with both participants scoring relatively high and above average on participation prior to the intervention. This suggested that they were already highly motivated and had higher levels of social participation than has been found in other samples with TBI (Chervinsky et al., 1998; Tate et al., 2011).

The group size of two appeared to have some advantages in terms of group processes such as universality (others experiencing the same issues), cohesiveness and sharing of information (Yalom & Leszcz, 2005). As this was a precursor to a

randomised controlled trial, the participants were not matched but were both younger men (an age difference of 10 years) but from different cultural backgrounds. In a clinical setting, where possible, it may be appropriate to match participants to increase homogeneity around age, social status and degree of pathology. This may produce more cohesion and therefore better outcomes (Whelan-Goodinson, Ponsford, & Schönberger, 2009). The funding mechanisms for therapy delivery with regard to group size, may need to be considered when translating this research into clinical practice. For example, in Australia the funding of psychological services through Medicare may not support small group work. The Medicare rebate for a group of only two people is substantially less than the fee for individual therapy of the same session duration. Thus, funding models may be an impediment for translation of the dyad model in some service delivery contexts. In previous treatment groups involving dyads, participants were randomly allocated to either the active treatment or waitlist control and were still able to achieve both statistically and clinically significant outcomes without being matched (Simpson et al., 2011). Anecdotally, the presence of more than one person in treatment sessions appeared to enhance adherence to the treatment protocol since it appeared to reduce any tendency for individuals to divert from the session's content.

It has been suggested that effective ACT interventions are delivered one-on-one (Kangas & McDonald, 2011) but an increasing number of studies are finding delivery of ACT in group situations is efficacious (for example: Kocovski et al., 2009; Ossman, Wilson, Storaasli, & McNeill, 2006; Vowles, Wetherell, & Sorrell, 2009). Limiting the group size to two, allowed each participant to have sufficient time to engage with the therapist but still provided the benefits of a group process as

has previously been demonstrated in other group interventions involving participants with TBI (Simpson et al., 2011). It is also possible that by sharing therapy time the focus does not remain sustained on any one individual for the full therapy session, potential reducing demands on cognitive resources (e.g., sustained concentration). Further research is warranted to investigate optimal methods for delivering ACT (small groups, dyads or individual) to individuals with a severe TBI.

There were a number of limitations to the study. The unplanned break in treatment between sessions four and five, due to P1's MVA, resulted in an increase in psychological distress and psychological inflexibility indicating this break may have contributed to decay in any treatment effects. It may have been appropriate to recommence the programme from the beginning to address any forgetting which may have occurred or to continue the therapy on an individual basis which would maintain the integrity of the treatment protocol. Another option would be to include an additional session that reviewed all the previous content in more detail. Though the content was briefly reviewed there was a disconnection in the flow of treatment and there was no indication that either participant engaged the strategies during the four week break. As such it was unclear whether the treatment as delivered was appropriate with regard to the number of sessions or the effectiveness of session seven after a one month break for consolidation of the intervention. Though the use of booster sessions to encourage treatment consolidation is used often in therapy (Powell, Heslin, & Greenwood, 2002), the exact number required is unclear. It has been proposed after a TBI this may need to be directed by each individual's need and there may be a requirement for multiple booster sessions for skills to be sustained (Hsieh, Ponsford, Wong, & McKay, 2012).

Another limitation of the study was that although both participants showed change in the expected direction, only P2 showed clinically significant change. It is unclear from the study whether P1's lack of clinical improvement was due to the impact of the MVA or an independent lack of treatment responsiveness. This highlights issues of generalisation of single case studies to a wider TBI population but may also show how uncontrollable stressful life events can influence the outcome of clinical interventions.

Overall, this study suggests some initial promise for ACT as an approach to improve psychological flexibility, reduce psychological distress and qualitatively increase life-role participation among people with severe TBI. The ACT intervention developed for the study indicated one participant demonstrated reliable change across multiple measures and visual inspections of weekly measures showed change in the hypothesised direction providing indications that the intervention may be effective. In addition, reviewing the intervention content, delivery method and measures indicates these protocols are sufficiently robust to progress towards the next phase of clinical outcome research. The information gained from this study will guide the formulation of a larger scale phase II, randomised controlled trial (Whiting, Simpson, McLeod, Deane, & Ciarrochi, 2012).

Chapter 4: Acceptance and Commitment Therapy (ACT) for psychological adjustment after traumatic brain injury: Reporting the protocol for a Randomised Controlled Trial

This is an identical version of the manuscript published in Brain Impairment.

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4.1 Distress following traumatic brain injury

The impact of traumatic brain injury (TBI) often results in a complex presentation of psychological symptoms and associated distress. These symptoms can encompass anxiety, depression, anger, grief and traumatic stress. The resulting psychological distress can be linked to the traumatic event causing the injury, to loss of functioning or a combination of both these factors. It has been proposed that chronic inflammatory processes in the brain may be an underlying mechanism that contributes to the development of depression and stress responses and inhibits the process of repair (Hoffman & Harrison, 2009). Furthermore, the ability to cope with these symptoms is often complicated by the cognitive changes brought about by the brain injury, by psychosocial factors, and by premorbid coping styles (Ponsford, Sloan, & Snow, 1995).

High levels of psychological distress after a TBI have been well documented. A recent systematic review concluded that there was a 33% prevalence rate of depression from one year and later post-injury (Guillamondegui et al., 2011). Hibbard and colleagues (1998) found that rates for anxiety symptoms reported in the literature ranged between 18% and 60%. Not only are psychological symptoms evident but there can also be disruption in the way people perceive their sense of self (Myles, 2004). People with a TBI may no longer have a stable sense of "who they are" and tend to view the self more negatively after a TBI (Carroll & Coetzer, 2011). These psychological symptoms can also co-present with behavioural problems such as verbal and physical aggression (Baguley et al., 2006; Rao et al., 2009).

All of these factors contribute to a complex adjustment process which influences the person's ability to (i) engage in many aspects of their rehabilitation and (ii)

become involved in meaningful activities (Fleming et al., 2011). Lower levels of depression have been associated with increased participation in social and recreational activities after a brain injury (Brown, Gordon, & Spielman, 2003). Therefore, timely intervention for these adjustment difficulties may lead to improved participation in rehabilitation and engagement in their life such that clients become better able to accept their changes and move on with their lives.

4.2 Psychological treatments for emotional/behavioural adjustment after TBI

Early psychological interventions in the treatment of TBI predominantly drew upon learning/behaviour theory and these approaches continue to play an important role, particularly in the management of challenging behaviours (Schlund & Pace, 1999; Wood & Alderman, 2011). The suitability of cognitive approaches (e.g., cognitive behavioural therapy, motivational interviewing and problem-solving therapy) has also been investigated, particularly for the treatment of psychological distress. Cognitive Behaviour Therapy (CBT) has been considered particularly applicable for those with a TBI because of the structured nature of the treatment and the ability to adapt the therapy to individual requirements (Khan-Bourne & Brown, 2003). These adaptations can include the use of written notes during sessions, undertaking one task at a time, using repetition to ensure new concepts are learned and breaking down tasks into smaller parts (Hibbard et al., 2005).

Programmes using CBT have proven to be effective in treating a range of post TBI psychological problems including anger (Medd & Tate, 2000), anxiety (Hsieh, Ponsford, Wong, Schonberger, et al., 2012), coping skills (Anson & Ponsford, 2006b), hopelessness (Simpson et al., 2011) and social anxiety (Hodgson et al., 2005). Despite these promising developments, the number of high quality studies

employing randomized controlled designs (RCTs) to evaluate psychological treatments for people with severe TBI is sparse. Systematic reviews have identified no cognitive interventions rated as Class 1 for depression (Fann et al., 2009) or anxiety (Soo & Tate, 2009). The one Class 1 study identified by Soo and Tate (2009) treated an intervention for Acute Stress Disorder among people with mild TBI (Bryant, Moulds, Guthrie, & Nixon, 2003). A subsequent RCT for the treatment of anxiety has just been published (Hsieh, Ponsford, Wong, Schönberger, et al., 2012) and holds the promise of being rated highly for its robust methodology. Only one RCT has been identified for the treatment of anger (Medd & Tate, 2000) and rated as Class 1 in one review (Ylvisaker et al., 2007) but Class 2 due to the small sample size in a second review (Cattelani et al., 2010). Overall, there are only a handful of robust psychological treatment studies of post-TBI adjustment that can be relied upon to guide decisions about the best approach to this significant problem. There is an urgent need for more high quality studies in this area.

In seeking to expand this limited evidence base, there are also reasons to question whether adapted forms of CBT represent the best treatment approach. One potential limitation of CBT for post-TBI adjustment is its emphasis on thought challenging (Kinney, 2001). Cognitive impairments and related problems with self-awareness may make challenging unhelpful thought processes very difficult for people with TBI (Sherer et al., 1998). Similarly, problems with divided attention may reduce the capacity to simultaneously hold thoughts in mind while seeking alternative or more helpful ways of thinking (Blanchet, Paradis-Giroux, Pépin, & Mckerral, 2009). The cognitive inflexibility often seen after a TBI may also reduce the capacity to shift to more helpful or adaptive thinking patterns (Heled et al., 2012). Given these concerns,

newer forms of cognitive therapy may also play a significant role in treating the problems of adjustment to TBI.

4.3 Acceptance and Commitment Therapy (ACT)

Acceptance and commitment therapy (ACT) is one of the 'third-wave' of behavioural therapies, with a focus on changing one's relationship with internal experiences (thoughts, feelings, memories and physical sensations) rather than on directly changing the content of these experiences. The key premise of ACT is to teach people to be able to have internal experiences, in a mindful and non-judgmental way, and still engage in effective action. The ACT model is comprised of six core processes which form a hexaflex indicating that all components are presumed to be interlinked (Hayes et al., 2003). The therapist can elect to work on any of the components of the model at any stage of the therapy process or these components can be combined and presented at the same time. In this respect use of the hexaflex components is not seen as linear.

The six core processes which configure the hexaflex and guide the process of developing psychological flexibility include cognitive defusion, acceptance, contact with the present moment, self as context, values and committed action (Hayes et al., 2003). Cognitive defusion is the process of creating some distance or separation from distressing thoughts, emotions or experiences. Acceptance is the opening up and making room for these internal experiences so there is no longer an ongoing struggle. Contact with the present moment is being in the here and now, consciously connecting with is happening in that moment. Self as context or the observing self seeks to demonstrate that a component of us is always the same, regardless of what is changing with regard to our feelings or experiences. Values are what guide our

behaviour and are unique and personally relevant to each individual. They assist in setting goals which is the committed action component of the hexaflex.

4.4 Effectiveness of ACT in chronic health conditions

Prior research using ACT with other chronic health conditions suggests it may be promising for use with people who have a TBI. The research into ACT and chronic pain has been the most extensive. A recent review identified 11 studies between 2004 and 2009 which used ACT with this population, of which three were RCTs (Ruiz, 2010). More recently a meta-analysis of acceptance based interventions for chronic pain found small to moderate effect sizes for reducing the pain experience and concluded that ACT maybe a good alternative to CBT with this population (Veehof, Oskam, Schreurs, & Bohlmeijer, 2011). In other chronic health conditions, ACT has also been found to be efficacious in improving coping with diabetes (Gregg et al., 2007), in reducing the impact of tinnitus (Hesser, Westin, Hayes, & Andersson, 2009) and maintaining activity levels despite no change in pain levels (Dahl et al., 2004). Given the growing evidence for the efficacy of ACT among other clinical populations, the possible value of ACT in facilitating the process of adjustment and reducing distress after TBI, warrants investigation.

4.5 Rationale for using ACT with TBI population

Support for ACT after brain injury has been discussed in two recent reviews (Kangas & McDonald, 2011; Soo et al., 2011). Kangas and McDonald (2011) considered the implementation of ACT in the context of mild to moderate acquired brain injury (ABI). They proposed that ACT may assist people after an ABI in moving forward with their lives by accepting their cognitive and physical changes. They also made a

number of recommendations for the design of a treatment programme. In a review of the applicability of ACT for treatment of anxiety after ABI, Soo and colleagues (2011) recommended that the behavioural based components of ACT such as values and committed action should be emphasised but modifications for the more cognitive components such as defusion may be enhanced by using concrete examples, repetition and use of written aids. The current study will investigate how the core processes within ACT can be operationalised to accommodate the cognitive impairments evident after a TBI and provide an alternative to cognitive strategies such as thought challenging. In addition, the treatment programme will seek to improve psychological flexibility and encourage committed action in accordance with individual values.

Following a brain injury, there is often a protracted period of recovery, cognitive improvements can take years to achieve or, the person can be left with persistent cognitive and emotional impairments (deGuise et al., 2008). Thoughts such as “my brain injury stops me doing what I want to do” or “my life is over because of my brain injury” can emerge as part of these persistent impairments. Challenging these thoughts using standard CBT techniques may be particularly difficult when the person is cognitively impaired (Kinney, 2001) and studies using cognitive restructuring strategies report that many patients have difficulty implementing such strategies (Anson & Ponsford, 2006b). The ACT approach reduces this problem by focussing on mindfulness-based approaches that do not require the client to engage in reasoning or evaluating evidence. These approaches help the client make space for difficult experience (e.g., not avoid it), to notice such experience with openness and curiosity, and to become less reactive to such experience. Clients learn to mindfully observe a thought like “I am stupid” and yet not let that thought dominate how they

behave. For example, an ACT practitioner might assist the patient to ”make space” for unpleasant thoughts by using concrete strategies such as “physicalising” the thought (Hayes et al., 2003). Another potential advantage of the use of experiential role plays and visual metaphors as a part of ACT, is that it makes the therapy less reliant on verbal means of expression. The metaphors can be tailored to the client’s background and may also use pictorial representations. Information is therefore delivered in more than one modality which is desirable in people experiencing difficulties in processing information from therapeutic counselling sessions (Simpson et al., 2011).

After a TBI, people need to define themselves in conjunction with both their cognitive and physical limitations (Whitehouse, 1994). This may inhibit them from developing new behaviours and reconnecting with life. ACT helps clients to let go of limited senses of self and to develop patterns of adaptive behaviour. Thus the acceptance component of ACT may be helpful in facilitating adjustment to unpleasant physical changes and the value clarification and commitment component can support behavioural activation in the presence of those changes. Perhaps most importantly, ACT aims to promote greater participation in activities congruent with a person’s values and this is an under-examined therapeutic need in people who have suffered a TBI. The concept of addressing a person’s values in order to develop a unique meaning for them after their injury was proposed before ACT was developed (Wright, 1960). Values create an opportunity to define and personalise goals in order to make them more client focussed and relevant to the client. The use of client centred goals is a well-researched and validated approach to ensure effective rehabilitation post TBI (Doig, Fleming, Cornwell, & Kuipers, 2009).

Finally, ACT is also hypothesised to increase psychological flexibility and the ability to persist with values-consistent behaviour in the face of challenges and obstacles. Psychological flexibility maybe related to cognitive flexibility (Chawla & Ostafin, 2007; Kashdan & Rottenberg, 2010). As already stated, impairments in cognitive flexibility are common after TBI (Heled et al., 2012) and are often a factor in poor treatment response, resulting in functional difficulties many years after a brain injury (McDonald et al., 2002). We could speculate that ACT may benefit people with TBI by improving both psychological and cognitive flexibility.

4.6 Testing the feasibility of ACT in TBI

Some initial evidence does exist for the benefits of ACT among people with cognitive impairment. An ACT intervention was successfully used to increase participation and adaptive functioning in adolescents and adults (ages 15-59 years) who had acquired their brain injury before the age of 18 years, i.e. paediatric acquired brain injury (Sylvester, 2011). There is also a case study where ACT was used to successfully treat an adolescent with learning disabilities to better manage anxious thoughts and obsessive ruminations (Brown & Hooper, 2009).

In preparation for the current trial, a feasibility study to evaluate the ACT treatment programme was also conducted at the Liverpool BIRU. (Whiting, Simpson, Ciarrochi, et al., 2012). The study was undertaken with two participants, both young males (20 and 29 years) who were diagnosed with a severe TBI (post-traumatic amnesia of 3 and 17 days) and were reporting psychological distress as measured by the Depression Anxiety and Stress Scale-21. They jointly engaged in a seven session, manualised treatment programme based on ACT principles. Data were analysed and presented as two separate case studies with pre and post-treatment

measures of mood, psychological flexibility and participation undertaken, in addition to sessional measures. The primary outcome measure, the Acceptance and Action Questionnaire-Acquired Brain Injury (AAQ-ABI), is a measure of psychological flexibility developed to target the types of issues occurring after a brain injury. This was adapted from a measure used in a study with paediatric acquired brain injury (Sylvester, 2011). Other outcome measures included a measure of social participation and psychological of 8 points). In addition to this, both participants achieved goals which had been established in accordance with their identified values indicating further support for the utility of ACT following a severe TBI. The successful outcome from the feasibility study has laid the groundwork for conducting the proposed protocol.

4.7 Conducting trials of psychological interventions in TBI: Design issues

To test the efficacy of ACT among people with TBI, a number of research design issues from previous trials experience helped shape the current protocol. As a starting point, the nature of Phase II and Phase III intervention trials treating the emotional or behavioural sequelae of people with severe TBI are qualitatively different from biomedical trials in which the same terminology is employed. Biomedical Phase II trials test the efficacy of a treatment (answering the question does it work?) and typically involves enrolling 100-300 patients in a pre- and post-test trial. Phase III trials then address the question (is this treatment better than current best practice?) by means of RCTs that may enrol thousands of patients.

In the field of TBI, the first difference is that Phase II trials often employ a randomized controlled design. In the context of nursing research, Feeley and associates (2009) have argued that the use of pilot RCTs for Phase II trials can act as

a precursor, testing acceptability and feasibility of treatment and trial delivery, as well as treatment efficacy. This lays the groundwork for subsequent Phase III trials. Consistent with this argument, the randomised controlled trials evaluating psychological interventions for affective and/or behavioural disturbance among people with severe TBI can be described as Phase II, all having sample sizes of less than 30 participants (Hsieh, Ponsford, Wong, Schonberger, et al., 2012; Medd & Tate, 2000; Simpson et al., 2011). Despite the small samples, the effect sizes for primary outcome variables from these studies has generally been robust (ES 0.89, Medd & Tate, 2000; ES>1.0, Simpson et al., 2011; ES 0.50, Hsieh et al., 2012).

Another characteristic of the trials is the intensity of intervention. In one of the first systematic reviews of evidence for the efficacy of neuro-rehabilitation it was concluded that many of the interventions lacked sufficient intensity (Carney et al., 1999). The interventions tested in the trials involved between 12 and 20 hours of therapy, highlighting the level of input that people with severe TBI require to benefit from cognitively-based interventions. This level of intensity is consistent with the recommendations of Kangas and McDonald (2011) in their discussion about the delivery of an ACT programme in TBI. There has also been ongoing debate about the relative merits of individual versus group-based delivery of therapeutic interventions. In a direct comparison of the two modalities it was found that individual therapy was more effective than group therapy in treatment for post-injury impairments of awareness (Ownsworth, Fleming, et al., 2008). Subsequent research suggests that small groups of two people can also be effective (e.g. Simpson et al., 2011). One benefit of keeping any group small is that it mitigates the risk of a dilution of treatment intensity.

Systematic reviews of treatment studies for post-TBI affective problems have highlighted the absence of clinically significant threshold levels of the targeted disorders in some studies (Fann et al., 2009; Soo & Tate, 2009). The most recent trials have employed such thresholds by using cut-off scores on standardised measures (Simpson et al., 2011) or participants meeting clinical criteria for psychiatric disorders (Hsieh, Ponsford, Wong, Schönberger, et al., 2012). The current trial therefore needed to clearly define the treatment population.

Another important consideration was the selection of the control condition, and this issue has been canvassed in some detail as it applies to experience-based treatments delivered in the rehabilitation context (Hart, Fann, & Novack, 2008). An active control condition typically contrasts some other type of standardised intervention to control for the level of therapist attention and degree of treatment accessed. This is stronger than a TAU condition, because TAU conditions often do not result in equivalent levels of intervention, and may in fact involve the provision of limited or no services during the study period (Hart et al, 2008). In addition, a credible active control can help maximise participant engagement in the trial. Despite the value of the active control, the Phase II published trials to date have typically employed TAU or standard care conditions. Bryant et al., (2003) provided one of the few exceptions, having employed an active control (i.e., a non-specific problem-solving programme) in their trial for the treatment of acute stress disorder, albeit in a mild TBI sample. One of the challenges in the introduction of active controls is to ensure that they are manualised (Hart et al., 2008; Schulz, Altman, & Moher, 2010; Whyte & Hart, 2003) in order to achieve an equivalent level of standardisation across treatment and control.

Whyte and Hart (2003) have also highlighted the problems associated with poor selection of outcome measures in rehabilitation intervention studies. One of the challenges in trialling new treatments can be the limited availability of appropriate outcome measures. In the ACT literature, the desired outcome of treatment is often increased participation and psychological flexibility. Effective measurement of psychological flexibility usually involves developing questionnaires to ensure the content is targeted to specific disorders and populations. As ACT has yet to be effectively used in a TBI population, no validated measures currently exist nor has the generic measure of psychological flexibility, the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) been validated on a TBI population. The issues outlined in this section informed the current trial protocol including (i) selection of research design, (ii) sample size, (iii) intensity of therapy, (iv) mode of delivery, (v) use of a diagnostic threshold, (vi) use of an active control, and (vii) selection of process and outcome measures. Furthermore, the protocol was developed in accordance with CONSORT statement (Schulz et al., 2010) as recommended by Tate and Douglas (2011).

4.8 Treatment Programmes

4.8.1 ACT

As developed and tested in the feasibility pilot study, the ACT treatment programme (titled “ACT on adjusting after your brain injury”) will incorporate all six core processes of ACT with a focus on each process during each week of the programme. Both mindfulness exercises and values work will be woven throughout the programme with both these components addressed in more detail during specific sessions. See Table 10 for a summary of the treatment programme. The programme

will use a treatment manual and participants will be given a workbook in which to complete in-session activities and undertake homework tasks.

Table 10. Summary of ACT treatment programme

Session	Content
1	Introduction to the group - Introductions and name tags, administer measures, icebreaker activity, group guidelines including confidentiality, reasons for attending, group aims, programme outline Exercise – mindfulness activity Confronting the agenda - Identifying individual issues, workability, breathing mindfulness exercise Homework - Introduce concept of homework, homework contract
2	Administer measures Exercise – mindfulness activity Review homework Review previous session Control is the problem - Normalcy of control & human suffering, - Exercise – Let suffering get close and Passengers on the Bus Homework - Valued activity & homework contract
3	Administer measures Exercise – mindfulness activity Review homework Review previous session Acceptance and defusion - Defusion exercises – milk milk milk, physicalise the thought, don't get eaten machine Homework -physicalising thoughts & homework contract
4	Administer measures Mindfulness activity Review homework Review previous session The observing self – - Separating self from thoughts/feelings/actions, - Exercise: Observer, the observing self, chessboard metaphor - Exercise: Mindfulness – eating a sultana Homework - Listening to mindfulness CD, homework contract, weekly diary
5	Administer measures Exercise - mindfulness activity Review homework Review previous session Introduction of values - Difference between goals and values, - Exercise - Survey of Life Principles – Card sort task and Funeral exercise Homework- Principles and action, homework contract
6	Administer measures Exercise - mindfulness activity Review homework Values and committed action - Setting goals with committed action Recap and review of each session Homework - Weekly diary and homework contract
7	Administer measures Exercise – mindfulness activity Review of progress Review course content Exercise – Leaves on a Stream Contacts for further assistance

4.8.2 Befriending

The active control will be based on the Befriending protocol (Bendall, Killackey, Jackson, & Gleeson, 2003). Befriending controls for a number of variables which may confound treatment programmes and has been found to have a moderate affect in reducing depressive symptoms and emotional distress in a number of different populations (Mead, Lester, Chew-Graham, Gask, & Bower, 2010). It was found to be a credible control for factors such as enjoyment of therapy, the dropout rate and client expectations against a CBT treatment for early psychosis (Bendall et al., 2006). The goal of the Befriending group was to engage participants in neutrally loaded topics that were of interest to the participants for the same duration as the ACT group.

The rationale for the Befriending intervention provided in both the participant information sheet and during the first session was "We are exploring how social contact influences mood and recovery. The goal of each session is to, NOT talk about how we feel but to engage in topics that are interesting and removed from your present worries or concerns." During session one, topics are identified for the following five sessions through a collaborative process. A suggested list of topics will be provided to participants (see Table 11) to assist with idea generation. Emotionally loaded topics are avoided and participants are redirected to neutral topics should the conversation move in that direction. One session is dedicated to an outdoor excursion, usually session two, to the local coffee shop. The group is run so that each participant and the therapist talks in turn on their topic and answers questions. This allows the group to remain structured and equal time is delegated for

each participant to engage in conversation. They are also given the topics prior to the session which allows for some homework activity and engagement.

Table 11. Summary of Befriending (active control) programme

Session	Content
1	Discussion of group rules and aims Introduction of each group member Activity - Identification of what we will cover each week Suggested Activities - Going for a coffee - Watch a movie over the week and discuss next session - Teach the other members to play a card game - Each person in the group speak about their favourite hobby/activity - Brain Storm other ideas Set timetable for activities for future sessions
2 - 6	Session content set according to timetable established in Session 1
7	Review of progress over previous month Discussion of referral for ongoing services

4.9 Aims and Hypotheses

The aim of the project is to elucidate the process of change during an ACT therapeutic intervention and explore the therapeutic processes involved in ACT using a time series analysis. The following hypotheses will be tested: (1) ACT treated patients will demonstrate improved psychological flexibility and lower psychological distress after treatment compared to patients receiving the active control treatment (Befriending; Bendall et al., 2003). (2) Improved psychological flexibility will predict lower levels of psychological distress following treatment. (3) ACT treated patients will demonstrate greater participation in rehabilitation compared to patients receiving Befriending.

4.10 Study Design

A single centre phase II randomised controlled trial will be conducted in accordance with the CONSORT statement (Schulz et al., 2010) (see Figure 3). The intervention will be undertaken at Liverpool Brain Injury Rehabilitation Unit (LBIRU) at Liverpool Hospital and participants recruited from the community outpatient service. The LBIRU provides rehabilitation services to people with a severe TBI (i.e. > 24 hours post-traumatic amnesia) in South-Western Sydney. Ethics approval for the project has been obtained by Sydney South West Area Health Ethics Committee and the Human Research Ethics Committee of the University of Wollongong. The study is being undertaken as part of the requirements for the degree of Doctor of Philosophy by the first author (DLW). The protocol has also been registered on the Australian New Zealand Clinical Trials Registry ACTRN12610000851066.

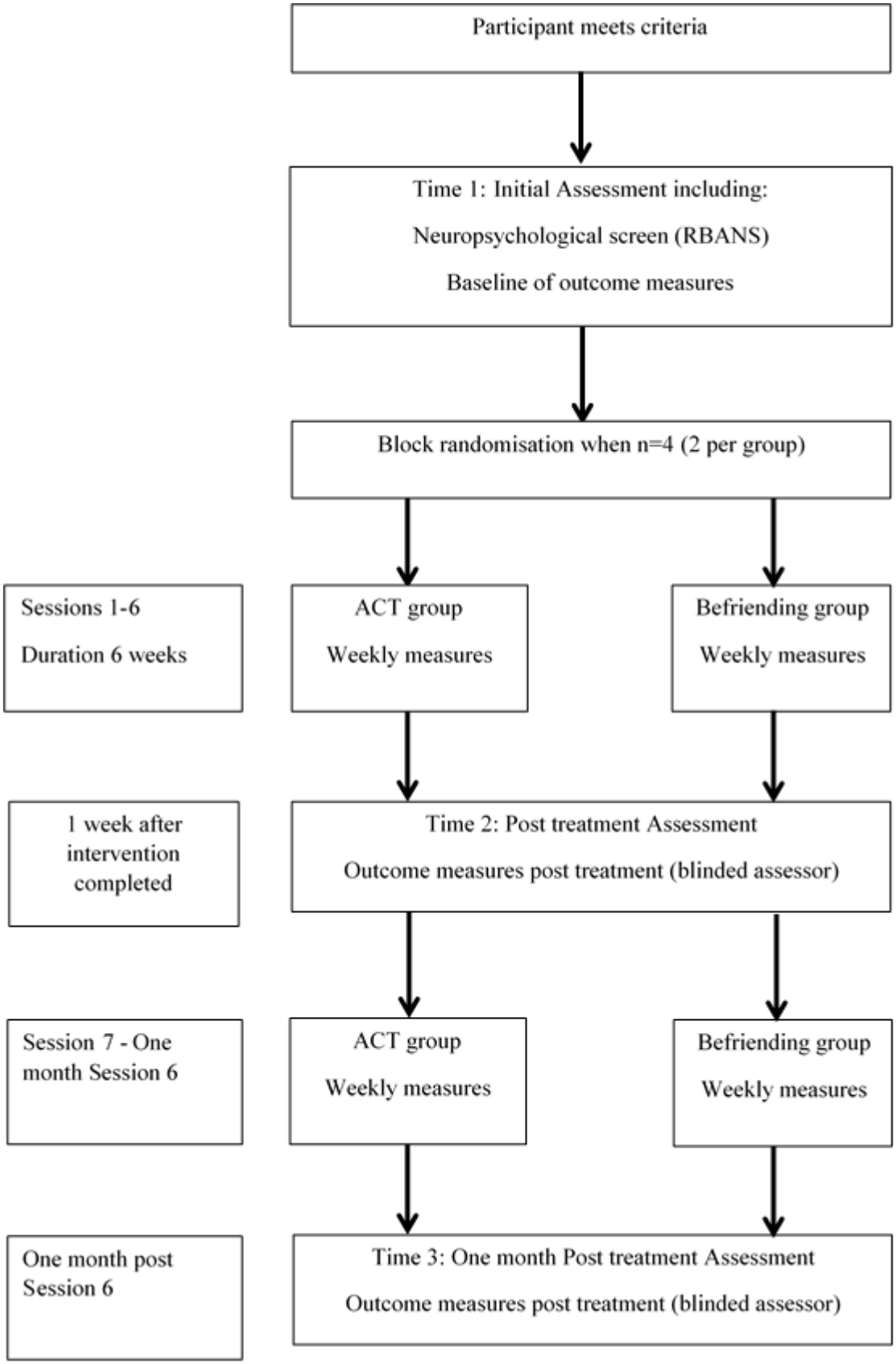

Figure 3. Study Design

4.11 Participants

Participants who meet the study inclusion criteria will be recruited over a 2-year period from the LBIRU community outpatient team. The criteria are, (i) sustained an extremely severe traumatic brain injury (posttraumatic amnesia, PTA > 1 week; Russell & Smith, 1961), (ii) injury after the age of 18 years, (iii) currently between 18 and 65 years, (iv) have sufficient cognitive capacity and English language skills to complete questionnaires and engage in group discussions (determined by existing neuropsychological assessments and in consultation with staff at the BIRU), (v) report a moderate range or greater on any of the subscales of the Depression Anxiety and Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995), and (v) have not have been diagnosed with a severe psychiatric disorder prior to the TBI.

4.12 Sample Size

We aim to recruit 48 participants over a 2-year period from the LBIRU community outpatient team. The LBIRU accepts 120 new referrals each year and has an active caseload of more than 400 clients with severe TBI of which approximately 90% are severe TBI. Average annual referrals to Clinical Psychology from 2009-2010 have been 73 clients. A review of these referrals indicates that approximately 50% of these clients would meet the study criteria for the study and with an anticipated refusal rate of 20% a sample size of 48 appears realistic for the specified time period. In addition for a large effect size (.89), and a one-tailed test, a sample size of 48 will provide over .90 power to detect a difference between the two groups.

4.13 Intervention Fidelity

To ensure treatment fidelity, the five domains recommended by Borelli (2011) were followed: (i) Intervention design has been addressed by registration of the trial protocol followed by this publication of the protocol in a peer-reviewed journal. This allows the study design to be described and independently reviewed; (ii) Training of providers in the ACT intervention will all be undertaken by the first author, who has eight years' experience in TBI and four years as an ACT therapist. Both groups will be implemented by a registered psychologist, experienced in both ACT and TBI. The first author will also receive ACT supervision from a recognised ACT trainer who is part of the research team (JC); (iii) Standardisation in intervention delivery will be enabled by employing a written manual for both treatment conditions. In addition, treatment sessions will be audio recorded and random samples of sessions (25%) reviewed by trained independent assessors for treatment fidelity. The ACT Core Competency Rating Scale (Hayes & Strosahl, 2004) and the Befriending fidelity scale (Bendall et al., 2003) will be used to check that the ACT treatment sessions and Befriending intervention are delivered respectively in accordance with the manualised programmes; (iv) Fidelity in receipt of intervention is particularly relevant with TBI patients as they are exhibiting cognitive impairment and may struggle with comprehension. Each session will commence with a review of the previous week's session and participants will be given written notes of the session and homework tasks to complete. Adherence to and acceptability of homework will be monitored using a homework form which will be completed at the end of each sessions and prior to the next session commencing (available from the first author on request). Sessions will be coordinated to ensure attendance in treatment does not fall

below 80% of all sessions. To maximise attendance, participants will be sent text messages or given reminder phone calls the day prior to the treatment session;(v) Ensuring the treatment is enacted in real life settings will be assessed during session seven. This is a relapse prevention session where feedback will be used to discuss how participants are using the strategies outside the group environment.

4.14 Measures

Measures will be administered at the screening phase, the assessment phase (Time 1), the post intervention phase (Time 2) and post relapse prevention (Time 3). See Table 12 for an indication of the measures to be administered at each time frame.

Table 12. Administration of measures: Intervention study

Measure	Baseline (T1)	Weekly measures	Post-intervention (T2)	Follow-up (T3)
Participant				
RBANS	x			
Demographic information	x			
AAQ-ABI	x	x	x	x
HADS	x		x	x
DASS-21	x	x	x	x
GHQ-12	x		x	x
PANAS	x		x	x
AAQ-II	x	x	x	x
MOT-Q	x		x	x
AQ	x		x	x
CST	x		x	x
I-PANAS-SF		x		
Family Member				
AQ	x		x	x
SPRS-2	x		x	x

RBANS: Repeatable Battery for the Assessment of Neuropsychological Status, AAQ-ABI: Acceptance and Action Questionnaire – Acquired Brain Injury, HADS: Hospital Anxiety and Depression Scale, DASS-21: Depression Anxiety Stress Scale-21, GHQ-12: General Health Questionnaire-12, PANAS: Positive Affect Negative Affect Scale, AAQ-II: Acceptance and Action Questionnaire-II, MOT-Q: Motivation for Traumatic Brain Injury Rehabilitation Questionnaire, AQ: Awareness Questionnaire, CST: Survey of Life Principles – Card Sort Task, I-PANAS-SF: Positive and Negative Affect Schedule - Short Form, SPRS-2: Sydney Psychosocial Reintegration Scale-2.

4.14.1 Background measures

Cognitive function will be assessed, for the purposes of descriptive information, using the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) (Randolph, 1998). The RBANS is a brief neurocognitive battery measuring immediate and delayed memory, attention, language, and visuospatial skills and has been found to be suitable for assessing cognitive function after TBI (McKay, Wertheimer, Fichtenberg, & Casey, 2008). The RBANS requires approximately 25 minutes to administer and is broadly used for clinical diagnostic purposes to establish neurocognitive status. Importantly it is not a measure used commonly at Liverpool BIRU and therefore removes the risk of confounding neuropsychological assessments conducted by the service.

4.14.2 Psychological process measures

These measures assess the hypothesised mediator of change in the intervention. That is, they are the psychological variables that are targeted by ACT and are hypothesised to lead to improved mental health and behavioural functioning. We will examine three process variables: Psychological flexibility, participation in rehabilitation and values-consistent living.

4.14.2.1 ***Psychological Flexibility.***

The Acceptance and Action Questionnaire – Acquired Brain Injury (AAQ-ABI; (Sylvester, 2011) will be used to measure psychological flexibility. The AAQ-ABI is a 15-item questionnaire assessing both acceptance and avoidance of thoughts that may arise as a result of a brain injury and was used in a study with paediatric acquired brain injury (Sylvester, 2011). For the present study the wording of one

item receives a minor revision to clarify its meaning further (item 5 “My brain injury defines me” to “My brain injury defines me as a person”). The AAQ-ABI uses a 5-point Likert scale (0=’not at all true’ to 4=’very true’) with scores ranging from 0 to 60 and higher scores indicative of greater acceptance. Initial analysis demonstrates it correlates highly with the Acceptance and Action Questionnaire-II (AAQ-II) (r_s= .61, N= 66, p< .000) (Whiting, Deane, Ciarrochi, et al., 2015). As the AAQ-ABI has yet to be fully validated, the more commonly used measure of psychological flexibility in ACT research, the AAQ-II (Bond et al., 2011) will also be administered. The AAQ-II is a 10-item questionnaire utilising a 7-point Likert scale with scores ranging from 0 to 70, with higher scores indicative of greater psychological flexibility or acceptance. Higher scores on the AAQ-II are associated with lower scores of psychological distress and it has satisfactory structure, reliability and validity have been demonstrated across a number of samples (Cronbach’s alpha ranging from 0.78 to 0.88). The main difference between the AAQ-ABI and the AAQ-II relates to specific reference to brain injury in the items.

4.14.2.2 ***Participation in rehabilitation.***

The Motivation for Traumatic Brain Injury Rehabilitation Questionnaire (MOT-Q) (Chervinsky et al., 1998) will be used to measure intent to engage in rehabilitation. The MOT-Q is a 31-item questionnaire with Likert-type response format with three subscales assessing attitudes to brain injury rehabilitation. The measure will be used to determine whether there is a change in participant’s willingness to engage in the rehabilitation process. The scale has four subscales, Lack of Denial, Interest in Rehabilitation, Lack of Anger and Reliance on

Professional Help. Reliability assessed by Cronbach's Alpha was 0.91 for the total scale (Chervinsky et al., 1998).

4.14.2.3 *Values-consistent living*

The Survey of Life Principles Version 2.2 – Card sorting task (CST) (Ciarrochi & Bailey, 2008) will be administered to assist in identifying the top ten values. A measure of commitment to values was created (see Appendix C) and this will be used to measure committed action in accordance with each participants identified values. The CST will also be used as a therapeutic tool during the ACT treatment condition.

4.14.3 Secondary Outcome Measures

4.14.3.1 *Psychological distress*

The Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) will be administered to assess psychological distress in part because it tends to be less confounded by somatic symptoms when compared to other anxiety and depression scales and has been found to sensitive to changes in a TBI population (Draper et al., 2007). The HADS has two subscales (7-items each) measuring self-reported anxiety and depression with score ranges of 0-21. The subscales have high internal consistency (Cronbach alpha = 0.90; Moorey et al., 1991) and high test-retest reliability (r = 0.92; Zigmond & Snaith, 1983).

The Positive and Negative Affect Scales (PANAS) (Watson, Clark, & Tellegen, 1988) will also be used for emotional distress but in addition will provide a measure of positive affect. The PANAS is a 20 item measure with 10 words relating to positive mood states and 10 words relating to negative mood. Respondents are asked

to rate on a 5-point scale, the extent they would normally feel that emotion (where 1 = never and 5 = always). The PANAS has good internal consistency on both subscales and is sensitive to short term mood states (Watson et al., 1988).

Weekly administered measures of psychological distress will include the DASS-21 (Lovibond & Lovibond, 1995) and the Positive and Negative Affect Schedule - Short Form (I-PANAS-SF) (Thompson, 2007). The DASS-21 is a 21 item self-report measure that assesses depression, anxiety and stress over the previous week using a 4-point scale. It has been found to be sensitive to psychological distress in an acquired brain injury (ABI) population (Ownsworth, Little, et al., 2008). The DASS-21 has good reliability on all three subscales (Cronbach's alpha = 0.73- 0.81: Lovibond & Lovibond, 1995). The I-PANAS-SF, is a shorter form of the PANAS and employs five words in each scale. This will be used for the weekly measures in order to reduce the burden on participants. The shortened version of the scale still retains good internal consistency (Cronbach's alpha = 0.78 & 0.76: Thompson, 2007).

4.14.3.2 ***Social participation***

The Sydney Psychosocial Reintegration Scale-2 (SPRS-2) will assess social participation. The SPRS-2 comprises 12 items rated, by either staff from the BIRU involved in the participant’s rehabilitation or a family member. Each item is rated on a 5-point Likert type scale and in addition to a global score the measure is organised into three domains of psychosocial outcome (occupation, relationships, independent living). Scores range from 0 to 48 with higher scores indicating an increasing level of independence. Internal consistency, test-retest and interrater reliability and concurrent validity were all strong (Tate et al., 2011).

4.14.3.3 ***Quality of life***

The Short Form Health Survey (SF-12) (Ware Jr et al., 1996) is a 12–item self-report questionnaire designed to measure a person's perceived health status across eight health concepts, including both mental and physical health. It demonstrates good reliability and validity (Ware Jr et al., 1996). The SF-12 has been used successfully with a TBI population, to assess health status, in previous large scale prevalence research (Anstey et al., 2004).

4.14.3.4 ***Psychiatric Screen***

The General Health Questionnaire–12 (GHQ-12) (Hardy et al., 1999) will be administered to screen for minor psychiatric disorders and in addition, it has been found to be sensitive to changes in psychological flexibility (Bond et al., 2011). It is a self-administered questionnaire with a focus on psychological components of health assessing symptoms such as concentration, anxiety, depression and confidence. It uses a 4-point Likert scale with a score range of 0 to 36 and demonstrates good reliability (Cronbach's $\alpha = 0.89$) and test-retest correlation ($r = 0.73$) (Hardy et al., 1999).

4.14.3.5 ***Awareness of deficits***

Poor self-awareness after a TBI has been found to lead to poorer outcomes (Ownsworth et al., 2007) and may impact on emotional distress (McBrinn et al., 2008) and decrease motivation to engage in treatment (Sherer et al., 1998). The Awareness questionnaire (AQ) (Sherer et al., 1998) will be used as a covariate in the analysis of the data. The Awareness questionnaire is a 17-item questionnaire relating to comparison of deficits pre and post injury on three domains including cognitive,

behavioural/affective and motor sensory. Each item is rated on a 5-point scale giving a total score of between 17 and 85. It is administered to the person with the brain injury and a family member and discrepancy scores are calculated to determine the level of awareness. The scale demonstrates good internal consistency for both the person with the brain injury and the family member (Cronbach's alpha = 0.88: Sherer et al., 1998).

4.15 Procedure

4.15.1 Screening and Recruitment

Participants will be recruited from the clinical psychology waiting list or by referral by other members of the LBIRU community rehabilitation team. They will initially be screened to determine whether they meet criteria and then informed consent will be attained. Following completion of the background, primary and secondary outcome measures (Time 1), participants will be assigned to the ACT or Befriending treatment group.

4.15.2 Random allocation

Random allocation will be undertaken by a third party (an employee of the LBIRU not directly involved in the study) using a block randomisation procedure (2 participants per group). Allocation concealment will be ensured by assigning participants an ID number and forwarding the block of IDs to the staff member who will then allocate participants to either of the two conditions on a 1:1 ratio via a computer-generated set of random numbers.

4.15.3 Treatment

Treatment will commence simultaneously with one group receiving the ACT programme and the second group receiving an equivalent number of sessions based on the Befriending protocol (Bendall et al., 2003). The sessions will be delivered by two clinical psychologists (one per group) with clinical experience in working with people with TBI. The psychologists will not be blind to the treatment condition. Sessions one to six will be undertaken weekly for a period of two hours at a negotiated time convenient for all participants. Weekly assessments will be undertaken, at the beginning of each session, with both groups (see Table 12).

4.15.3.1 *Follow-up assessments and booster session*

Primary and secondary outcome measures will be re-administered to all participants at the end of the programme after the completion of session six (Time 2). Participants will return after one month for a relapse prevention session (session seven) and will then be reassessed on the outcome measures (Time 3) immediately after the booster session. Staff undertaking the Time 2 and Time 3 assessments will be blind to the treatment condition. Participants will be informed not to reveal the condition to which they were allocated to the assessor. To monitor assessor blinding, assessors will record if participants inadvertently revealed the condition that they were allocated to, and assessors will also be asked to guess the condition to which the participant was allocated. On the completion of the post treatment assessment, participants in the active control will be offered individual treatment by the clinical psychologist at the BIRU.

4.16 Data Analysis

We will analyse using IBM SPSS Statistics Version 19 and AMOS version 20. Data screening will be conducted and descriptives performed to assess the variable distributions (e.g., skewness, kurtosis). To deal with any violations of statistical assumptions, we will conduct both typical parametric analyses and nonparametric bootstrap analyses using 5,000 samples and the bias-corrected percentile method (Mooney, Duval, & Duval, 1993.)We will not declare an effect to be significant unless it was significant in both analyses.

The intervention analyses will focus on two major questions: 1) What aspects of mental health do the interventions positively influence, and 2) by what processes do the interventions work. Figure 4 presents a model of the analyses. Model A represents the total effect of Intervention (X) on mental health Outcome (Y). This model is tested by using repeated measures analyses that assess the extent that the ACT versus Befriending intervention influences well-being at T2 and T3, relative to baseline.

Model B represents the direct effect of X on Y, and the indirect effect through the mediator (M), or psychological process variable (psychological flexibility, value success). This tests our key hypothesis that the intervention leads to improvement in mental health by increasing scores on the mediator (e.g., increasing psychological flexibility or value consistent living). Model C is a multiple mediation model, and will allow us to test the extent that our intervention unique alters each of our process variables and the extent that these process variables in turn uniquely influence outcomes. We will use the bootstrapping method described by Preacher and Hayes (2008) to test the meditational models. In order to establish temporal precedence

(e.g., that the mediator changes before the outcome), we will focus on the influence of change in the mediators (baseline to post-intervention) on changes in the outcomes (post-intervention to follow-up).

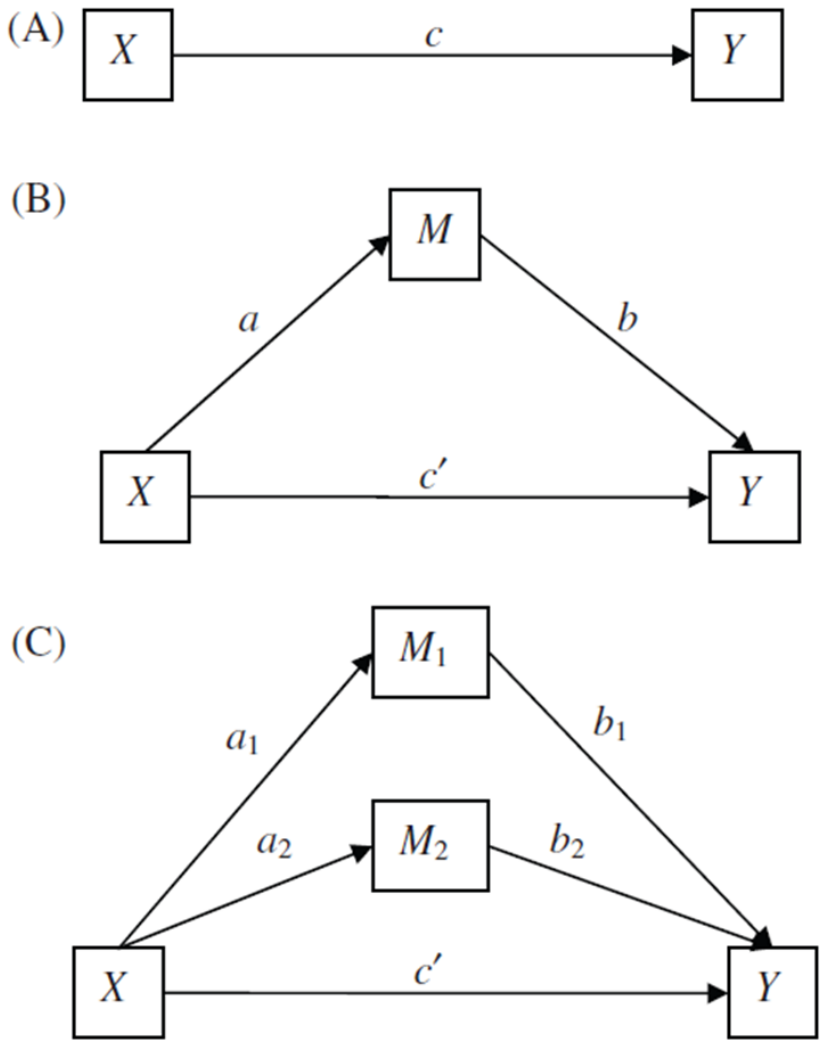

Figure 4. A multiple mediation model of the role of the intervention (X) in increasing psychological flexibility (M1), values success (M2) & mental health outcomes (Y)

Baseline data will be analysed to confirm that the two conditions have similar demographic and clinical characteristics. We will conduct both completer analysis (those who complete all three time points) and intention to treat analyses (Hollis & Campbell, 1999). We will utilise the full information maximum likelihood (FIML)

method to deal with missing data. This method is often preferred to other methods on both theoretical grounds (e.g. it makes less restrictive assumptions) and empirical grounds (the method appears to work better than its alternatives) (Bentler, 2006; Enders & Bandalos, 2001).

4.17 Discussion

After sustaining a TBI, people can experience a wide range of psychological issues which impact on their ability to engage in rehabilitation and return to pre injury functioning. Current studies into the treatment of these psychological issues are limited and often do not meet guidelines for gold standard clinical trials. There is strong need for empirically validated outcome studies to understand the efficacy of effective treatment of psychological distress in a TBI population. Empirical outcome research using ACT is still in its infancy but so far has yielded positive results. However, its efficacy with people experiencing a TBI needs to be determined. There is also an increasing emphasis on the need to clarify the mechanisms by which psychological therapies produce change and an understanding of these components.

This study will implement a RCT comparing ACT with an active control (Befriending) and strive to clarify the process of change during an ACT therapeutic intervention. In addition, the project will explore the therapeutic processes involved in ACT in an attempt to understand the relationships between psychological flexibility, participation and psychological distress after a severe TBI. The results from this study will augment the existing literature on the treatment of psychological adjustment after a severe TBI and contribute to the evidence base of therapeutic interventions for this population.

4.18 Progress

The clinical trial commenced in September 2011 and to date (November 2012) 16 people with a TBI have been screened for the programme with 11 meeting the selection criteria. Three declined to participate in the research programme, with one electing to engage in individual sessions with the clinical psychologist instead. This has resulted in two groups undertaking the treatment programme (N=8) with 2 non-completers. Recruitment is currently underway for the third group. It is anticipated to continue recruiting for the study until December 2013 and then data analysis will be undertaken with the sample achieved at that time (projected N=24).

4.19 Addendum to progress to date

Recruitment for the study is proposed to continue until December 2015 (projected N=24). However, for the purposes of this thesis, given time requirements for completion of doctoral studies a preliminary analysis will be undertaken and is reported in Study 5 (Chapter 6). Prior to reporting the preliminary results from the RCT, the following chapter five reports the results of additional validation work on the primary outcome measure of psychological flexibility.

Chapter 5: Validating Measures of psychological flexibility in a population with acquired brain injury

This is an identical version of the manuscript published in Psychological Assessment.

Whiting, D. L., Deane, F. P., Ciarrochi, J., McLeod, H. J., & Simpson, G. K. (2015). Validating measures of psychological flexibility in a population with acquired brain injury. *Psychological Assessment*, *23*(2), 415-423. doi: http://dx.doi.org/10.1037/pas0000050.

5.1 Introduction

The rehabilitation process after an acquired brain injury (ABI) is a challenging journey requiring adjustment to, and ultimately acceptance of, the changes that have occurred. An ABI encompasses any injury to the brain sustained after birth caused by a lack of oxygen, infection, disease, or a traumatic injury to the head. The injury can result in changes to personality, behaviour, physical and sensory abilities. In addition, cognitive impairments are well documented after a traumatic brain injury (Draper & Ponsford, 2008; Millis et al., 2001) but also occur in other acquired brain injuries including brain tumour (Taphoorn & Klein, 2004), stroke (Nys et al., 2005; Patel, Coshall, Rudd, & Wolfe, 2003) and hypoxia (Caine & Watson, 2000).

As a result of post injury changes, people with ABI often display high levels of psychological distress, which can present as depression (Bombardier et al., 2010), anxiety (Gould et al., 2011), irritability (Alderman, 2003) and anger (Baguley et al., 2006). In addition self-identity problems can develop (Myles, 2004) as the person struggles to come to terms with their post injury self. Hence, facilitating acceptance of emotional dysregulation and identity changes after an ABI is an important therapeutic outcome. However, acceptance is not a passive process. It requires an individual to develop *psychological flexibility*, operationalised as the ability to persist with and/or change behaviour that is consistent with personal values whilst allowing difficult thoughts or feelings to occur (Hayes et al., 2003). Interventions which foster acceptance of the post ABI changes may have relevance with this client group and as a by-product, alleviate symptoms of psychological distress.

5.1.1 Acceptance and Commitment Therapy

One of the main therapy approaches that focus on promoting psychological flexibility is Acceptance and commitment therapy(ACT; Hayes et al., 2003). ACT is a third wave behavioural therapy that proposes when people engage in a narrow repertoire of behaviour in order to manage or avoid difficult thoughts or experiences, they are demonstrating psychological *in*flexibility which, in turn, is associated with worse psychopathology (Kashdan & Rottenberg, 2010). Rather than addressing specific symptoms, ACT focuses more on promoting psychological flexibility by using principles from the underlying philosophy of functional contextualism (Hayes et al., 2003).

Functional contextualism from an ACT perspective involves analysis of internal (thoughts, feelings and memories) and/or external experiences (behaviours) within the context in which they occur. It proposes that by changing a person's relationship to their thoughts, the contingencies controlling behaviour are changed and more adaptive behavioural contexts can be created. For example, a major component of ACT focuses on activating behaviour that is consistent with personally held values. Another component involves being willing to allow difficult inner experience to occur (e.g., self-doubt), in the service of valued action. Hence, a behavioural context is created that promotes adaptive behavioural repertoires rather than focusing on removing maladaptive ones (e.g. changing negative self-concepts).

ACT may be particularly useful for addressing the mixed psychological distress presenting after a brain injury, where a major goal is to improve an individual's functioning and engagement in a meaningful life. In addition, ACT uses a mixture of written work, visual metaphors and experiential role plays allowing the therapist to

work in novel ways to compensate for comprehension difficulties that may arise from the cognitive impairments presenting after an ABI. The suitability of this approach has been supported in two recent reviews examining the use of ACT with individuals with an ABI (Kangas & McDonald, 2011; Soo et al., 2011).

5.1.2 Measuring Psychological Flexibility

Despite suggestions that ACT may be effective in the treatment of psychological distress after an ABI, no measures of psychological flexibility have been validated with this client group. To date, three different measures of psychological flexibility have been used in treatment studies with participants demonstrating cognitive impairment (Brown & Hooper, 2009; Pankey & Hayes, 2003) and only one of those with an ABI sample (Sylvester, 2011). These measures include a simple ACT process measure that utilised a Likert scale with items around defusion of psychotic symptoms and willingness to accept aversive emotions and take action to achieve behavioural goals (Pankey & Hayes, 2003). A modified version of the Acceptance and Action Questionnaire-9 (AAQ-9; Hayes et al., 2004) has also been administered. The researchers simplified the language of the AAQ-9 and used a five-point visual scale (sections in a pie chart) instead of a Likert scale (Brown & Hooper, 2009).

The third study developed a measure specifically to address the acceptance and avoidance of issues relating to an ABI, the Acceptance and Action Questionnaire-Acquired Brain Injury (AAQ-ABI; Sylvester, 2011). The AAQ-ABI comprises 15 items and is adapted from other measures of psychological flexibility (e.g., Acceptance and Action Questionnaire-II item: “I worry about not being able to control my worries and feelings’ translates to the AAQ-ABI item: ‘My worries and fears about my brain injury are true’). The items specifically focus on identifying

thoughts, feelings and behaviours that may arise around functional disability occurring after an ABI. The AAQ-ABI was used as a process measure during an ACT intervention with individuals with an ABI (Sylvester, 2011), but the psychometric properties of the scale have not been evaluated. As such, it is not clear if it is an appropriate tool to assess psychological flexibility after an ABI.

In considering current measures of psychological flexibility, the Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004) is the most commonly used scale to measure this construct in ACT research. The latest version, the Acceptance and Action Questionnaire-II (AAQ-II) was developed to overcome reliability issues with the original AAQ and demonstrates superior psychometric properties over the earlier version across a range of populations (Bond et al., 2011). The AAQ-II is considered a general measure of psychological flexibility relating to anxiety and depression but increasingly the measure has been adapted to assess psychological flexibility in the context of specific issues, whether psychological or situational. Focused measures related to psychological and health related conditions include weight related problems (Lillis & Hayes, 2008), diabetes (Gregg et al., 2007), pain (Hayes et al., 2006; McCracken et al., 2004) and tinnitus (Westin et al., 2008).

Previous studies using the AAQ-II with various populations have found that low levels of acceptance or psychological flexibility are associated with high levels of psychological distress (e.g. Beck Depression Inventory scores) and behavioural ineffectiveness including avoidance (e.g. the White Bear Suppression Inventory scores; Bond et al., 2011; Wegner & Zanakos, 1994). This kind of psychological inflexibility relates to the avoidance of both internal and external experiences and is linked to a number of avoidance measures including avoidant coping (Hayes et al., 2004) and thought suppression (MacKenzie, 2008).

5.1.3 Purpose of the Study

To date, none of the measures of psychological flexibility have been validated on a population with cognitive impairment. This is an important gap because the aftermath of ABI is marked by significant problems with psychological distress and behavioural and emotional functioning. These issues may hinder the rehabilitation process and psychological interventions which promote acceptance of these changes, such as ACT, might improve therapeutic outcome. This measure may also contribute to an improved ecological perspective of cognitive flexibility, traditionally measured by neuropsychological tests (Greve et al., 2002), as this is considered to be a component of psychological flexibility (Chawla & Ostafin, 2007; Kashdan & Rottenberg, 2010). Finally, this research addresses this gap by undertaking a preliminary validation of two measures of psychological flexibility, the AAQ-II and the AAQ-ABI. The first step in the analysis involves an exploratory factor analysis (EFA) to determine the factor structure of the AAQ-ABI. Following this process, tests of construct validity (emotional distress and avoidance as supported in previous research) are performed on both the AAQ-II and AAQ-ABI to determine the appropriateness of each measure for people with an ABI.

5.2 Methods

5.2.1 Participants

This study involved 150 participants (116 males, 34 females) with an ABI, who were recruited from the Liverpool Brain Injury Rehabilitation Unit, Sydney (LBIRU). The relatively low proportion of women reflects the fact that 117 participants had suffered a traumatic brain injury, which is more common in men.

The sample size ensured a sufficient participant item ratio of 10:1 to conduct the EFA on the AAQ-ABI (15 items) (Streiner, 1994). The inclusion criteria included having sustained the ABI after the age of 17 years, currently being aged between 17 and 65 years and having sufficient language skills and cognitive ability to complete the measures. A total of 294 participants were screened of these, 26 (8.8%) declined to participate and 107 (36.4%) did not meet the study criteria. In addition to this, 11 (3.7%) were excluded when they were found to be feigning neuropsychological impairment on the Test of Memory Malingering (Tombaugh & Tombaugh, 1996) which is lower than rates reported in other head injury samples (Mittenberg, Patton, Canyock, & Condit, 2002; Moss, Jones, Fokias, & Quinn, 2003). Participants with dementia or other degenerative neurological illnesses (e.g. Parkinson's disease, multiple sclerosis) were also excluded (*N* = 2, 0.7%).

5.2.2 Measures

The AAQ-ABI (Sylvester, 2011) is a questionnaire assessing psychological flexibility specifically relating to the acceptance and avoidance of thoughts and feelings that may arise as a result of an ABI. The scale comprises 15 items using a 5-point Likert scale (response format 0='not at all true' to 4='very true'). It has scores ranging from 0 to 60 with higher scores indicating greater levels of acceptance. The original developers were experts in either ACT or brain injury and they reviewed the items to ensure they correctly encapsulated the construct of the acceptance in an ABI population (DeVellis, 2003). In this study, the wording of one item received a minor revision to disambiguate its meaning (item 5 "My brain injury defines me" to "My brain injury defines me as a person"). The scores were reversed so higher scores were indicative of greater psychological inflexibility to ensure consistent scoring

with the AAQ-II (Bond et al., 2011). Currently there are no validation data available on this measure, nor an analysis of its factor structure or clear reporting of how items were generated.

5.2.2.1 *Demographics*

Demographic and background information related to the participants' injuries and premorbid and current functioning were collected. Injury severity for individuals with a traumatic brain injury was determined by the length of post-traumatic amnesia (PTA). A PTA of less than one hour is classified as mild TBI; 1-24 hours as moderate; 1-7 days as severe and greater than 7 days as very severe (Russell & Smith, 1961).

5.2.2.2 *Psychological Flexibility*

The AAQ-II (Bond et al., 2011) is a 7-item questionnaire utilising a 7-point Likert scale (response format, 1='never true' to 7 = 'always true') with scores ranging from 0 to 49, and higher scores indicative of greater psychological inflexibility or experiential avoidance. The AAQ-II is positively related to psychological distress including measures of depression and anxiety. Previous confirmatory factor analysis on three different samples supports a one-factor model with scores indicating good reliability and validity (Cronbach's alpha ranging from 0.78-0.88: Bond et al., 2011). The main difference between the AAQ-ABI and the AAQ-II relates to specific references to brain injury in the items (e.g., AAQ-II item 1: 'It's OK if I remember something unpleasant', AAQ-ABI item 7: 'It is OK for me to feel different after my brain injury').

5.2.2.3 ***Mood***

The Depression Anxiety and Stress Scales-21 (DASS-21) is a 21 item self-report measure that assesses depression, anxiety and stress over the previous week using a 4-point scale. The DASS-21 has good reliability for scores achieved on all three subscales with Cronbach's $\alpha = 0.73\text{-}0.81$, (Lovibond & Lovibond, 1995) and it has been shown to be a valid measure of depression, anxiety and stress in people with ABI (Ownsworth, Little, et al., 2008). Also the current factor structure of the DASS-21 has been recently been confirmed in a severe TBI population (Randall et al., 2014) providing additional support for its use in a population with brain injury. In a sample of university students, scores on the subscales of the DASS showed a significant positive association with psychological inflexibility (Bond et al., 2011).

The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) is a 20-item scale with two independent subscales of affective mood state, Positive Affect (PA) and Negative Affect (NA). Single word descriptors are used (e.g. inspired, proud, enthusiastic or ashamed, nervous, scared). Participants are required to rate the extent they have experienced the mood state over the past week using a 5-point Likert scale (response format, 1 = 'very slightly' to 5 = 'extremely'). High PA scores demonstrate the extent to which an individual experiences pleasure in their environment while high NA is indicative of distress and lack of engagement. Scores on the subscales have good internal reliability (Positive Affect $\alpha = .88$, Negative Affect $\alpha = .85$) (Watson et al., 1988). The PANAS was selected as scores on the Negative affect subscale has been associated with psychological inflexibility in both cross sectional studies (Kashdan, Barrios, Forsyth, & Steger, 2006; Shallcross, Troy, Boland, & Mauss, 2010) and in experimental studies where increases in acceptance

(psychological flexibility) have resulted in lowered negative affect (Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Twohig, Hayes, & Masuda, 2006).

5.2.2.4 *Threat Appraisal and Experiential Avoidance*

The Avoidance and Threat Appraisals Questionnaire (ATAQ; Riley, Brennan, & Powell, 2004) is a 36-item measure developed to identify specific threat appraisals and related avoidance that may occur after an individual experiences a traumatic brain injury (e.g. 'Sometimes I worry I might get attacked and injured when I am out'). Participants are required to indicate whether in the previous month they have experienced that appraisal and if they have avoided something as a result of the appraisal. This yields two scores for total threat appraisal and total avoidance behaviour. The questionnaire demonstrates good internal reliability for scores on both indices (Cronbach's α being 0.92 and 0.94 respectively) (Riley et al., 2004). Avoidance of thoughts and memories that result in psychological distress are associated with psychological inflexibility (Hayes et al., 2006). Therefore it is expected that scores on the ATAQ will be positively related to scores on both the AAQ-II and AAQ-ABI.

5.2.3 Procedure

Ethical approval was granted by the local health district Human Research Ethics Committee and informed consent was obtained from participants before administration of the measures. The first sample of 75 participants, who completed the full battery of tests, comprising the DASS-21, PANAS, ATAQ, AAQ-II and AAQ-ABI, was recruited when they attended a neuropsychological assessment at the Liverpool Brain Injury Rehabilitation Unit. The two measures of acceptance (AAQ-II and AAQ-ABI) were re-administered between 1-2 weeks later to assess test-retest reliability. The second sample of 75 participants was recruited from the active outpatient clients of the brain injury unit and completed the AAQ-ABI only, to meet

the sample size requirements of the EFA and to reduce assessment burden on participants. In addition, demographic information including injury information was collected for all participants from their medical file.

5.2.4 Data Analysis

Data were entered and analysed using IBM SPSS version 22.0 (IBM Corp, 2013). The analysis of the AAQ-ABI involved an EFA using principal axis factoring followed by direct Oblimin rotation. The analysis of the AAQ-II involved a confirmatory factory analysis (CFA) examining the Chi-square statistic (χ^2) and four additional indicators of fit including the root-mean-square error (RMSEA), the standardised root-mean-square residual (SRMR), the comparative fit index (CFI), and the Non-Normed Fit Index (NNFI) (also known as the Tucker-Lewis Index TLI). Goodness of fit was explored using a two-index presentation format as suggested by Hu and Bentler (1999). Internal consistency was assessed using Cronbach's alpha and test-retest reliability employed intraclass correlations. Construct validity was undertaken using Spearman's rank correlation coefficient as the measures have ordinal data (Likert scales). To control for Type I error, arising from the multiple comparisons in testing construct validity, a Bonferonni correction was applied with alpha set at .001 with one-tailed testing.

5.3 Results

5.3.1 Participant Characteristics

All measures in the assessment battery were completed by participants (n = 150) with the exception of a small amount of missing data (N = 3, 4%) on the AAQ-ABI and AAQ-II second administration for the test-retest reliability. Participants' ABI

resulted from either a severe traumatic injury (*N* = 117) that is with a period of post-traumatic amnesia (PTA) greater than one day), a brain tumour (*N* = 11), a hypoxic injury (*N* = 9) or a cerebrovascular accident (CVA: *N* = 13). All participants showed some degree of cognitive impairment as measured on the Trail Making Test (Reitan, 1958) (Trails A, z score M= -1.2, SD= 1.71; Trails B, z score M=-2.52, SD=3.52). The Trail Making Test is a recommended test of neuropsychological impairment for a brain injury population (Wilde et al., 2010). Participants were more likely to have been born in Australia and had a mean age of 38.12 years (SD = 13.74). This is older than the typical TBI population with the mean age being influenced by the non-traumatic ABI participants who are usually older. A series of non-parametric comparisons between the traumatic brain injury group and those with other forms of ABI confirmed this and revealed age as the only significant difference between the groups, with the traumatic brain injury group being younger in age ($z = 2.98$, $p < .01$; TBI 36.4 years ± 13.4 vs. other ABI 44.4 years ± 13.2). Demographic information is detailed in Table 13.

Table 13. Demographic variables

Variable	Total Participants (n=150)	TBI (n=117)	Other ABI (n=33)
	Mean (SD) / Number (%)		
Gender			
Male	116 (77.3%)	97 (83%)	19 (58%)
Female	34 (22.7%)	20 (17%	14 (42%)
Age (years)	38.1 (13.7)	36.5 (13.4)	44.4 (13.2)
Born in Australia			
Yes	100 (66.7%)	80 (68.4%)	20 (60.1%)
No	50 (33.3%)	37 (31.6%)	13 (39.9%)
Education (years)	11.6 (2.2)	11.3 (2.0)	11.6 (2.3)
Time since injury (months)	15 (6-39)	32.8 (34.4)	27.5 (38.6)
PTA (months)		32.6 (38.8)	N/A

Note. PTA = post-traumatic amnesia

5.3.2 Data and Item Level Screening: AAQ-ABI

Individual items on the AAQ-ABI were examined in the first instance to review skewness and unbalanced distributions (Clark & Watson, 1995). A number of the items had unbalanced distributions (for example: item 11, ‘Other people make it hard to accept myself’ and item 13, ‘I often pretend I don’t have a brain injury’) where the majority of participants endorsed ‘not at all true” (item 11 = 58%; item 13 = 49.2%). However, these were still retained due to the small item pool and with clinical populations there is a greater tendency to have unbalanced distributions (Clark & Watson, 1995). Inspection of frequencies found none of the 15 items had a restricted range such that none of the items had more than 90% of responses falling on any two points of the Likert scale (Streiner, 1993).

5.3.3 Factor analysis

5.3.3.1 *Exploratory Factor Analysis of the AAQ-ABI*

The 15 items of the AAQ-ABI were subjected to an EFA using principal axis factoring followed by direct Oblimin rotation using IBM SPSS Version 22 (IBM Corp, 2013), as it is anticipated there would be some correlation between the factors (Costello & Osborne, 2005). This analysis resulted in three factors with eigenvalues greater than 1.0 which accounted for 44.82% of the variance, the first factor accounted for 32.2% of the variance, the second factor 7.96% of the variance and the third factor 4.66% of the variance. This was supported by a review of the Scree plot which indicated a two or three factor solution. The pattern matrix for the EFA is displayed in Table 14.

Table 14. Pattern Matrix of the Exploratory Factor Analysis (n = 150)

Item No.		Factor 1	2	3
5	My brain injury defines me as a person	**.814**	-.133	.147
9	My worries and fears about my brain injury are true	**.778**	.204	.093
2	I hate how my brain injury makes me feel about myself	**.765**	.041	-.033
3	I need to get rid of my anxiety about my brain injury	**.762**	.002	.157
4	I stop doing things when I feel scared about my brain injury	**.760**	.011	.077
11	Other people make it hard for me to accept myself	**.595**	.016	-.066
14	Most people are doing better than me	**.583**	.013	-.296
8	I would give up important things in my life if I could make the brain injury go away	**.571**	.197	-.129
6	I am moving forward with life	**-.467**	.260	.288
13	I often pretend that I don't have a brain injury	.247	**.503**	-.334
10	I try not to think about having a brain injury	.151	**.477**	-.011
15[a]	Even with my brain injury I can do good work	**-.409**	**.467**	.208
12[b]	I don't need to be ashamed of my brain injury	-.123	.305	.239
1	I do things I care about even when I feel upset about my brain injury	.040	.152	**.594**
7	It is OK for me to feel different after my brain injury	.065	-.085	**.477**

Note. Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 17 iterations.
[a]Item 15 excluded due to loading on two factors. [b]Item 12 excluded due to factor loading < 0.4

Inspection of the pattern matrix was undertaken and suggested three factors. Items that performed poorly were excluded including items with a loading of less than .4 and also items that loaded equally on more than one factor (Costello & Osborne, 2005). This removed two items (items 12 & 15) and left factors two and three with only two items each. All three factors were interpretable, Factor one appeared to represent 'reactive avoidance' of emotions arising from the ABI; Factor two, 'denial' of the ABI and; Factor three, 'active acceptance' of the ABI itself. Further analyses were undertaken on all three factors. The same extraction and rotation was run again on the remaining 13 items. These three factors accounted for 47.01% of the variance

(Factor one = 35.43%, Factor two = 6.65%, Factor three = 5.01%) with the following Cronbach's alpha coefficients; Factor one .89, Factor two .38 and Factor three .46. Small or no correlations existed between each factor score, -.27 between Factor one 'reactive avoidance' and Factor two 'denial', .29 between Factor one and Factor three 'active acceptance' and no correlation -.02 between Factors two and three. The mean scores for the sample on the three factors were; Factor one M = 12.61 (SD = 9.32), Factor two M = 3.46 (SD = 2.46) and Factor three M = 3.10 (SD = 2.10).

5.3.3.2 ***Confirmatory Factor Analysis of the AAQ-II***

Before conducting a CFA, all data, including all item scores and the AAQ-II total score, were tested for normality. Only item-5 fell outside the acceptability ranges for skewness (Clark & Watson, 1995). A CFA was run on the 7 items of the AAQ-II with SPSS Amos Version 22 (IBM Corp, 2013). Using Hu and Bentler's (1999) two index presentation strategy, the current one-factor model of the AAQ-II was not a good fit for this ABI sample. All measures of fit with the exception of Standardised Root Mean Square (SRMR) fell outside recommended guidelines (Table 15). Scores on the AAQ-II demonstrated high internal consistency (Cronbach's α=.90). The AAQ-II mean score for this sample (n=75) was M = 20.16 (SD = 10.18).

Table 15. Confirmatory factor analysis for the AAQ-II in an ABI sample (n=75)

Model	χ^2	df	RMSEA (≤.06)	SRMR (≤.09)	CFI (≥.95)	NNFI (≥.95)
ABI (N=75)	46.22**	14	.176	.065	.890	.835

Note. RMSEA = root-mean-square error of approximation; SRMR = standardised root-mean-square; CFI = comparative fit index; NNFI = non-normed fit index; values in parentheses define good model fit for the respective fit index (Hu & Bentler, 1999).

**p<.001

5.3.4 Test – Retest Reliability AAQ-ABI and AAQ-II

Test-retest reliability was undertaken on both measures after a 7-14 day (M=9.74, SD= 3.23) interval between the two test occasions. A high degree of reliability was found between scores on Factor one (reactive avoidance) of the AAQ-ABI between the two time points, with an ICC coefficient of .92 (95% CI = .86 to .95). Scores on the other two factors were not as reliable over the two time points (Factor two – Denial: ICC = .75, 95% CI = .60-.85; Factor three- Active acceptance: ICC =.68, 95% CI = .49-.80). The scores on the AAQ-II also had good test-retest reliability (AAQ-II: ICC = .86, 95% CI = .78 - .91).

5.3.5 Relationship with Age

The relationship between age and both the AAQ-ABI (three factors) and the AAQ-II was explored as earlier analysis had indicated that participants with an injury from a trauma were significantly younger than participants with a brain injury from other sources (CVA, BT or hypoxic). Factor two of the AAQ-ABI (Denial of the ABI), had an inverse relationship with age (r_s = -.33, p = .003) such that as age increased denial decreased. This relationship with age was not present on any of the other subscales on the AAQ-ABI or the AAQ-II.

5.3.6 Construct Validity

5.3.6.1 *Psychological Flexibility*

There was a moderate to strong positive relationship between AAQ-II Factor one scores and the AAQ-ABI but this was at a low enough level to indicate they are not

measuring exactly the same construct (see Table 16). Factor two and three scores of the AAQ-ABI were not significantly correlated with scores on the AAQ-II.

Table 16. Correlation matrix (r_s), AAQ-ABI & AAQ-II with other measures (n = 75)

	AAQ-ABI			AAQ-II	**AAQ-ABI (RA)**
	Reactive Avoidance (RA)	Denial (D)	Active Acceptance (AA)		(Control variable-AAQ-II)
Psychological Flexibility					
- AAQ-ABI (RA)	**.28**				
- AAQ-ABI (D)	**.18**	.11			
- AAQ-ABI (AA)	**.70****	.20	.06		
- AAQ-II					
Depression (DASS-21)	**.67****	.26	.15	.67**	.39**
Anxiety (DASS-21)	**.63****	.44**	.21	.55**	.53**
Stress (DASS-21)	**.64****	.30	.08	.58**	.36**
Positive Affect (PANAS)	**-.35****	-.10	.37**	-.27	-.16
Negative Affect (PANAS)	**.74****	-.27	.11	.70**	.54**
Appraisal Threat (ATAQ)	**.66****	.28	-.02	.63**	.50**
Avoidance (ATAQ)	**.72****	.40**	.06	.62**	.51**

Note. AAQ-ABI = Acceptance and Action Questionnaire-Acquired Brain Injury; AAQ-II = Acceptance and Action Questionnaire-II; DASS-21 = Depression Anxiety Stress Scale-21; PANAS = Positive Affect, Negative Affect Scale; ATAQ = Appraisal Threat and Avoidance Questionnaire; AAQ-ABI (RA) = Reactive Avoidance factor. **p<.001

5.3.6.2 ***Psychological Distress***

High psychological inflexibility as assessed by both the AAQ-ABI Factor one and the AAQ-II were associated with high levels depression, anxiety, stress and negative affect. Table 16 details the correlations of the AAQ-ABI (3 Factors) and AAQ-II with other psychological measures. Positive affect had a moderate inverse relationship with psychological inflexibility. Threat appraisal and behavioural avoidance as measured by the ATAQ, demonstrated a moderate to strong positive

relationship, with both measures. Overall the AAQ-ABI Factor one had slightly stronger relationships in the hypothesised direction than did the AAQ-II. The other two factors of the AAQ-ABI had different and smaller correlations with other measures compared to both Factor one of the AAQ-ABI and the AAQ-II (see Table 16).

5.3.6.3 *AAQ-ABI partial correlations with psychological distress*

As there were significant relationships between the measures of psychological distress and both measures of psychological flexibility, we examined the association between the AAQ-ABI Factor one and measures of psychological distress (DASS-21, PANAS, ATAQ), whilst controlling for general psychological flexibility (AAQ-II). Significant partial correlations between Factor one of the AAQ-ABI with measures of psychological distress (DASS-21, PANAS & ATAQ) are present when the impact of general psychological flexibility (AAQ-II) is controlled (see Table 16).

5.4 Discussion

The main focus of this study was to assess the psychometric properties of the AAQ-ABI to explore its use with individuals who have an ABI. We also assessed the widely used AAQ-II. This is the first validation of two ACT-based measures of psychological flexibility in an ABI population and the preliminary findings appear promising. The EFA of the original 15-item AAQ-ABI revealed three subscales comprising of 13 items. Scores on the first factor “reactive avoidance” had good internal and test-retest reliability, and good construct validity. They were also highly correlated to scores on a measure of avoidance of thoughts and feelings associated with the brain injury (ATAQ), providing evidence of convergent validity. Although

scores on the AAQ-ABI-Reactive Avoidance subscale were strongly correlated with scores on the AAQ-II, the magnitude of the correlation suggested both measures may be capturing different aspects of psychological flexibility. Partial correlations confirmed that scores on the AAQ-ABI were significantly related to scores on the other measures (e.g., psychological distress) even when the effects of the AAQ-II were controlled. This suggested unique variance was being captured by the AAQ-ABI.

The other two factors (denial and active acceptance), only had two items each but were retained due to their descriptive clarity and because they appeared to be conceptually different to factor one. Factor two appeared to capture denial of the injury and demonstrated a moderate positive relationship with measures of psychological distress. Factor three appeared to represent a more active acceptance as demonstrated by its relationship with positive mood. Both factors in their current form had poor reliability and factors with fewer than three items are often excluded due to their weak and unstable structure (Costello & Osborne, 2005). Thus, we can only recommend that factor one, "reactive avoidance" be used clinically with factors two and three being retained for research and future item generation efforts.

The AAQ-II is a general measure of psychological flexibility and is meant to be relevant to a wide range of contexts and disorders. This measure has previously performed well in assessing psychological inflexibility across a range of samples including undergraduate students, substance abuse outpatients, and employees of a UK retail bank (Bond et al., 2011). However, confirmatory factor analysis in the current study indicated that the one factor model of the AAQ-II is not a good fit in an ABI population. Despite this, the AAQ-II had similar correlations with other measures in our ABI sample compared to those found in other populations (Bond et

al., 2011). In addition, scores on the AAQ-II had good test-retest reliability in individuals with an ABI.

In comparing the two measures, scores on the AAQ-ABI had slightly stronger associations with psychological distress and avoidance when compared to the AAQ-II, providing additional support for the premise that psychological flexibility is somewhat context dependent (Hayes et al., 2003). The decision to use the AAQ-ABI or the AAQ-II in an ABI population requires consideration of the targeted outcome. If the outcome is to measure processes of change relating to acceptance of feelings that may arise after an ABI, the ABI specific measure may be more appropriate as has been indicated with other adaptations in clinical health populations (e.g., diabetes and tinnitus: Gregg et al., 2007; Westin et al., 2008). Population specific measures are also more likely to reveal significant mediational effects of psychological flexibility in clinical interventions when compared to general measures (Ciarrochi et al., 2010). However, if improvement in general psychological flexibility is the target then the AAQ-II may be the better choice. There is little difference in the length of the Reactive Avoidance scale (9 items) of the AAQ-ABI compared to the AAQ-II (7 items) but the 5-point response scale used in the AAQ-ABI is likely to reduce cognitive demand (Weijters, Cabooter, & Schillewaert, 2010) compared to the AAQ-II's 7-point scale.

5.4.1 Limitations and Further Research

At this stage, the AAQ-II is the more extensively validated and refined measure used to assess changes in psychological flexibility in ACT treatment trials. In contrast, the AAQ-ABI is a new measure that had a number of limitations in its early conception. The development of the AAQ-ABI did not follow the most conceptually,

robust process nor in the recommended order (DeVellis, 2003). Firstly, there was a relatively small item pool generated when good scale development recommends a large item pool be generated based on sound conceptual foundation (Worthington & Whittaker, 2006). The procedure used for generating items for the AAQ-ABI included revision of items from other measures of acceptance including the earlier 10-item version of the AAQ-II (Bond et al., 2011). This is one strategy suggested in scale development (Streiner & Norman, 2008) but it is also recommended that more than one process is used to generate items in order to achieve good scale development (Clark & Watson, 1995). A larger item pool may have resulted in more robust second and third factors which appear to have some initial face validity but would benefit from further development. Despite these limitations, the current study has systematically evaluated the AAQ-ABI and found Factor One "Reactive avoidance" to be psychometrically sound and likely to capture aspects of psychological flexibility in an ABI population albeit in those with sufficient cognitive capacity to complete self-report measures.

There are a number of steps still required in order to complete the validation process in an ABI population for both of these measures. One approach would be to undertake an ACT intervention with individuals experiencing an ABI and administer both measures to assess change. The 15-item AAQ-ABI has been previously used as a process measure in a small unpublished study and detected a significant increase in psychological flexibility from pre to post intervention but this improvement was not sustained at the one month follow up (Sylvester, 2011). It would be anticipated the AAQ-ABI will be more sensitive to relevant areas of change than the AAQ-II, as the questions are targeted directly toward thoughts and feelings that may arise as a result of an ABI. It is recommended that future research also test the sensitivity of the

AAQ-ABI and AAQ-II to changes over a longer period than the one to two week test retest time frame that was undertaken in this study. Finally, it may be useful to further explore the “denial” and “active acceptance” factors on the AAQ-ABI, by generating additional items and undertaking further factor analysis and construct validity assessment. In a clinical context, denial amongst individuals with ABI is often observed and commonly associated with impairments in self-awareness, a prevalent and often impeding factor in successful rehabilitation after an ABI (Prigatano, 2005). Thus, there is potentially high clinical utility for the “denial” factor in the AAQ-ABI.

The sample used in this study was generally older than a typical TBI population due to the inclusion of non-traumatic ABI and this was indicated by the statistical significant difference between the mean age of participants with a TBI and those with a non-traumatic ABI. Furthermore, exploratory correlations indicated that age had a significant inverse relationship to scores on the “denial” factor. This relationship has been demonstrated previously where older people had more accurate self-awareness than younger people and it was suggested that they may have developed better coping strategies and overall psychological functioning with age (Sabaz et al., 2014).

Both the AAQ-II and AAQ-ABI provide a measure of psychological flexibility in a population who typically demonstrate impairments in their cognitive flexibility (Heled et al., 2012). As it is proposed that a component of psychological flexibility is cognitive flexibility (Chawla & Ostafin, 2007; Kashdan & Rottenberg, 2010), undertaking further research into the relationship between the AAQ-ABI and AAQ-II and neuropsychological measures of cognitive flexibility may contribute to our understanding of both these constructs in an ABI population. One criticism of

neuropsychological tests is their low ecological validity (Burgess et al., 2006) because individuals who perform poorly on testing, are often still able to function effectively in a familiar environment. As both the AAQ-II and AAQ-ABI items address an individual's relationship to their thoughts and experiences contextually, these measures may provide a complementary source of information to neuropsychological testing in individuals with an ABI.

5.4.2 Conclusions

The study provides preliminary validation of two measures of psychological flexibility for individuals with an ABI. Scores on both the AAQ-ABI and AAQ-II had satisfactory internal consistency, good reliability across time, in addition to having expected relationships with theoretically-relevant constructs. This suggests that both measures are appropriate for measuring psychological flexibility in an ABI population. If treatment is specifically targeting acceptance towards thoughts and feelings around the changes occurring after an ABI, then the AAQ-ABI questions may be more relevant to this context than a general measure like the AAQ-II (Bond et al., 2011).

The ABI specific measure may also contribute to our understanding of how interventions that promote psychological flexibility work as has been demonstrated with other population specific measures (Gregg et al., 2007; Lillis et al., 2009). The study provided further support that psychological flexibility has some situational specificity and that psychological *in*flexibility is associated with greater psychopathology. In addition, these measures of psychological flexibility may augment neuropsychological assessment for individuals with an ABI, particularly

measures of cognitive flexibility, by providing a measure of flexibility that is specific to the ABI context.

Chapter 6: Acceptance and commitment therapy after a severe traumatic brain injury: A randomised controlled trial to facilitate psychological adjustment

This chapter describes the initial results of a Phase II clinical trial. Due to time limitations in completing doctoral studies and the slower than projected recruitment rate, the results of the RCT will be analysed and reported before completion of the full study. It is proposed to continue recruitment for the RCT until December 2015 in order to provide a sample size of N = 24. The chapter has not yet been submitted for publication, but will provide the substance of a journal submission in the future.

6.1 Introduction

The rehabilitation journey after a severe traumatic brain injury (TBI) involves a complex adjustment process as the individual copes with multiple changes. As a result, the incidence of psychological distress is high (Bombardier et al., 2010; Bryant et al., 2010; Gould et al., 2011) and often multifaceted (Rogers & Read, 2007; Whelan-Goodinson, Ponsford, Johnston, et al., 2009). Furthermore, the adjustment process is complicated by cognitive impairments, physical changes as well as grief and loss issues (Roundhill, Williams, & Hughes, 2007). The individual must incorporate all these changes in order to adjust to a new self (Freeman, Adams, & Ashworth, 2015; Myles, 2004) with the process of adjustment varying during the post injury journey (Antonak et al., 1993; Schönberger et al., 2014).

Successful treatment for psychological distress to facilitate this adjustment process has generally focussed on reducing specific symptoms associated with problems such as depression (Fann et al., 2015; Topolovec-Vranic et al., 2010), hopelessness (Simpson et al., 2011), anxiety (Hodgson et al., 2005; Hsieh, Ponsford, Wong, Schönberger, et al., 2012), anger (Medd & Tate, 2000) and post-traumatic stress (Bryant et al., 2003). The primary treatment approach that has been utilised is cognitive behavioural therapy (CBT). CBT has also been found to be effective in treating general emotional distress, including depression, anxiety and stress, after acquired brain injury (Bradbury et al., 2008). However, some studies have found CBT to be no more effective than supportive counselling (Ashman et al., 2014) or usual care (Fann et al., 2015) in reducing symptoms of psychological distress in individuals with a TBI. CBT appears promising but there have been a limited number of high quality clinical studies in order to fully establish its efficacy with this

population (Fann et al., 2009; Soo et al., 2011). A recent Cochrane Review (Gertler, Tate, & Cameron, 2015) reported only four studies that used a psychological intervention to treat depression. Three of which used a wait list control (Bédard et al., 2014; Fann et al., 2015; Simpson et al., 2011) and one study which compared CBT to supportive psychotherapy (Ashman et al., 2014). An analysis of the combined results of the three studies using the non-treatment control indicated very low evidence for psychological therapy to treat depression after a TBI (Gertler et al., 2015).

Other successful psychotherapeutic treatments to address psychological distress or improve outcome after TBI have included motivational interviewing with problem solving, supportive counselling and psycho-education over the telephone (Bell et al., 2005; Bombardier et al., 2009) but again, such interventions have not been universally effective (Bell et al., 2011). An alternative approach to symptom reduction after a TBI has included developing appropriate coping strategies that the individual can utilise during their recovery. A number of treatment programmes have addressed the broader spectrum of coping skills, (Anson & Ponsford, 2006b; Backhaus, Ibarra, Klyce, Trexler, & Malec, 2010), social skills (McDonald et al., 2008) or increased participation (Powell et al., 2002) with psychological distress usually being a secondary outcome. None of these studies screened for psychological distress or depression as an inclusion criteria. This may have resulted in a floor effect and contributed to a lack of any significant reduction in levels of depression after the intervention.

Acceptance and Commitment Therapy (ACT) is described as a third wave behavioural therapy that holds some promise. ACT emphasises increasing values consistent behaviour despite or in the presence of distressing thoughts and feelings (Hayes et al., 2003). Rather than focussing on symptom reduction, the therapy aims

to either increase or decrease behaviours (internal or external) that allow a person to move towards valued goals. This therapy outcome is termed psychological flexibility which is at the core of the ACT model, represented diagrammatically as a hexaflex (see Figure 1). As people improve their psychological flexibility, decreases are often evident in psychological distress (Bond et al., 2011). There is an increasing international evidence-base for the efficacy of ACT to facilitate adjustment in people experiencing a number of chronic health conditions including; cancer (Feros, Lane, Ciarrochi, & Blackledge, 2013; Rost, Wilson, Buchanan, Hildebrandt, & Mutch, 2012) and chronic pain (Vowles et al., 2009; Wetherell et al., 2011; Wicksell, Ahlqvist, Bring, Melin, & Olsson, 2008).

The ACT approach has been detailed in early papers (Chaper 2; Whiting, Deane, Simpson, et al., 2015) and Table 2 provides a summary. Reviews have indicated the potential of ACT, to address psychological distress (Kangas & McDonald, 2011; Whiting, Deane, Simpson, et al., 2015) and anxiety (Soo et al., 2011) following brain injury. These publications have also suggested the techniques used in ACT are able to compensate for the cognitive impairments evident after a brain injury through the use of strategies such as using metaphors and experiential exercises. A limited number of cases studies have successfully implemented ACT with a TBI population (Sylvester, 2011; Whiting, Simpson, Ciarrochi, et al., 2012). In addition, a study using ACT to improve psychosocial functioning was undertaken with veterans, some reporting a combat related head injury (Blevins et al., 2011). Despite impaired cognitive flexibility being common in people with a TBI participants in these studies were able to improve their psychological flexibility and showed improvements in other areas of psychological functioning.

In assessing complex interventions, the selection of the appropriate primary and secondary measures which measure the desired treatment outcome is important (Craig et al., 2008). In rehabilitation intervention studies, this selection has often been problematic as outcomes for rehabilitation treatment focus on function which is influenced by contextual and environmental factors (Whyte & Hart, 2003). A review of previous ACT studies indicates three important outcomes for an ACT intervention, increased psychological flexibility, increased participation in meaningful activities and decreased levels of psychological distress in the context of the issue creating the distress. Not surprisingly these outcomes have been the primary targets in the few ACT studies amongst people who have experienced a TBI (Sylvester, 2011; Whiting, Simpson, Ciarrochi, et al., 2012).

In order to measure psychological flexibility in the context of acquired brain injury, the Acceptance and Action Questionnaire for Acquired Brain Injury (AAQ-ABI) was initially developed by Sylvester (2011) with validation being undertaken by later research (AAQ-ABI; Whiting, Deane, Ciarrochi, et al., 2015). Initial case studies (Whiting, Simpson, Ciarrochi, et al., 2012) have indicated the AAQ-ABI is sensitive to changes in psychological flexibility and has a strong relationship with a well-validated measure of general psychological flexibility, the Acceptance and Action Questionnaire-II (Bond et al., 2011).

Another major outcome of ACT is to allow people to engage in a meaningful life despite experiencing ongoing struggles, captured by the committed action component of the ACT model. Within TBI, the concept of committed action appears to be a difficult construct to capture and has been operationalised differently in the published cases. Sylvester (2011), operationalised committed action by a functional measure of participation, the Participation Objective, Participation Subjective Scale (POPS;

Backhaus et al., 2010). This is a broad measure of participation covering five domains including domestic engagement, major life activities, transportation, relationships and community, recreational and civic involvement. A number of the domains may have limited relevance for some people for example, domestic activities such as washing dishes may not be meaningful for some young men, reducing the appropriateness of the measure to assess committed action in the context of values.

Blevins and colleagues (2011) used what they describe as a global measure of function, the Short-Form Health Survey (SF-12; Ware Jr et al., 1996) but, again this does not appear to adequately capture the construct of committed action. The SF-12 is generally described as a quality of life measure and has been used in both ACT research (Hayes et al., 2006) and with a TBI population (Anstey et al., 2004) to measure this construct. The other TBI case study, has explored operationalising committed action in the context of rehabilitation engagement and social functioning (Whiting, Simpson, Ciarrochi, et al., 2012) with limited success. More specifically, the measure failed to measure a statistically meaningful change but may have not adequately captured the construct of committed action. Further exploration of the measures to assess and measure this committed action in the context of brain injury appears warranted.

This current study has been developed to address a number of issues in previous published treatment studies in TBI. Studies have included a mix of acquired brain injuries, for example participants with stroke or hypoxic injuries in addition to TBI (Bradbury et al., 2008; Hodgson et al., 2005; Medd & Tate, 2000). Severity of injury is often not reported (Bradbury et al., 2008) or participants' severity of TBI (based on post-traumatic amnesia score, PTA) may be highly variable ranging from mild

(PTA < 1 hour) to severe injury (PTA > 24 hours) (Ashman et al., 2014; Bell et al., 2011; Bombardier et al., 2009; Fann et al., 2015). The risk of having a sample of mixed injury severity is that people with mild injuries may inflate the scores. These issues may not allow an adequate representation of how people with a severe TBI will perform in the intervention.

Another issue that arises from these studies is whether clinical levels of a disorder have been established prior to treatment (Bombardier et al., 2009) or whether psychological factors are a secondary outcome rather than the focus of treatment (Ownsworth, Fleming, et al., 2008). Also the time since injury can vary greatly within samples from very recent < 1 month to >20 years (Powell et al., 2002). It would be anticipated that the factors contributing to psychological distress and impeding the adjustment process would vary greatly depending on where the person is on their post injury journey (Antonak et al., 1993).

Other elements in the design of this clinical trial were to utilise an active control group, something that is not commonly used in treatment trials with participants who have had a TBI. The use of an active control allows for the control of a number of factors including therapist contact, the expectancy of the client, a therapeutic alliance, and replication of intervention time (Bendall et al., 2006). The majority of previous studies in TBI have either used usual treatment or a wait list control (Bédard et al., 2014; Bell et al., 2011; Brenner et al., 2012; Simpson et al., 2011). Only a small number of completed randomised controlled trials have implemented an active control condition or compared different treatment modalities with individuals with a severe TBI (Ashman et al., 2014; Fann et al., 2015; Hsieh, Ponsford, Wong, Schönberger, et al., 2012; Vanderploeg et al., 2008).

In deciding on the control treatment to use, one consideration is the manualisation of the control intervention in order to maintain an equivalent level of standardisation across the treatment condition and control conditions (Hart et al., 2008; Schulz et al., 2010). Befriending therapy (Bendall et al., 2003), as an active control intervention that meets these guidelines for manualisation and standardisation. Befriending therapy has been successfully used as a way to provide social support to psychiatrically unwell people (Mead et al., 2010) as well as a control condition in the treatment of schizophrenia (Bendall et al., 2006; Jackson et al., 2008).

The aims of this study are to explore the efficacy of ACT compared to an active control (Befriending therapy), for people with a severe TBI in order to facilitate their post injury adjustment. The primary hypothesis is that participants who complete the ACT protocol will improve their levels of psychological flexibility and participation when compared to the participants who complete Befriending therapy. The secondary hypothesis is that those who complete the ACT group will report significant reductions in psychological distress and increases in quality of life when compared to those who complete Befriending therapy. Finally, it is proposed that participants in the ACT group will maintain their treatment gains at one month follow-up after the cessation of treatment.

6.2 Methods

6.2.1 Design

The study was a randomised controlled trial (RCT) comparing ACT to an active control group (Befriending therapy: Bendall et al., 2006; Bendall et al., 2003) with participants randomly allocated to either group on a 1:1 ratio using a 2 x 2 (group x

time, baseline and post-intervention) repeated measures factorial design. Both treatment groups will be delivered in addition to the standard care provided by the service with the exception that during participation in the trial additional psychological treatment will not be provided. Standard care may include occupational therapy, physiotherapy, speech therapy, social work, return to work assistance, case management and medical treatment. The trial is reported according to the CONSORT statement (Schulz et al., 2010) with the study flow diagram displayed in Figure 5. The protocol (Whiting, Simpson, McLeod, et al., 2012) has been registered on the Australian New Zealand Clinical Trials Registry ACTRN12610000851066.

6.2.2 Participants

Participants were recruited from the multidisciplinary outpatient service of Liverpool Brain Injury Rehabilitation Unit (LBIRU). Selection criteria included having a severe traumatic brain injury (post-traumatic amnesia =>7 days), having incurred the injury after the age of 18 years of age and currently being between 18 and 65 years, having sufficient cognitive capacity to complete self-report measures as determined by the treating team and neuropsychological assessment, and having sufficient language skills to participate in the programme. In addition participants needed to be exhibiting a clinical level of psychological distress as measured on the Depression Anxiety Stress Scale-21 (DASS-21: Lovibond & Lovibond, 1995). This was defined as a moderate score or above on any of the subscales (Depression > 13, Anxiety > 9 and Stress > 18). Exclusion criteria included having a severe psychiatric illness, including psychotic disorder or drug and alcohol addiction which was determined by a number of processes including a review of the medical file, self-

report and consultation with their treating rehabilitation team. In addition, participants were excluded if they were more than five years post injury and if they were currently receiving psychological intervention.

Formal power analysis was not undertaken, but an analysis based on prior studies that had participants with TBI provided a power estimate for determining the target sample size. Power analysis to estimate sample size was complicated by the small number of outcome studies where participants had severe TBI and no prior studies with such samples using the primary outcome measures specified in this study. However, previous RCTs using a severe TBI groups have found moderate to large effect sizes (ES of 0.5 and 1.0) on the primary outcome measure with 8 to 10 participants in each group (Hsieh, Ponsford, Wong, Schönberger, et al., 2012; Simpson et al., 2011). In a study using a mixed ABI group a large effect size on the primary outcome variable was reported even with a small sample size (n = 16, ES = .89; Medd & Tate, 2000). Thus, a moderate to large ES was anticipated (0.5 to 1.0) and a sample size of 20 (10 in each group) was thought sufficient to detect effects in this range.

6.2.3 Measures

A battery of nine standardised self-report instruments, measuring primary and secondary outcomes was administered. These included a combination of measures that had been effective in previous ACT or TBI research. In addition, one proxy-report measure was completed by a significant other (family member or close friend), a study specific data protocol, proxy measure and an objective standardised measure were also administered.

6.2.3.1 ***Primary outcome measures***

6.2.3.1.1 Psychological Flexibility (brain injury specific)

The nine item version of the Acceptance and Action Questionnaire - Acquired Brain Injury was used in this study (AAQ-ABI: Whiting, Deane, Ciarrochi, et al., 2015). The AAQ-ABI uses a 5-point Likert scale (0=’not at all true’ to 4=’very true’) with scores ranging from 0-36 and higher scores indicating greater psychological inflexibility in the context of having experienced a TBI. Questions are targeted to assess psychological flexibility around the thoughts, feelings and behaviours that may arise after incurring a brain injury (Item 1. *I hate how my brain injury makes me feel about myself*; Item 7. *My worries and fears about my brain injury are true*). The measure has shown sound psychometric properties with good internal consistency (α = .89), test-retest reliability (ICC = .92) and construct validity, correlating highly with the Acceptance and Action Questionnaire-II (AAQ-II) (r_s= .70) (Whiting, Deane, Ciarrochi, et al., 2015).

6.2.3.1.2 Participation in rehabilitation

The Motivation for Traumatic Brain Injury Rehabilitation Questionnaire (MOT-Q: Chervinsky et al., 1998) was used to measure the willingness of the participant to engage in the rehabilitation process. It is a 31-item scale using a Likert type response format (‘strongly disagree’ = -2 to ‘strongly agree’ = 2), with four subscales; Lack of Denial, Interest in Rehabilitation, Lack of Anger, and Reliance on Professional Help. The total score can range from to -62 to 62 and a mean total score for a TBI sample has been reported as 17.4 (*SD* = 20.6) (Chervinsky et al., 1998). Internal consistency for the total score as assessed by Cronbach’s alpha was 0.91 (Chervinsky et al., 1998).

6.2.3.1.3 Values-consistent living

The Survey of Life Principles Version 2.2 – Card sorting task (SLP) (Ciarrochi & Bailey, 2008) served a dual role as an measurement of values importance at each time point and also by assisting participants with values identification during the intervention (session five). The SLP consists of 60 items that reflect different life principles and abstract goals across a number of domains (e.g. "acting with courage" or "designing things"). Participants are required to rate each principle, which is printed on a business sized card. Each card is randomly presented and allocated to one of three categories by respondents; (1) These principles are not very important to me; (2) These principles are of moderate importance to me; (3) These principles are of the highest importance to me. From the highest importance category, respondents are requested to select their top 10. These 10 are rated using a 5-point Likert scale (where 0 = 'not very' and 4 = 'extremely') by answering two questions (1) How important was the value (Importance) and (2) How consistently are you acting in accordance with your value (Success). SLP scores of value importance have demonstrated good internal consistency (Cronbach's alpha between 0.79 - 0.97; Ciarrochi & Bailey, 2008).

6.2.3.2 ***Secondary Outcome Measures***

6.2.3.2.1 General psychological flexibility

The AAQ-II (Bond et al., 2011) was also administered because at the commencement of the clinical trial, the AAQ-ABI had not been validated. The AAQ-II is a seven-item questionnaire utilising a 7-point Likert scale with scores ranging from 0 to 49 with higher scores reflecting greater psychological inflexibility in general. A recent validation on an ABI sample indicated good internal consistency

(Cronbach's alpha = .90) and test-retest reliability (ICC = .89) (Whiting, Deane, Ciarrochi, et al., 2015).

6.2.3.2.2 Psychological distress

The DASS-21 (Lovibond & Lovibond, 1995) is a 21 item self-report measure assessing depression, anxiety and stress over the previous seven days. It uses a 4-point scale with scores ranging from 0 – 28 for each of the three subscales (scores are doubled to maintain consistent scoring with the DASS, 42 items). The measure has good reliability on all three subscales (Cronbach's alpha = 0.73-0.81; Lovibond & Lovibond, 1995) and the existing factor structure was found to be replicated in samples with a severe TBI (Randall et al., 2014).

The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) was used to assess psychological distress as it has been recommended as being less vulnerable to the confounding effect of somatic symptoms in the measurement of anxiety and depression after TBI (Draper et al., 2007). It consists of two subscales (7-items each) measuring self-reported anxiety and depression over the past 7 days with total scores ranging from 0-21. Though sensitivity to change in a TBI population has been demonstrated (Draper et al., 2007), the depression scale of the HADS was found to have limited sensitivity (67%) for diagnosing depression in a TBI sample (Whelan-Goodinson, Ponsford, & Schönberger, 2009). Scores on the subscales have high internal consistency (Cronbach's alpha = 0.90: Moorey et al., 1991) and high test-retest reliability (r = 0.92; Zigmond & Snaith, 1983).

The Positive and Negative Affect Scales (PANAS) (Watson, Clark, & Tellegen, 1988) was selected to give a measure of positive mood. The 20-item measure assesses both positive (10 adjectives) and negative mood (10 adjectives) over the

past few weeks using a 5-point Likert scale (where 1 = never to 5 = always). Total scores range from 10 to 50 for each subscale. The PANAS has good internal consistency on both subscales and is sensitive to short-term mood state changes (Watson et al., 1988).

The General Health Questionnaire–12 (GHQ-12: Hardy et al., 1999) was administered to assess distress and minor psychiatric disorders. It is a self-report questionnaire with a focus on psychological components of health and assesses symptoms such as depression, stress, anxiety based insomnia, ability to cope and lack of confidence. In this study the Likert method of scoring was implemented using a 4-point scale (0 to 4) and the mean is taken for all 12 scores. The scale shows good reliability (Cronbach's alpha = 0.89) and test-retest correlation (r=0.73) (Hardy et al., 1999) and higher scores have been associated with greater psychological inflexibility (Bond et al., 2011).

6.2.3.2.3 Quality of Life

The Short Form Health Survey (SF-12) (Ware Jr et al., 1996) is a 12–item self-report measure designed to measure perceived health status and has also been described as a broad assessment of quality of life. The SF-12 generates two subscales, physical and mental health with a score from 0 (worst) to 100 (best), standardised to a mean of 50 and a standard deviation of 10 in the general population. It demonstrates good reliability and validity (Ware Jr et al., 1996).

6.2.3.2.4 Social Participation

The Sydney Psychosocial Reintegration Scale-2 (SPRS-2) is a clinician or significant other rated scale of social participation. The SPRS-2 comprises 12 items rated on a 5-point Likert scale giving a global score across three domains of

psychosocial outcome (occupation, relationships, independent living). The total score ranges from 0 to 48 with higher scores indicating an increasing level of independence and participation. Internal consistency, test-retest and interrater reliability and concurrent validity have been found to be satisfactory (Tate et al., 2011). The SPRS will give an indication of committed action in relation to a participant's values by showing increases in participation.

6.2.3.2.5 Participant characteristics

In order to collect demographic, psychosocial and injury information, a study specific protocol was administered. Cognitive function for the purposes of descriptive information was assessed using the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS: Randolph, 1998). The RBANS is broadly used for clinical diagnostic purposes to establish neurocognitive status and takes less than 30 minutes to administer. It assesses five neurocognitive domains as well as overall cognitive function and provides a scaled score profile with six index scores. All scores use age related norms against the general population with a mean score of 100 and standard deviation of 15. The Immediate Memory index consists of two subtests, List Learning and Story memory, the Attention Index consists of both Digit Span and Coding subtests, the visuospatial/Constructional Index consists of the Figure Copy and Line Orientation subtests; the Language Index consists of Picture Naming and Semantic Fluency subtests and the Delayed Memory Index consists of four subtests, List Recall, Story Recall, List Recognition, and Figure Recall. Though developed for an aging population with dementia, the RBANS has been found to an appropriate measure of cognitive function after TBI (Lippa, Hawes, Jokic, & Caroselli, 2013; McKay et al., 2008).

Awareness of deficits, an important factor to facilitate engagement in therapy (Schönberger, Humle, & Teasdale, 2006) was also measured using the Awareness Questionnaire (AQ: Sherer et al., 1998). Low self-awareness that may occur after a TBI may impact on emotional distress (McBrinn et al., 2008) and decrease levels of motivation to engage in rehabilitation (Sherer et al., 1998) which has been associated with poorer outcomes (Ownsworth & Clare, 2006). The AQ has 17 items and is administered to both the person with the brain injury and a family member/close friend. Items are rated on a 5-point scale (total score of between 17 and 85), a discrepancy score between the two ratings (ranging from -68 to 68), is calculated to determine level of awareness. A positive discrepancy score indicates the person with the TBI is under reporting their impairments while a negative score indicates an over reporting of impairments. The scale has good internal consistency for the person with the brain injury and the family member, Cronbach's α=0.88 for both (Sherer et al., 1998).

6.2.3.3 ***Treatment Protocol***

6.2.3.3.1 ACT on adjusting after your brain injury (ACT)

The ACT programme was developed primarily by the first author (DLW), a clinical psychologist trained in ACT and with more than five years' experience working clinically with individuals with severe TBI patients. Other authors (JC & HM), one an experienced ACT practitioner and the other with knowledge of ACT but with expertise in TBI, provided input and consultation on the intervention development. The ACT treatment programme was independently reviewed by a clinician who had demonstrated both clinical and research experience in both ACT and acquired brain injury. Amendments were made to the protocol as recommended.

The treatment programme involved seven weekly 1.5 hour group sessions with each session focussing on a component of the ACT Hexaflex (see Table 17). Delivery of the programme was by a treatment manual with each participant being issued their own work book. This allowed participants to make notes from the sessions as well as providing them with the theoretical component of the ACT model. Homework tasks were also included at the end of each session. Sessions six and seven reviewed the content of all previous sessions. The content of the programme also covered participants' personally identified values, in order to encourage increased participation. The actual content of the sessions involved a combination of mindfulness exercises, psycho-education, discussion and experiential exercises relevant to that session's content. Instructions for the home task concluded the sessions and individuals were required to rate both their motivation and willingness to complete the home task and their engagement in the home task activity was discussed at the next session.

Table 17. Summary of ACT treatment programme

N	Session Title	Session goals/ principles	Experiential exercises	Homework activity
1	Introduction/ confronting the agenda	Getting to know each other Establishing framework of the group Introduce workability of current coping strategies	Mindful breathing Confronting the agenda Mindfulness of the breath Discussion about homework	Monitor mood & coping used over the week
2	Control is the problem	Understanding about control and the normalcy of human suffering Introduce values	Mindful breathing Review homework Walking while telling yourself you can't walk to the back of room Chocolate cake – avoid thinking about a chocolate cake while therapist describes it in detail Let suffering get close[a] Passengers on the bus – metaphor representing all the difficult thoughts, feelings and memories you carry with you	Noticing control behaviours – identifying a valued activity being avoided & noting what occurs (thoughts/feelings/behaviours) when they try to engage in the activity
3	Acceptance and defusion	Understanding impact of language, learning defusion techniques	Breathing meditation Milk, milk, milk – repeating the word milk repeatedly to reduce meaning of the word Physicalise the thought – defusion exercise to make a distressing thought more concrete Don't get eaten machine[b]	Defusion - practicing physicalising the thought
4	Self-as-context and contact with present moment	Separating self from thoughts/feelings/actions Education about mindfulness	Mindfulness of breath Separation of self [c] Observer exercise[d] Chessboard metaphor Eating a sultana mindfully	Practice everyday mindfulness Practice mindfulness meditation (recording)
5	Values	Difference between goals (committed action) and values	Noticing thoughts mindfulness exercise Lighthouse metaphor Travelling west metaphor Survey of Life Principles 2.2[b] Funeral metaphor	Principles and action exercise[b]
6	Values and committed action	Engaging in committed action in conjunction with values Recap and review of each session	Body scan meditation Committed action identification Recall experiential exercises & rationale for exercise	Daily diary exercise involving principles & action[b]
7	Relapse prevention (one month after session 6)	Review progress & consolidate learning	Body scan meditation Discuss progress & homework Recall experiential exercises & rationale for exercise	NA

[a]Wilson and Dufrene (2009); [b]Ciarrochi and Bailey (2008); [c]Eifert, McKay and Forsyth (2003); [d]Hayes, Strosahl and Wilson (2003).

Building on previous research, a number of strategies were implemented to accommodate for cognitive impairments (Hibbard et al., 2005; Judd & Wilson, 2005; Kangas & McDonald, 2011; Khan-Bourne & Brown, 2003; Soo & Tate, 2009; Soo et al., 2011; Whiting, Deane, Simpson, et al., 2015). The programme content was repeated and presented in multiple ways, verbally, visually and using experiential exercises, to facilitate encoding of material. To improve retention, participants were required to discuss the content in the context of their personal experiences and this was written up on a whiteboard with participants copying their own examples into their workbooks. To assist with consolidation of content, the whole programme was reviewed in session six and again in session seven after a one month break as a relapse prevention measure.

6.2.3.3.2 Befriending Therapy (Befriending)

The active control utilised Befriending therapy (Bendall et al., 2003) which has been developed as a control intervention for psychotherapy clinical trials. The Befriending group followed the same structure of the ACT group, meeting weekly for six sessions for approximately 1.5 hours with a follow up session undertaken one month later. The Befriending manual (Bendall et al., 2003) was used by the therapist and participants were given a handout on the first session which detailed the group rules, the activity for the first session and the structure for the following sessions (see Table 18). Befriending has been successfully used as an active control in previous clinical trials (Bush et al., 1999; Jackson et al., 2008) though not with individuals with a brain injury.

Table 18. Summary of the befriending therapy programme

Session	Content
1	Introduction of each group member Discussion around group rules and aims Education about Befriending Therapy Identification of weekly topics by brain storming using the whiteboard For Example: - Going for a coffee - Talking about a previous holiday - Educating others in the group about a hobby or sport - Watch a movie over the week and discuss next session Set the agenda for the sessions 2-6
2 - 6	Session content set according to timetable established in Session 1 - Each participant, including the therapist, to speak on the designated topic with equal time allowance - Time for questions and general discussion
7	Discussion and review of progress over previous month Referral for ongoing services discussed and facilitated

6.2.3.4 *Assessment of treatment fidelity*

Treatment sessions were audio recorded for assessment of adherence to the treatment protocol. In order to ensure all content of the treatment programmes were reviewed, a systematic approach was taken by selecting one session (n = 7) per intervention (n = 2) for each group (n = 5). For example group 1 (ACT and Befriending) session 6, group 2 session 5, group 3 session 4, etcetera. This produced a total of 14 out of a possible 70 sessions for fidelity checking (20%), seven for each intervention. Two purpose developed fidelity measures based on the treatment manuals were used to ensure adherence to both ACT and Befriending treatment protocols (see Appendix C).

The ACT adherence measure was developed after reviewing previous adherence protocols used with ACT interventions (Plumb & Vilardaga, 2010). The measure included 21 items rated on a 5-point Likert scale (1 = 'not at all' to 5 = ''extensively') with total scores ranging from 42 to 105. Higher scores indicate greater adherence to ACT and the treatment protocol. The 21 items were separated into 14 sessional ACT items relating to a) compliance with the treatment manual and, b) the ACT content covered during the session. The additional seven items were designed to assess all seven sessions and included four ACT *in*consistent items, for example, '*challenging cognitions'*, and three general items, for example, '*strategies used to compensate for cognitive impairment*'.

The Befriending Therapy manual (Bendall et al., 2003) identifies six key factors that differentiates it from active therapy, for example, '*Therapist redirects from unresolved conflicts to a neutral topic*'. These six factors were rated on a 5-point Likert scale (0 = 'none of the time to 5 = 'all of the time') giving a potential session scores that could range from 6 to 30. Higher scores are indicative of greater adherence to the Befriending protocol.

6.2.4 Procedure

Following ethical approval from the Sydney South West Local Health District Human Research Ethics Committee, the clinical psychology waiting list of LBIRU outpatient service (Tate et al., 2004) was reviewed for potential participants from September 2011 to October 2014 (n = 169). Forty one participants who met the study criteria were then screened using the DASS-21 for psychological distress. Eleven participants did not meet the study criteria as their DASS-21 subscale scores fell below the moderate range and one participant demonstrated too high a level of

cognitive impairment which was indicated by his inability to understand the questions on the DASS-21. Of the remaining 29 potential participants, eight declined to participate in the intervention preferring to have individualised therapy instead. From this group of 21, one participant moved out of area before he could be randomised to a group and one experienced deterioration in his mental health requiring hospitalisation (see Figure 5).

The remaining 19 participants provided informed consent and completed the baseline assessment battery (Time 1) by the therapist administering the ACT intervention (DLW). Participants were then allocated to either the ACT (10 participants) or the Befriending (9 participants) group once four participants met the study criteria. Four identification numbers were generated and these numbers were randomised by a block randomisation procedure using a computer generated set of random numbers. This randomisation was conducted independently by a person off site allowing concealed allocation. All participants remained in the treatment group to which they had been allocated. Three participants began the treatment programme but did not complete (2 in ACT, 1 in Befriending), resulting in eight participants completing treatment in each group.

In the ACT group, one participant withdrew after session one, stating they no longer wanted to attend a group but preferred individual treatment. The other participant from the ACT group withdrew after session three, citing work commitments as the reason and withdrew from all clinical psychology treatment. In the Befriending group, one participant withdrew after session two reporting that the group was not as expected, they also transferred to individual therapy. None of these

three participants consented to return for additional testing at post-intervention (T2) or follow up (T3).

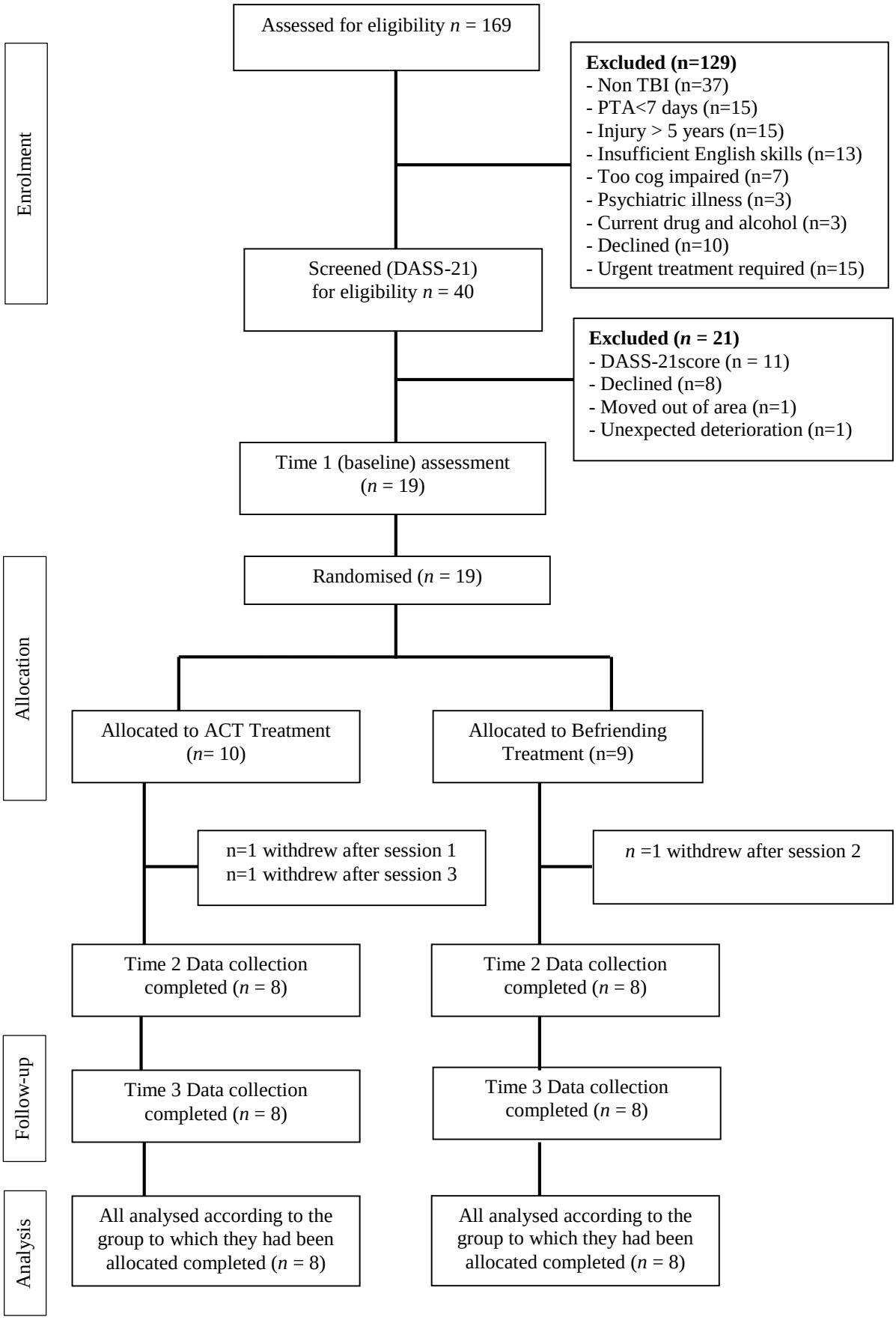

Figure 5. Study Flow Diagram

The ACT intervention was delivered by an ACT trained clinical psychologist with ten years' experience in TBI (DW). The Befriending Therapy was delivered by three therapists. One was an ACT trained clinical psychologist with more than seven years' experience in TBI and the other two were clinical psychology postgraduate students who were undertaking their final clinical placement at LBIRU. Post-intervention (Time 2, after session 6) and follow up measures (Time 3, after session 7) were administered by an independent assessor (research assistant with postgraduate psychology qualifications) blinded to the treatment condition. To monitor the effectiveness of the blinding, the blinded assessor completed a protocol after both the post-intervention (Time2) and follow up (Time 3) assessments. They were required to indicate, whether any participants inadvertently disclosed their treatment group allocation and to guess the intervention group to which the participation was allocated. There was 100% non-disclosure of treatment group allocation by participants and the assessor was successful in guessing the participant's correct treatment group allocation at both Time 2 and 3 in 58.1% of cases (n = 32), suggesting the blinding was largely effective. After the completion of all groups, treatment fidelity was undertaken by a Registered Psychologist trained in ACT, who was both independent and located off site to the study.

6.2.5 Data analysis

Data were entered into PASW Statistics Version 19.0 (IBM Corp, 2013). Data screening to test for normality was undertaken using Shapiro Wilks tests for all outcome measures across each treatment group. For hypothesis 1 and 2, repeated measures analysis of variance were conducted for all primary and secondary variables (group by time) using per protocol analysis. Subgroup analyses were also

conducted using repeated measures analysis of variance in order to compare the efficacy of the ACT and Befriending groups. Per protocol analysis was used in the present report in order to assess whether differential treatment effects are present under ideal conditions. Specifically, when it is known the participants completed the treatment as designed. Given the small sample size this allows the opportunity to maximise the potential to detect effects. The limitation of this analysis should effects be detected is the potential bias due to attrition (e.g., Ten Have et al., 2008). However, the absolute number of participants not completing treatment was low (n = 3 of 19 randomised) and they were distributed across both treatment groups.

Both 95% confidence intervals (CI), effect size (ES, Cohen's d) and changes in mean scores were calculated on those outcome measures which showed trends toward statistical significance. Descriptors for clinically significant changes in mean outcome scores from baseline to post-intervention were identified as small (0.5 SD), medium (1 SD), and large (2 SD) and were calculated from normative data from TBI samples (Cumming, 2013). This method of estimation is proposed to be superior to using null hypothesis significance testing (Cumming, 2014) and follows current recommended guidelines (American Psychological Association, 2010). ES calculation was undertaken by using an online calculation tool (Becker, 1998) with descriptive categorisation of ES used the following parameters, small ES = .2, medium ES = .5 and large ES >.8 (Cohen, 1988).

Hypothesis 3, to evaluate the retention of any treatment gains after one month a 2 (group: ACT vs Befriending) by 2 (time: T2 vs T3) repeated-measures ANOVA was conducted. In order to reduce the number of comparisons and to reduce the chance of Type-I-error, only those measures that were significant or near significant in that

analysis of T1 to T2 change were tested in the T2 to T3 comparisons. The *p* value for the group by time (T2, T3) ANOVA was set at $p < .05$. Due to the small sample size (n=8 completers in each group), no Bonferroni adjustment was undertaken (Feise, 2002; Perneger, 1998).

6.3 Results

Primary and secondary outcome variables showed normal distributions on all baseline measures (T1). Four variables at post-intervention (T2) and two variables at T3 had non normal distributions but when the skewness and kurtosis were examined according to the standard error (Tabachnick & Fidell, 1996), only two variables failed to meet the criteria for normal distribution. These both occurred at post-intervention (T2), with the distribution of the ACT group being negatively skewed for the HADS Depression subscale while the Befriending group had a positively skewed distribution for PANAS Negative subscale. The HADS Depression scores at T1 and T2 were reflected by subtracting each score from the highest score plus one (i.e., 17 +1) and then transformed (Log10), and the PANAS Negative scores at T1 and T2 were transformed (Log10). Transformations resulted in a normal distribution and analysis was performed on the transformed scores for these variables.

At initial screening, all participants (n=19) reported a moderate score or above on any one of the three DASS-21 subscales. For depression 17 participants scored higher than moderate, 16 higher than moderate on anxiety and 13 on higher than moderate on the stress subscale. The majority of participants (n = 15) scored above the moderate range on more than one subscale. Independent t-tests were undertaken to compare both groups (Befriending and ACT) at baseline (T1) across eight variables (age, gender, time since injury, PTA duration, RBANS and AQ) and

outcome measures. The Befriending group had significantly longer PTA scores than the ACT group ($t\ (17) = 2.1$, $p = .05$) but no other significant group differences were identified. The longer PTA score did not appear to translate to differences in cognitive ability, as measured by the RBANS, as all RBANS index scores showed no significant differences between the two groups (see Table 19). Overall participants in both groups indicated a level of impairment in the below average range of cognitive ability, more than one standard deviation below the mean.

Non-parametric-tests were undertaken on DASS-21 screening subscales and demographic variables (age, gender, time since injury and PTA score) to compare participants randomised to those who met criteria but declined. A significant difference was shown for only one variable, time since injury. Those who declined treatment incurred their injury more recently (Median = 7.56 months) than those who agreed to participate (Median = 17.14 months) (Mann-Whitney $U = 24.50$, $p < .01$). Independent t-tests were undertaken at baseline on all primary and secondary measures and no significant differences were found between the ACT or Befriending groups.

Table 19. Demographic characteristics by group assignment

	All randomised participants		Participants who declined treatment
	ACT (n = 10)	Befriending (n=9)	(n = 8)
Age (years), Mean (SD)	36.4 (13.5)	37.2 (12.5)	33.6 (16.9)
Time since injury (months), Mean (SD)	20.7 (17.5)	33.3 (21.5)	7.1 (5.0)
Gender, n (%)			
Male	8 (80%)	7 (77.8%)	7 (87.5%)
Female	2 (20%)	2 (22.2%)	1 (12.5%)
PTA (days), Mean (SD)	19.4 (13.7)	36.3 (21.2)	33.5 (23.7)
Years of Education, Mean (SD)	11.2 (2.0)	11.4 (1.0)	
Level of Awareness, Mean (SD)	-.67 (10.6)	3.7 (6.6)	
RBANS Index Score, Mean (SD)			
Immediate Memory	84.2 (18.3)	79.4 (15.9)	
Visuospatial	93.3 (20.6)	95.9 (16.0)	
Language	85.0 (16.3)	84.3 (18.1)	
Attention	72.0 (13.8)	80.8 (17.2)	
Delayed Memory	84.6 (18.8)	86.1 (16.9)	
Total Score	79.4 (15.6)	80.8 (15.2)	

Note. PTA: Post-traumatic amnesia, RBANS: Repeatable battery for the assessment of neuropsychological status.

6.3.1 Hypothesis 1

Repeated measures analysis of variance indicated the treatment group by time interaction for the primary outcome measures of psychological flexibility (AAQ-ABI) was not significant ($F_{1,14} = 3.85$, $p = .07$). A visual inspection of the confidence intervals (see Figure 6) showed there was no difference in psychological flexibility between the two groups. There were no significant main effects for group and time.

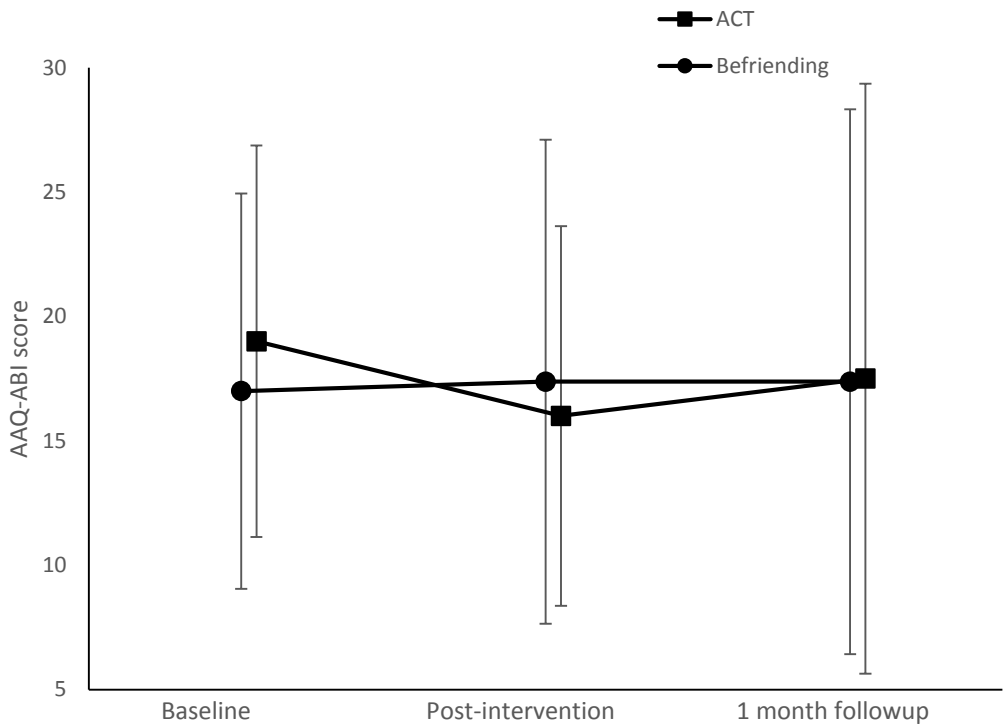

Figure 6. AAQ-ABI mean scores for ACT and Befriending across three time points with 95% CI

There was a significant time by group interaction on the motivation to participate in rehabilitation questionnaire but it was not in the hypothesised direction ($F_{1,14} = 4.5$, $p = .05$). Participants in the ACT group decreased their motivation while participants in the Befriending group maintained their motivation scores from baseline to post-intervention. A visual inspection of the 95% CI of the mean MOT-Q scores (see Figure 7) indicate the ACT group were more highly motivated at baseline than the Befriending group. There was no significant interaction effect for the Survey of Life Principles (SLP; $F_{1,14} = .85$, $p = .37$). There were also no main effects for both variables. Table 20 shows the descriptive statistics for the three primary outcome measures.

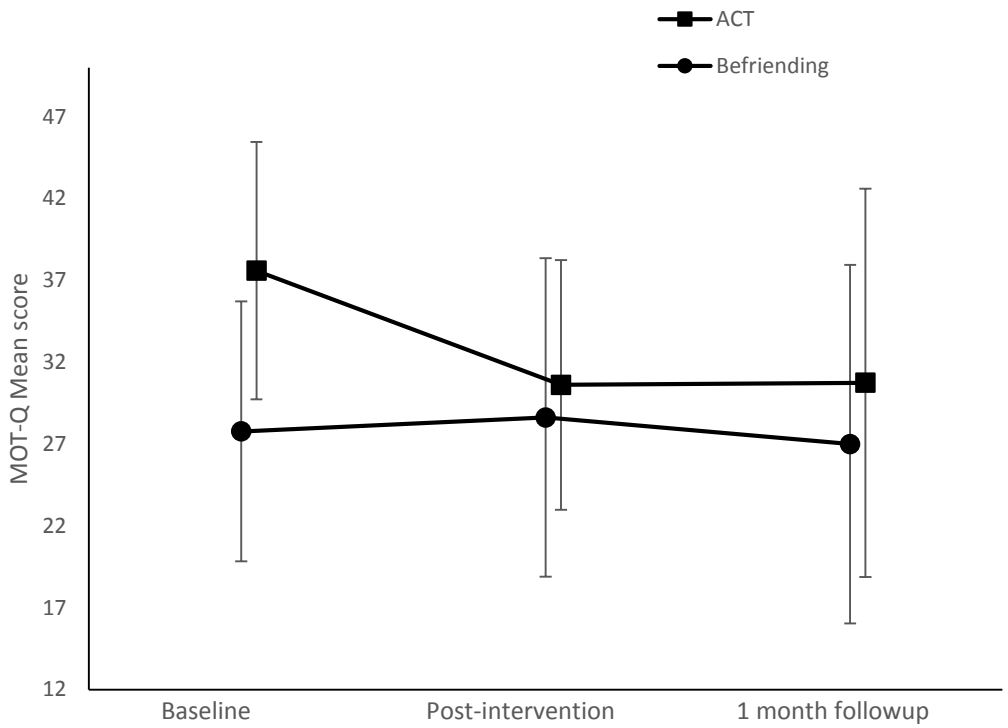

Figure 7. MOT-Q mean scores for ACT and Befriending across three time points with 95% CI

Table 20. Comparison of group means and 95% confidence intervals (CI) across time for primary outcome measures

Measure	Time 1				Time 2				Time 3			
	ACT Mean (SD)	(n=10) 95% CI	Befriending Mean (SD)	(n=9) 95% CI	ACT Mean (SD)	(n=8) 95% CI	Befriending Mean (SD)	(n=8) 95% CI	ACT Mean (SD)	(n=8) 95% CI	Befriending Mean (SD)	(n=8) 95% CI
AAQ-ABI	19.00 (7.09)	13.48,24.52	17.00 (7.37)	11.34,22.66	16.00 (8.94)	8.52,23.48	17.38 (8.48)	10.28,24.47	17.5 (9.41)	9.63, 25.37	17.38 (5.55)	12.73,22.02
MOTQ-Total	37.60 (12.25)	28.84,46.36	27.78 (12.11)	18.48,37.09	30.62 (15.33)	17.81,43.44	28.63 (15.33)	15.81,41.44	30.75 (15.55)	17.75,43.75	27.00 (16.36)	13.32,40.68
SLP	2.07 (.89)	2.07, 3.33	2.36 (.80)	1.75 ,2.98	3.01 (.75)	2.39, 3.64	2.46 (.70)	1.88, 3.05	2.73 (1.04)	1.86, 3.61	2.65 (.49)	2.24, 3.06

AAQ-ABI: Acceptance and Action Questionnaire – Acquired Brain Injury, MOT-Q: Motivation for Traumatic Brain Injury Rehabilitation Questionnaire, SLP: The Survey of Life Principles Version 2.2 – Card sorting task

6.3.2 Hypothesis 2

Repeated-measures ANOVA was carried out on the nine secondary outcome measures. A significant group by time interaction was found on the DASS-depression subscale (time x group: $F_{1,14} = 6.97$, $p = .02$) where those in the ACT group decreased their levels of depression over the course of treatment compared to those in the Befriending group. There was a main treatment effect for time (baseline to post-intervention) on DASS-depression and the ACT group had a large effect size ($d = 1.1$), while the Befriending group showed no change ($d = .12$).

A visual inspection of the group DASS-depression means with 95% CI (see Figure 8) shows the ACT group moved from the moderate/severe range at baseline to the mild/moderate range post-intervention while the Befriending group showed no change remaining in the moderate/severe range. The overlap of the 95% CI at post-intervention suggests the estimate of effect was not as strong as was reported from the repeated-measures ANOVA results.

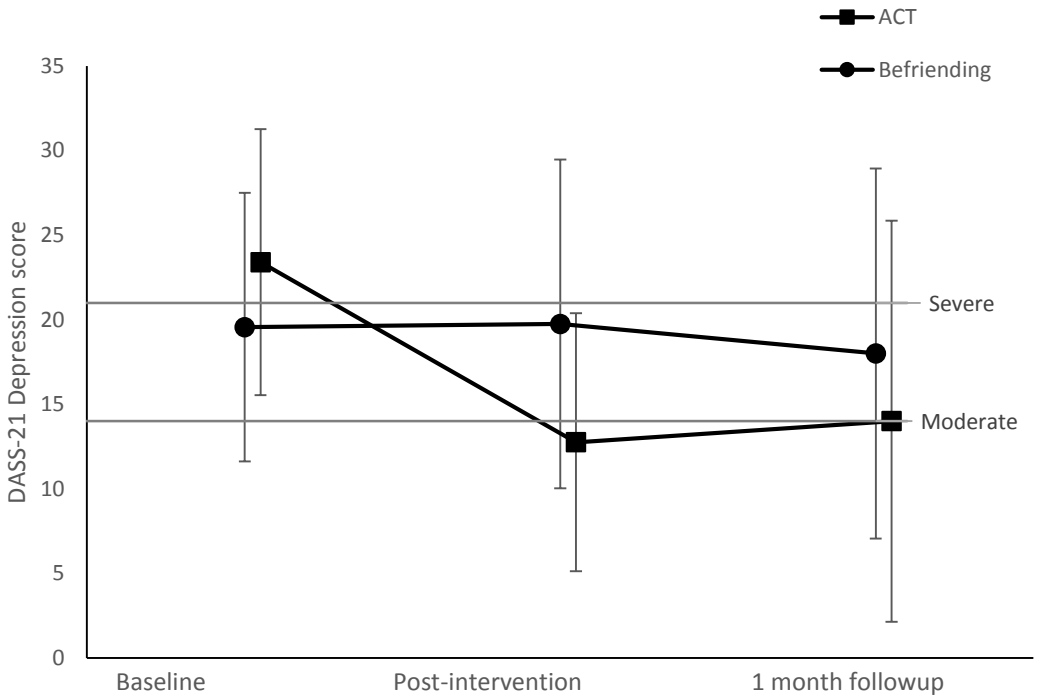

Figure 8. DASS-21 Depression mean scores for ACT and Befriending across three time points with 95% CI

Clinically significant cut offs for DASS-21 depression were calculated from a large severe TBI sample (M = 9.63, SD = 10.5; Randall, et al., 2104) and plotted. Reviewing within group differences from baseline to post-intervention, the ACT group showed a small-to-medium clinical reduction in their levels of depression while the Befriending group indicated no change (see Figure 9).

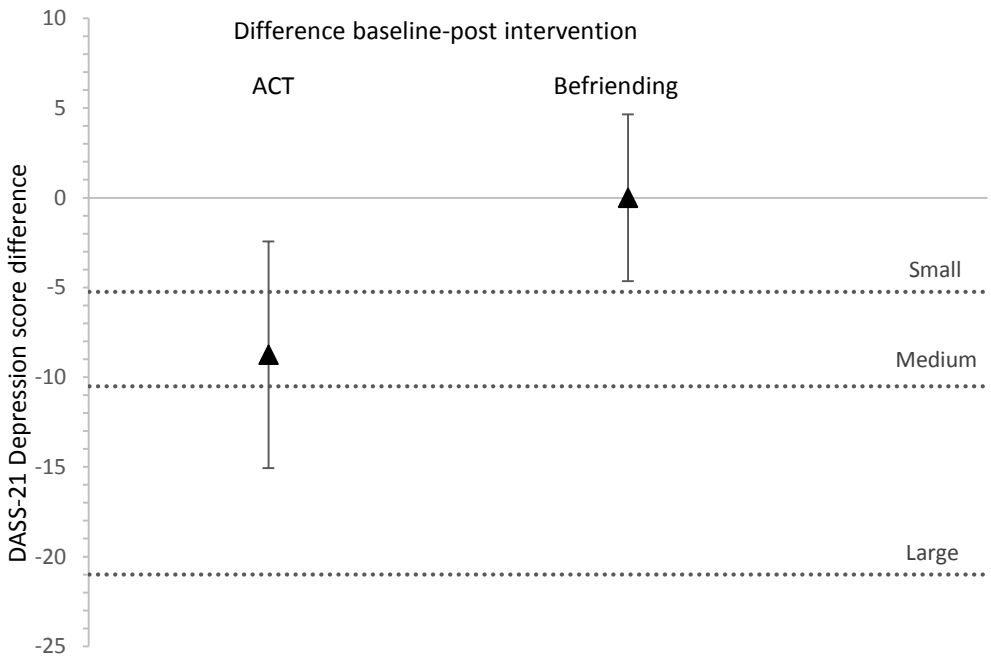

Figure 9. Mean post-intervention (T2) minus baseline (T1) differences for DASS-21 Depression with 95% CI

A repeated measures ANOVA revealed a significant group by time interaction for DASS-21-stress ($F_{1,14}$ = 6.66, p = .02) with those in the ACT group demonstrating a greater reduction in their levels of stress from baseline to post-intervention compared to the Befriending group. There were no significant main effects but a moderate to large effect size (d = .79) was obtained in the ACT group from baseline to post-intervention while the Befriending group showed no effect (d = .02).

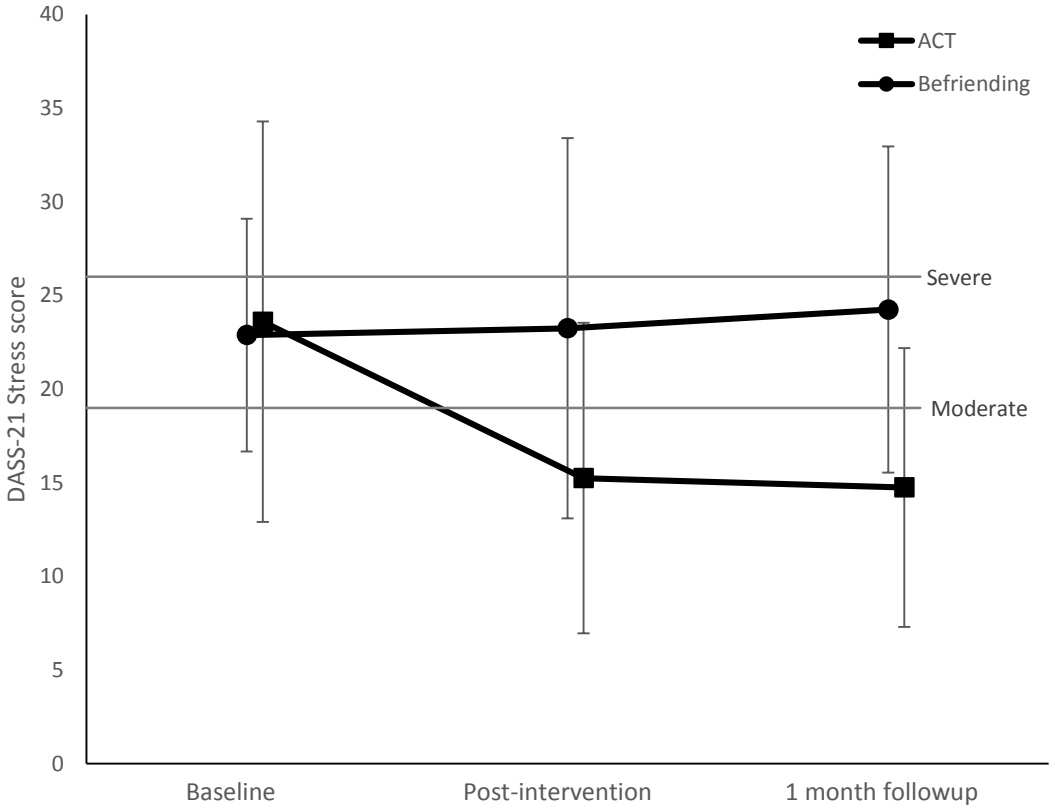

Figure 10. DASS-21 Stress mean scores for ACT and Befriending across three time points with 95% CI

A visual inspection of the 95% CI of the DASS-21-stress mean scores at each time point (see Figure 10), indicated the ACT group moved from the mild/severe range at baseline to the mild to moderate range post-intervention and maintained these gains at the one month follow up. Befriending means DASS-21 stress scores remained relatively stable across the three time points.

Clinically significant cut offs for DASS-21 stress were calculated from a large severe TBI sample (M = 11.84, SD = 10.67; Randall, et al., 2104) and plotted. Reviewing within group differences from baseline to post-intervention, the ACT group showed a small-to-medium clinical reduction in their levels of stress while the Befriending group indicated no change (see Figure 11).

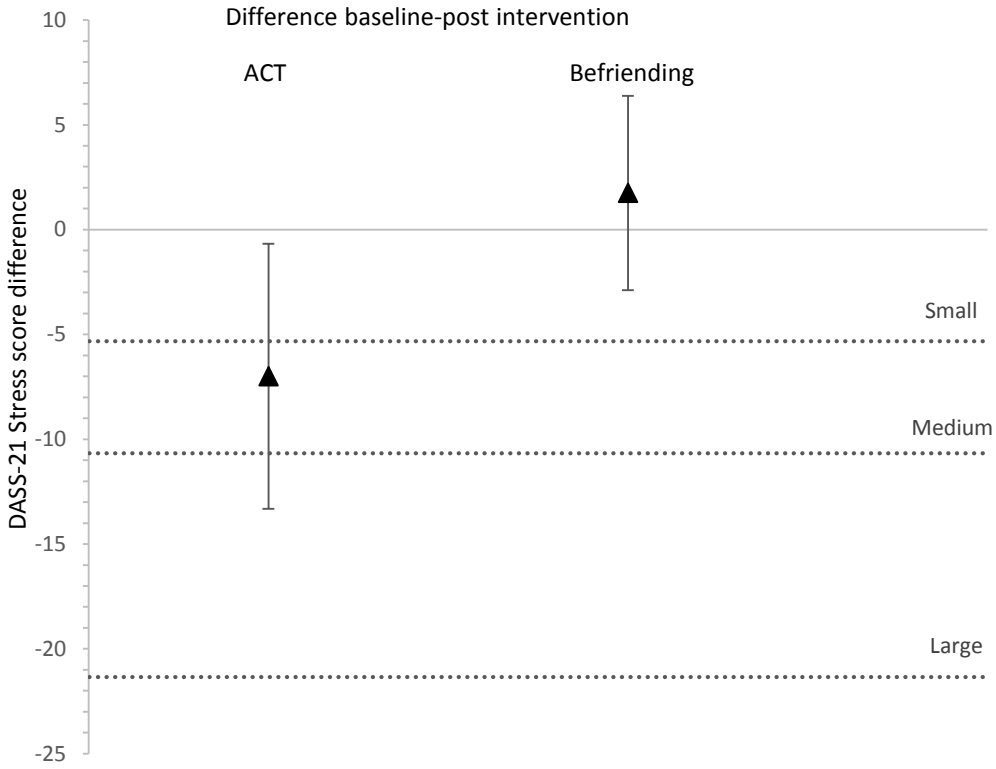

Figure 11. Mean post-intervention (T2) minus baseline (T1) differences for DASS-21 stress with 95% CI

None of the other secondary outcome measures demonstrated significant interaction effects or main effects for group and time from baseline to post-intervention. Table 21 shows the descriptive statistics for the all secondary outcome measures.

Table 21. Comparison of group means and 95% confidence intervals (CI) across for secondary outcome measures

Measure	Time 1				Time 2				Time 3			
	ACT Mean (SD)	(n=10) 95% CI	Befriending Mean (SD)	(n=9) 95% CI	ACT Mean (SD)	(n=8) 95% CI	Befriending Mean (SD)	(n=8) 95% CI	ACT Mean (SD)	(n=8) 95% CI	Befriending Mean (SD)	(n=8) 95% CI
AAQ-II	30.60 (12.81)	21.44,39.76	33.67 (11.26)	25.01, 42.32	24.13 (12.90)	13.34,34.91	27.27 (9.54)	19.27,35.23	24.75 (12.35)	14.43,35.07	28.00 (10.11)	19.54,36.46
DASS-Dep	23.40 (11.00)	15.53,31.27	19.56 (10.33)	11.61, 27.50	12.75 (9.13)	5.12, 20.38	19.75 (11.63)	10.02,29.48	14.00 (14.18)	2.14, 25.86	18.00 (13.09)	7.05, 28.95
DASS-Anx	17.20 (10.60)	9.62, 24.78	13.78 (6.67)	8.65, 18.9	10.75 (9.74)	2.56, 18.94	10.50 (12.32)	.20, 20.80	12.75 (12.23)	2.52, 22.98	10.00 (12.00)	-.03, 20.03
DASS-Str	23.60 (8.68)	17.39,29.81	22.89 (10.15)	15.08, 30.69	15.25 (12.14)	5.10, 25.40	23.25 (9.91)	14.96,31.54	14.75 (10.42)	6.04, 23.46	24.25 (8.91)	16.8, 31.7
HADS-Dep	9.60 (3.53)	7.07, 12.13	9.89 (4.29)	6.60, 13.18	8.38 (4.03)	5.00, 11.75	8.25 (4.23)	4.71, 11.79	7.88 (4.39)	4.21, 11.54	9.88 (5.08)	5.63, 14.12
HADS-Anx	12.70 (4.24)	9.66, 15.74	9.69 (3.57)	6.92, 12.41	8.38 (4.44)	4.66, 12.09	8.88 (4.26)	5.32, 12.43	8.38 (4.14)	4.92, 11.83	9.88 (3.52)	6.93, 12.82
PANAS-Neg	27.40 (10.27)	20.06,34.74	27.89 (7.79)	21.9, 33.87	20.13 (10.75)	11.14,29.11	25.63 (6.63)	20.08,31.17	20.88 (11.14)	11.56,30.19	24.50 (8.62)	17.29,31.71
PANAS-Pos	27.00 (9.20)	20.42,33.58	27.78 (10.77)	19.50, 36.05	29.63 (9.16)	21.96,37.29	29.88 (9.92)	21.58,38.17	30.75 (10.14)	22.27,29.00	30.50 (11.84)	20.60,40.40
GHQ-12	1.71(.61)	1.27, 2.14	1.87 (.61)	1.40, 2.34	1.5 (.85)	.79, 2.21	1.54 (.54)	1.09, 1.99	1.34 (1.00)	051, 2.18	1.63 (.46)	1.24, 2.01
SF12-MCS	35.87 (10.99)	28.01,43.73	37.08 (11.55)	28.16, 45.16	42.86 (9.10)	35.25,50.47	40.87 (11.31)	31.41,50.33	46.45 (10.31)	37.83,55.07	43.78 (10.71)	34.83,52.74
SF12-PCS	35.23 (8.64)	29.05,41.41	41.48 (9.95)	33.83, 49.12	40.17 (10.28)	31.58,48.77	39.71 (10.06)	31.30,48.12	43.23 (11.03)	34.01,52.45	38.60 (7.64)	32.21,44.99
SPRS - Total	26.56 (7.80)	20.56,32.55	30.00 (9.25)	22.89, 37.11	31.63 (8.77)	24.33,38.95	30.57 (14.62)	17.05,44.09	30.00 (10.42)	20.36,39.64	31.17 (7.71)	23.08,39.25

AAQ-II: Acceptance and Action Questionnaire-II, HADS: Hospital Anxiety and Depression Scale, DASS-21: Depression Anxiety Stress Scale-21, PANAS: Positive Affect Negative Affect Scale, GHQ-12: General Health Questionnaire-12: SPRS-2: Sydney Psychosocial Reintegration Scale-2, SF-12 Health Survey.

6.3.3 Hypothesis 3

A second set of repeated measures ANOVAs was undertaken on those primary and secondary outcome measures which showed significant interaction effects ($p < .05$) (DASS-21 depression and stress), to determine whether treatment gains were maintained after a month. No significant differences were established between post-intervention (T2) and one month follow up (T3) indicating treatment gains were maintained for both depression and stress (see Figure 8 and Figure 9).

6.3.1 Treatment fidelity rating

All participants provided permission to have the sessions recorded, but due to equipment failures, only 66 out of 70 possible sessions were recorded for rating purposes (7 weekly sessions by 5 x 2 treatment groups). A total of 21% (n=14) of sessions were rated for treatment fidelity. Overall, adherence to the ACT treatment manual for the selected sessions were rated as being 92.5% (mean fidelity rating of 4.73 out of a possible 5). Adherence to ACT processes and rationale, for example '*making and keeping commitment to valued activities'* (session six) was 93.3% while ACT *in*consistent items such as '*changing the content of thoughts'* was rated as occurring 0% of the times. The general items relating to individual rapport, using strategies to compensate for cognitive impairment and overall competence were given a mean rating of 4 out of a possible 5. For the Befriending group the overall adherence to protocol was rated as 80% (mean fidelity rating score of 4 out of 5).

6.4 Discussion

This is the first RCT to trial the efficacy of ACT in facilitating psychological adjustment and reducing psychological distress after a severe TBI in a civilian population. The main hypothesis that ACT would be more effective than Befriending in increasing psychological flexibility and participation was not confirmed. Although the interaction effect for psychological flexibility approached significance (p = .07) in the hypothesised direction, a visual inspection of the 95% CI of each groups' mean score, revealed there was no difference between the groups at each time point.

On the secondary outcome measures that assessed psychological distress, there was a significant group by time (baseline and post-intervention) interaction effect for both depression and stress (DASS-21). Treatment effects were large in the ACT group for depression and were moderate-to-large for stress and were comparable to the effect sizes achieved using CBT with this population (e.g. ES 0.89, Medd & Tate, 2000; ES>1.0, Simpson et al., 2011; ES 0.50, Hsieh et al., 2012). Visual inspection of the 95% CI of the group means confirmed these conclusions. The mean depression score of the ACT group moved from the severe to the moderate range, baseline to post-intervention and the mean stress score for the ACT group score moved from the moderate/severe range to the moderate/mild. These improvements in clinical categories on the DASS-21 are indicating a clinically significant change (Tingey et al., 1996) for both depression and stress. The results suggest the ACT intervention enabled individuals with a severe TBI to reduce their self-reported levels of depression and stress although, the data were not consistent with the mechanism of change being psychological flexibility as has been found in other ACT studies (Ciarrochi et al., 2010).

The evidence base for ACT as an effective treatment for both anxiety (Arch et al., 2012) and depression (Forman et al., 2007) in non TBI populations is increasing. Also, in a case study to reduce anxiety after a stroke (Graham et al., 2015), ACT was effective in reducing feelings of anxiety. The incidence of both depression and anxiety after TBI has been rated as high (Gould et al., 2014; Guillamondegui et al., 2011) with rates of depression continuing to be high for a number of years after the injury (Kreutzer et al., 2001). This indicates that successful treatment to alleviate psychological distress by reducing symptoms of depression and anxiety is highly relevant for a TBI population.

As discussed, the psychological presentation after a TBI is complex and multifaceted. Although depression and anxiety after TBI are well researched, there is limited research on the construct of stress which appears to be an important factor in the psychological presentation after a TBI. In other populations there is a large correlation between depression and stress (Lovibond & Lovibond, 1995) which has been replicated in an acquired brain injury sample (Whiting, Deane, Ciarrochi, et al., 2015). Despite this strong relationship, the stress subscale of the DASS-21 appears to encapsulate unique areas of distress separate from depression. It is proposed to be an indication of negative affect (Henry & Crawford, 2005) and is also strongly associated with symptoms of chronic worry (Brown et al., 1997; Szabó, 2011).

There are suggestions that stress may be an important psychological factor after a TBI. Specifically after a mild to moderate TBI, chronic stress has been found to be a predictor for the development of depression (Bay, Hagerty, Williams, Kirsch, & Gillespie, 2002) and results in poorer functional outcomes following TBI (Bay, Sikorskii, & Gao, 2009). Incurring a TBI creates a stress response (Bay et al., 2009) and the subsequent adjustment process is also stressful as the individual attempts to

cope and adapt to the many changes secondary to the injury (Karlovits & McColl, 1999). In this study, self-reported stress showed significant reductions after the ACT intervention which were then maintained after the one month follow up indicating the effectiveness of the intervention on this construct of psychological distress.

Though both depression and stress demonstrated a significant change on the DASS-21, anxiety as measured by both the HADS and DASS-21 did not indicate a significant change nor was the HADS depression scale sensitive to change. This raises issues of selecting outcome measures that are sensitive to change in a TBI population (Whyte & Hart, 2003). A trend towards significance was indicated on the DASS-21 anxiety for those in the ACT group who also moved from the severe range to the moderate range suggesting that a large sample may be required to detect a statistically significant change. The HADS failed to detect any changes in either anxiety or depression and for depression, this lack of sensitivity has been indicated in other TBI samples (Whelan-Goodinson, Ponsford, & Schönberger, 2009). For the anxiety measures, some symptoms of anxiety such as trembling or dizziness overlap with the sequelae of TBI and it has been suggested this may confound the results of self report measures of mood (Ownsworth, Little, et al., 2008). These results suggest further validation of these outcomes measures of emotional distress on a TBI population is warranted.

The lack of significant change in the primary outcome of psychological flexibility may in part be due to the overlap between psychological flexibility and cognitive flexibility (Kashdan & Rottenberg, 2010; Whiting, Deane, Simpson, et al., 2015). The impairments in cognitive flexibility that commonly occur after a TBI may impact on the individual's ability to achieve improvements in their psychological flexibility. This suggests that other components of the therapy (e.g. behavioural

activation) may be contributing to therapeutic change but will require further exploration. The other primary outcomes that did not show differential change dependent on group membership, were committed action and participation. It is possible this was due to the low sample size and insufficient power. The overall pattern of results were in the expected direction with all but one mean score of outcome measures in the ACT group moving in the hypothesised direction. In contrast the Befriending group had a far less consistent pattern.

It is unclear whether the measures selected adequately encapsulated the construct of committed action. The SLP is a relatively new measure with little available validation data and none available with TBI samples. It did not appear to identify any change in overall values success in this sample. Participants in the ACT group were already highly motivated, with scores on the MOT-Q more than one standard deviation above the population mean, suggesting a possible ceiling effect on this outcome measure. After the intervention, the ACT group scores on the MOT-Q showed a statistically significant reduction but were still above the population mean and may have decreased as a result of regression to the mean. One limitation of both of these measures was that they may have been distal and too general to the construct of committed action. An actual measure of behavioural achievement such as using the Goal Attainment Scale (GAS: Malec, 1999) may identify more idiographic and behavioural outcomes. The use of goals to measure participation outcomes are a common measure after TBI (Doig, Fleming, Cornwell, & Kuipers, 2009) but are subject to low inter-rater reliability (Evans, 2012). Although GAS measures allow for individualised goals the potential limitation is the high level of specificity and narrow focus for idiosyncratic goals (Malec, 1999). Therefore a broader based

measure of committed action may also be warranted. Further investigations of appropriate measures to assess this outcome are required.

This RCT is one of the few to use an active control group with individuals who have a severe TBI. Befriending has been used as both a standalone therapy to treat depression by facilitating social engagement (Mead et al., 2010) and as a control treatment in schizophrenia research (Bendall et al., 2006). An active and credible control contributes to participant engagement which was evidenced by only one individual leaving the befriending group once treatment had commenced. It also controls for a number of factors such as therapist attention (Bendall et al., 2003). This is in contrast with waitlist control groups that often do not provide equivalent levels of intervention and often have no or limited services during the wait period (Hart et al., 2008). In contrast, Befriending therapy meets the requirements of an active control by also including the use of manuals to ensure standardisation between the treatment and control (Hart et al., 2008; Schulz et al., 2010; Whyte & Hart, 2003). This active control condition makes the treatment effects of ACT on depression and stress in this study all the more notable.

The study had a number of limitations with the most prominent being the smaller than anticipated sample size (initial proposal was for 24 in each group). Lower than expected recruitment rates may have been a function of the need to meet the eligibility criteria. These strict criteria attempted to overcome the heterogeneity of previous studies with regard to severity of injury (PTA >= 7 days) and time since injury (within 5 years). The study was also underpowered to cope with the large number of both primary and secondary outcome measures. Participants in the study were engaged in active rehabilitation and as such were receiving therapy from a number of other clinicians such as physiotherapy, occupational therapy social work.

This level of intervention was different for each participant and not monitored therefore the differential impact of participant's rehabilitation programme was not controlled.

Another limitation was the short follow-up period (one month). Recent studies using CBT to treat post TBI anxiety (Hsieh, Ponsford, Wong, Schönberger, et al., 2012) have shown an ongoing recovery up to six months post-intervention. Due to the logistics in undertaking this research, a longer follow up was not possible but future studies could include additional booster sessions and longer follow up to determine whether any improvements are retained or whether there is a delay in treatment response.

There was a large degree of difference in therapist experience between two of the therapists who ran the Befriending group and the clinical psychologist who conducted the ACT group. Befriending requires a lower level of skill delivery as it involves discussing emotionally neutral topics and redirecting participants from emotionally laden topics (Bendall et al., 2003). It has also been effectively delivered by volunteers with minimal levels of training and resulted in modest reductions in levels of depression (Mead et al., 2010).

Most of the TBI intervention literature is still focused on, (i) adaptation (how to adapt material to compensate for cognitive impairments i.e. the delivery of the therapy); (ii) investigating whether cognitive-based therapies are effective; and (iii) what type of cognitive profile people have and who can participate meaningfully in these interventions. TBI research is in its infancy when it comes to investigating mechanisms of change. This may reflect the much earlier development stage of TBI psychological intervention research compared to other populations (e.g., those with anxiety disorders).

It is recommended, future research replicate this study in a larger sample across multiple sites. In addition more proximal measures that reflect committed action or participation should be utilised (e.g., Goal Attainment Scaling). The screening measure used was the DASS-21 which is a broad measure of psychological distress and based on self-report only. Future studies might consider including a standardised clinical assessment tool to provide an additional objective measure of psychological distress. Also, approximately one third of participants (9 out of 29) who met the study criteria declined to participate as they indicated a preference for individual therapy. Further research could explore the intervention delivered on a one to one basis to include those who decline the group modality. In addition, research which investigates the mechanisms of change in the intervention are also required in a TBI population.

This study is one of the first to trial ACT in a severe TBI population to treat psychological distress and one of the few clinical trials in TBI research to use an active control group. Though the sample size was small, the group consisted of individuals with severe TBI (7 days PTA or longer) in the first five years of their injury, providing a more homogenous sample than is usually reported in clinical trials in neuropsychological contexts. Overall the study suggests that ACT decreases some components of psychological distress when compared to an active control in a group of people with a severe TBI but the potential mechanism by which this occurred, specifically increases in psychological flexibility, could not be confirmed.

Chapter 7: Conclusions and Recommendations

7.1 Summary

This thesis incorporated a number of individual studies across both Phase I and Phase II clinical outcome research. The initial study comprised a review of cognitive and psychological flexibility and the implications for treatment after a severe traumatic brain injury. This review was in the context of acceptance-based therapies investigating whether impaired *cognitive* flexibility secondary to TBI, constrains the capacity to develop the *psychological* flexibility required to cope with the emotional impact of the injury (Chapter 2).

Phase I clinical outcome research was undertaken by implementing an ACT intervention and described the results from two case studies that explored the feasibility of the measures and treatment protocol (Chapter 3). After amendments were made to the ACT treatment protocol, the clinical trial protocol was published to comply with the reporting guidelines of the CONSORT statement (Schulz et al., 2010) and to ensure transparency with the clinical trial (Chapter 4). The next study validated outcome measures of psychological flexibility on a population with an acquired brain injury before moving into the Phase II clinical trial. These included the well validated general measure of psychological flexibility, the AAQ-II and a measure specifically addressing psychological flexibility around the thoughts and feelings that may arise around the brain injury, the AAQ-ABI (Chapter 5). Finally, a Phase II RCT was undertaken exploring the efficacy of ACT to facilitate psychological adjustment after a severe TBI (Chapter 6).

7.2 Clinical Implications

The findings of the thesis have important implications for clinical practice. After a TBI, significant psychological distress is often present as the person attempts to

adjust and accept their post-injury changes. Previous psychological therapy after a severe TBI has focussed on individual symptom management with CBT demonstrating some efficacy to treat depression, anxiety, anger and hopelessness. Treatments that focus on the broader aspects of psychological distress have not been as efficacious.

This is the first Phase II RCT to implement ACT with individuals who have a severe TBI and adds to the limited research on psychological interventions for this client group. The thesis also validated two outcome measures of psychological flexibility in an acquired brain injury sample in order to enable clinicians to measure the effectiveness of their ACT clinical interventions. On the basis of the current research, clinicians can implement ACT knowing there is preliminary evidence of efficacy for the intervention to decrease psychological distress in individuals who have a severe TBI. Clinicians can also be reassured about the validity of measures to assess the effectiveness of their therapy.

Psychological therapy after a TBI requires modification to account for cognitive impairment. Recommendations have previously been made on how to modify both CBT and ACT in order to accommodate a range of cognitive impairments. This thesis provides additional evidence that ACT can be modified to compensate for cognitive impairments and guidelines on the application of modifications for both ACT and TBI are provided in Chapter 2.

The present thesis sought to overcome some of the limitations of previous research by increasing the rigor of the methodological design. The sample was more homogenous and limited to individuals with a severe TBI and those who demonstrated clinical levels of distress. This allows clearer conclusions to be drawn about the samples for whom ACT interventions might be helpful. The design of the

study utilised an active control group and followed the reporting guidelines of the CONSORT statement. The treatment protocol and outcome measures were trialled in a Phase I study before being transitioned to a Phase II clinical trial. Despite these strengths there were also some limitations.

7.3 Limitations

The conceptual review (Chapter 2) was selective rather than systematic as it sought to examine the literature around both cognitive and psychological flexibility in an attempt to clarify these constructs in a severe TBI group. Given the diverse literature relevant to understanding cognitive and psychological flexibility a selective review was deemed appropriate given the need to integrate these wide ranging areas.

The Phase II clinical trial was under powered due to having a smaller sample size than initially proposed. A number of factors contributed to this smaller than projected sample size, including the time constraints of undertaking doctoral research, the slower than anticipated recruitment rate and the strict eligibility criteria. Other psychological intervention studies with severe TBI participants have also had similar sample sizes (For example: Hsieh, Ponsford, Wong, Schönberger, et al., 2012; Medd & Tate, 2000; Simpson et al., 2011) and have produced moderate to large effect sizes. The smaller sample size also prevented the exploration of the mediational effect of psychological flexibility on psychological distress as was proposed in the published protocol. The operationalisation of committed action after a brain injury in this study did not appear to adequately capture the construct. Specifically, there was a ceiling effect on the measure used and the measures used may have been too distal to the construct of committed action. It is recommended that further exploration and

measurement refinement is undertaken on the committed action construct in the context of brain injury.

7.4 Future Research

The findings in this thesis contribute to the broader knowledge of psychological interventions to address adjustment and reduce psychological distress. The research could be expanded to explore the additional factors on the AAQ-ABI by generating additional items and undertaking further validation on these factors. At this stage the construct of psychological flexibility may benefit from further exploration to clarify its definition. This might involve incorporating both observational and implicit measurement to develop an understanding of how psychological flexibility operates in real time.

Also, further research might examine the relationship between self-report measures of psychological flexibility and task-based measures of cognitive flexibility. It is also unclear how the components of ACT (e.g., acceptance, diffusion, committed action) interact to promote psychological flexibility especially in individuals with a severe TBI. Further clinical trials into the use of ACT with this population group, that is a larger *multicentre* clinical trial, would allow a sample size sufficient to investigate the mediational effect of psychological flexibility on distress. Although, there is a need to better understand the mechanisms of change in ACT, there is a wider research need to determine the components of change across all forms of psychological therapies when treating people with TBI.

7.5 Conclusions

Overall, this thesis presents a comprehensive body of work that investigates the use of ACT to facilitate psychological adjustment after a severe TBI. Previous interventions have focussed on specific symptoms of psychological distress including depression (Fann et al., 2015; Topolovec-Vranic et al., 2010), hopelessness (Simpson et al., 2011), anxiety (Hodgson et al., 2005; Hsieh, Ponsford, Wong, Schönberger, et al., 2012), anger (Medd & Tate, 2000) and post-traumatic stress (Bryant et al., 2003). Only a few studies though, have sought to facilitate post-injury adjustment by promoting psychological flexibility and increasing participation (Sylvester, 2011; Whiting, Simpson, Ciarrochi, et al., 2012). In summary, the thesis indicates that those with cognitive impairments can reduce feelings of psychological distress after engaging in an ACT programme. Although, evidence from clinical trial was not consistent with psychological flexibility being the mechanism by which this change occurs.

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Appendix A

Approval from Human Research Ethics Committees and clinical trial registration

University of Wollongong

NON STANDARD APPROVAL: APPROVAL BY EXTERNAL HREC
In reply please quote: NSA10/015
Further Enquiries Phone: 4221 4457

17 November 2010

Ms Diane Whiting
Brain Injury Rehabilitation Unit
Liverpool Hospital
Locked Bag 7103
Liverpool BC NSW 1871

Dear Ms Whiting,

Thank you for forwarding the documentation from Sydney South West Area Health Service (SSWAHS) for the Human Research Ethics Committee approval for the project detailed below. The approval of this project has been noted.

Given the standardised nature of the SSWAHS consent form and likely delays resulting from the requested change, the HREC will waive the requirement to alter the consent form for this application. However please be advised that any new applications that will need to be submitted to the HREC should not refer to participants as "subjects" in the Participant Information Sheet (PIS) or Consent Forms (CF) and this should be borne in mind when submitting materials to other local Human Research Ethic Committee's for their approval.

Ethics Number:	NSA10/015
Title:	An investigation of psychological flexibility following acquired brain injury and validation of the Acceptance and Action Questionnaire-ABI
Principal Researcher:	Ms Diane Whiting
UOW Researchers	Ms Diane Whiting

As this project has been approved and will be monitored by the Sydney South West Area Health Service HREC no additional monitoring of the project will be undertaken by a University of Wollongong HREC.

The University of Wollongong has institutional responsibilities for the research which are separate to the ethical review. The University must be informed if there are reports of serious or unexpected adverse effects on participants, or there are complaints about the project. Should either of these events occur please advise the Ethics Manager immediately.

Yours sincerely

Pp Eve Steinke
Research Ethics Manager
UOW & SESIAHS Health and Medical HREC

Research Services Office University of Wollongong NSW 2522 Australia
Telephone: +61 2 4221 3386 Facsimile: +61 2 4221 4338
research_services@uow.edu.au www.uow.edu.au/research

SYDNEY SOUTH WEST
AREA HEALTH SERVICE
NSW HEALTH

Human Research Ethics Committee (Western Zone)
Locked Bag 7017, LIVERPOOL BC, NSW, 1871
Phone: 02 9612 0614
Facsimile: 02 9612 0611

8 November 2010

Ms Diane L Whiting
Brain Injury Rehabilitation Unit
Liverpool Hospital
Locked Bag 7103
LIVERPOOL BC NSW 1871

Dear Ms Whiting,

Re:	An investigation of psychological flexibility following traumatic brain injury (TBI) and validation of the Acceptance and Action Questionnaire-TBI.
HREC number:	HREC/10/LPOOL/75
SSA Western Zone number:	SSA/10/LPOOL/179
Local HREC Number	10/061

Thank you for submitting an application for authorisation of this project.

I am pleased to inform you that the delegate of the Chief Executive has granted authorisation for this study to take place at the following site(s):

- Liverpool Hospital

The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the lead HREC for review, are copied to this office.

2. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, are to be submitted to this office.

Yours sincerely,

Miss Righa Saroo
Research Governance Officer
Sydney South West Area Health Service

SYDNEY SOUTH WEST
AREA HEALTH SERVICE
NSW HEALTH

Human Research Ethics Committee (Western Zone)
Locked Bag 7017, LIVERPOOL BC, NSW, 1871
Phone: 02 9613 0514
Facsimile: 02 9613 0511

June 11, 2010

Ms Diane L Whiting,
Brain Injury Rehabilitation Unit
Liverpool Hospital
Locked Bag 7103
LIVERPOOL BC NSW 1871

Dear Ms Diane Whiting,

HREC NO **HREC/09/LPOOL/233**
Local No **2009/165**
Title: **A trial of Acceptance and Commitment therapy to facilitate psychological adjustment following a traumatic brain injury.**

Thank you for submitting the above project which was first considered by the SSWAHS HREC (Western Zone) on 26th October, 2009. This HREC is constituted and operates in accordance with the National Health and Medical Research Council's *National Statement on Ethical Conduct in Research Involving Humans* and the *CPMP/ICH Note for Guidance on Good Clinical Practice*.

Following review of your correspondence dated 23rd March 2010, I am pleased to advise that the Committee has granted ethical approval of the above project.

The following documentation has been reviewed and approved by the HREC:

- **Participant Information Statement**
  Brain Injury Rehabilitation Unit, Liverpool Hospital
  Version 2 - dated 13.03.2010
- **Participant Consent Form**
  Consent Form
  Version 1 – 29/09/2009

Please note the following conditions of approval.

1. The Principal Investigator will immediately report anything which might warrant review of ethical approval of the project in the specified format, including:
   - any serious or unexpected adverse events; and
   - unforeseen events that might affect continued ethical acceptability of the project
2. The Principal Investigator will report proposed changes to the research protocol, conduct of the research, or length of HREC approval to the HREC in the specified format for review.
3. The Principal Investigator will inform the HREC, giving reasons, if the project is discontinued before the expected date of completion.

COPY

University of Wollongong

INITIAL APPLICATION NON STANDARD APPROVAL
In reply please quote: NSA10/010
Further Enquiries Phone: 4221 4457

25 August 2010

Dr Hamish McLeod
Faculty of Health & Behavioural Science
University of Wollongong

Dear Dr McLeod,

I am pleased to advise that the Humanities, Social Science and Behavioural HREC has noted the application below and the approval of the Sydney South West Area Health Service HREC (Western Zone). The project has been granted 'non-standard approval' status as this project has been approved and will be monitored by the Sydney South West Area Health Service HREC (Western Zone). No additional monitoring of the project will be undertaken by this HREC.

Ethics Number:	NSA10/010
Title:	A trial of acceptance and commitment therapy to facilitate psychological adjustment following a traumatic brain injury.
Principal Researchers:	Ms Dione Whiting
UOW Researchers:	Dr Hamish McLeod, A/Professor Joseph Ciarrochi
Approval Date:	19 August 2010

The University of Wollongong Humanities, Social Science and Behavioural HREC is constituted and functions in accordance with the NHMRC *National Statement on Ethical Conduct in Human Research.*

Yours sincerely

A/Professor Steven Roodenrys
Chair, Human Research Ethics Committee

Cc: A/Professor Joseph Ciarrochi, Faculty of Health & Behavioural Science

Research Services Office University of Wollongong NSW 2522 Australia
Telephone: +61 2 4221 3386 **Facsimile:** +61 2 4221 4338
research_services@uow.edu.au www.uow.edu.au/research

Diane Whiting

From:	info@actr.org.au
Sent:	Tuesday, 12 October 2010 1:21 PM
To:	Diane Whiting
Subject:	Your ACTRN (registration number): ACTRN12610000851066

Dear Diane,

Re: An intervention trialling Acceptance and Commitment Therapy to facilitate the adjustment process in adults experiencing psychological distress after a traumatic brain injury

Thank you for submitting the above trial for inclusion in the Australian New Zealand Clinical Trials Registry (ANZCTR).

Your trial has now been successfully registered and allocated the ACTRN: ACTRN12610000851066

Web address of your trial: http://www.ANZCTR.org.au/ACTRN12610000851066.aspx
Date submitted: 5/10/2010 11:33:31 AM
Date registered: 12/10/2010 1:21:20 PM
Registered by: Diane Whiting

If you have already obtained Ethics approval for your trial, could you please send the ANZCTR a copy of at least one Ethics Committee approval letter? A copy of the letter can be sent to info@actr.org.au (by email) OR (61 2) 9565 1863, attention to ANZCTR (by fax).

Please be reminded that the quality and accuracy of the trial information submitted for registration is the responsibility of the trial's Primary Sponsor or their representative (the Registrant). The ANZCTR allows you to update trial data, but please note that the original data lodged at the time of trial registration and the tracked history of any changes made will remain publicly available.

The ANZCTR is recognised as an ICMJE acceptable registry (http://www.icmje.org/faq.pdf) and a Primary Registry in the WHO registry network (http://www.who.int/ictrp/network/primary/en/index.html).

If you have any enquiries please send a message to info@actr.org.au or telephone 161 2 9562 5333.

Kind regards,
ANZCTR Staff
T: 161 2 9562 5333
F: +61 2 9565 1863
E: info@actr.org.au
W: www.ANZCTR.org.au

This email has been scanned for the Sydney South West Area Health Service by the MessageLabs Email Security System. SSWAHS regularly monitors emails and attachments to ensure compliance with the NSW Government's Electronic Messaging Policy.

1

Appendix B

Statement from co-authors confirming authorship contribution of the PhD candidate

Statement from co-author confirming authorship contribution of the PhD candidate

As co-author on the following papers:

1. Whiting, D. L., Deane, F. P., Simpson, G. K., McLeod, H. J., & Ciarrochi, J. (2015). Cognitive and psychological flexibility after a traumatic brain injury and the implications for treatment in acceptance-based therapies: A conceptual review. *Neuropsychological Rehabilitation*. doi: 10.1080/09602011.2015.106211

2. Whiting, D. L., Deane, F. P., Ciarrochi, J., McLeod, H. J., & Simpson, G. K. (2015). Validating measures of psychological flexibility in a population with acquired brain injury. *Psychological Assessment, 23*(2), 415-423. doi: http://dx.doi.org/10.1037/pas0000050.

3. Whiting, D. L., Simpson, G. K., McLeod, H. J., Deane, F. P., & Ciarrochi, J. (2012). Acceptance and commitment therapy (ACT) for psychological adjustment after traumatic brain injury: Reporting the protocol for a randomised controlled trial. *Brain Impairment, 13*(3), 360-376.

4. Whiting, D. L., Deane, F.P. Simpson, G.K. Ciarrochi, J. & McLeod, H. (under review). The feasibility of using Acceptance and Commitment Therapy to address psychological distress after a severe traumatic brain injury: Two case studies. *Neuropsychological Rehabilitation.*

I confirm that Diane Lynn Whiting has made the following contributions:

- Design of the research
- Data collection
- Data analysis
- Writing of the first draft of the manuscript
- Revision of the manuscript

Principal Supervisor:

Professor Frank P. Deane

School of Psychology

University of Wollongong

Principal Supervisor Signature: _____ Date: 21/8/15

Statement from co-author confirming authorship contribution of the PhD candidate

As co-author on the following papers:

1. Whiting, D. L., Deane, F. P., Simpson, G. K., McLeod, H. J., & Ciarrochi, J. (2015). Cognitive and psychological flexibility after a traumatic brain injury and the implications for treatment in acceptance-based therapies: A conceptual review. *Neuropsychological Rehabilitation*. doi: 10.1080/09602011.2015.106211

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I confirm that Diane Lynn Whiting has made the following contributions;

- Design of the research
- Data collection
- Data analysis
- Writing of the first draft of the manuscript
- Revision of the manuscript post-reviewers comments (with exception of paper 4 which is currently under review)

Associate Supervisor:

Associate Professor Grahame K. Simpson

Brain Injury Rehabilitation Research Group

Ingham Institute of Applied Medical Research

Associate Supervisor Signature: G K Simpson Date: 21/8/15

Statement from co-author confirming authorship contribution of the PhD candidate

As co-author on the following papers:

1. Whiting, D. L., Deane, F. P., Simpson, G. K., McLeod, H. J., & Ciarrochi, J. (2015). Cognitive and psychological flexibility after a traumatic brain injury and the implications for treatment in acceptance-based therapies: A conceptual review. *Neuropsychological Rehabilitation*. Doi:10.1080/09602011.2015.106211

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- Data analysis
- Writing of the first draft of the manuscript
- Revision of the manuscript post-reviewers comments (with exception of paper 4 which is currently under review)

Secondary Supervisor:
Professor Joseph Ciarrochi
Institute of Positive Psychology & Education, Australian Catholic University

Secondary Supervisor Signature: Joseph Ciarrochi Date: August 21, 2015

Statement from co-author confirming authorship contribution of the PhD candidate

As co-author on the following papers:

1. Whiting, D. L., Deane, F. P., Simpson, G. K., McLeod, H. J., & Ciarrochi, J. (2015). Cognitive and psychological flexibility after a traumatic brain injury and the implications for treatment in acceptance-based therapies: A conceptual review. *Neuropsychological Rehabilitation*. doi: 10.1080/09602011.2015.106211

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I confirm that Diane Lynn Whiting has made the following contributions:

- Design of the research
- Data collection
- Data analysis
- Writing of the first draft of the manuscript
- Revision of the manuscript post-reviewers comments (with exception of paper 4 which is currently under review)

Secondary Supervisor:

Dr Hamish McLeod

Institute of Health and Wellbeing,

University of Glasgow, Scotland

Secondary Supervisor Signature: _____ Date: 21/08/15

Appendix C

Study Measures

1. Demographic study specific protocol
2. Repeatable Battery for the Assessment of Neuropsychological Status (RBANS)
3. Awareness Questionnaire (AQ)
4. Acceptance and Action Questionnaire – Acquire Brain Injury (15-items)
5. Acceptance and Action Questionnaire – Acquired Brain Injury (AAQ-ABI) (9 items)
6. Acceptance and Action Questionnaire – II (AAQ-II)
7. Motivation for Traumatic Brain Injury Rehabilitation Questionnaire (MOT-Q)
8. The Survey of Life Principles Version 2.2 – Card sorting task (SLP)
9. Depression Anxiety Stress Scales – 21 (DASS-21)
10. Hospital Anxiety and Depression Scales (HADS)
11. Positive and Negative Affect Scales (PANAS)
12. General Health Questionnaire – 12 (GHQ-12)
13. The Short Form Health Survey (SF-12)
14. Sydney Psychosocial Reintegration Scale-2 (SPRS-2)
15. ACT on Adjusting after your Brain Injury Scale for Rating Therapist's Adherence to Treatment Manual
16. Befriending Fidelity Checklist
17. The Avoidance and Threat Appraisals Questionnaire (ATAQ)

Data Collection sheet | **Code**

Informant: Member of staff---------- 1 ☐
Family member---------- 2
Other ---------- 3
If other: _____

Date of interview: ☐☐- ☐☐-☐☐☐☐

DoB: ☐☐- ☐☐-☐☐☐☐ Participant No: ☐☐☐

1. Socio-demographic:

1.1 Sex: Male ---------- 1 ☐
Female---------- 2

1.2 Ethnicity: Country of Birth (see Dbase code) ☐☐
Language at home (see Dbase code) ☐☐

1.3 Pre-injury data (i.e. before head injury)

1.3.1 Relationship status: Married / De facto---------- 1 ☐
Single---------- 2
Separated/Divorced---------- 3
Widowed---------- 4
Missing---------- 5

1.3.2 Living with : Alone---------- 1 ☐
Parents---------- 2
Spouse---------- 3
Other family---------- 4
Friends---------- 5
Attendant care/nursing staff---- 6
Other---------- 7
Missing---------- 8

1.3.3 Years of education (Completed High School = 12 years) ☐☐

1.3.4 Qualification (circle the highest level of attainment only) ☐
Did not complete high school / secondary school ---------- 1
Completed high school Yr 10 ---------- 2
Completed high school Yr 12---------- 3
Completed trades qualification ---------- 4
Completed certificate / diploma ---------- 5
Enrolled in undergraduate degree, did not complete-------- 6
Completed undergraduate degree or higher ---------- 7

Data Collection sheet **Code**

1.3.5 Vocational status: Professional/Managerial--------- 1 ☐☐
Unskilled/Semi skilled---------- 2
Skilled Labour---------- 3
Clerical/Sales---------- 4
Supported work---------- 5
Student---------- 6
Volunteer---------- 7
In rehabilitation---------- 8
Homemaker---------- 9
Avocational---------- 10
Other---------- 11

1.3.6 Activity status: Full time----------1 ☐
Part time----------2
Casual----------3
Unemployed/doing nothing-------4
Missing----------5

1.3.7 Financial status: Self-employed----------1 ☐
Salaried----------2
Compensation----------3
Centrelink----------4
Dependent----------5
Missing----------6

2. Injury details

2.1 Date of injury ☐☐- ☐☐-☐☐☐☐

2.2 Injury circumstances: MVA driver--------- 1 ☐☐
MVA passenger----- 2
MBA---------- 3
MVA pedestrian----- 4
Pushbike---------- 5
Fall*---------- 6
Struck by object**-- 7
Gunshot---------- 8
Other TBI---------- 9
Other---------- 10

If other:_____

* include work, home, sports, intoxication, other
**assault, at work, accidental, other

Data Collection sheet **Code**

2.3 Lowest GCS in 1st 24 hours: ☐☐
(if more than one available, lowest GCS within the 1st 24 hours)

2.4 Length PTA(days): ☐☐☐

4. Post-injury psychosocial functioning

4.1 Relationship status: ☐
Married / De facto---------- 1
Single---------- 2
Separated/Divorced---------- 3
Widowed---------- 4

4.2 Living with: ☐
Alone---------- 1
Parents---------- 2
Spouse---------- 3
Other family---------- 4
Friends---------- 5
Attendant care/nursing staff---- 6
Other---------- 7

4.3 Vocational status: ☐☐
Professional/Managerial--------- 1
Unskilled/Semi skilled---------- 2
Skilled Labour---------- 3
Clerical/Sales---------- 4
Supported work---------- 5
Student---------- 6
Volunteer---------- 7
In rehabilitation---------- 8
Homemaker---------- 9
Avocational---------- 10
Other---------- 11

4.4 Activity status: ☐
Full time----------1
Part time----------2
Casual----------3
Unemployed/doing nothing-------4

4.5 Financial status: ☐
Self-employed----------1
Salaried----------2
Compensation----------3
Social Security----------4
Dependent----------5

9

RBANS™

Repeatable Battery for the Assessment of Neuropsychological Status

Christopher Randolph

Record Form A

20-12-11

Name _____ Age ____ Sex ____ Education Level _____

Examiner _____ Date of Testing _____ Ethnicity _____

Observations: _____

	Immediate Memory	Visuospatial/ Constructional	Language	Attention	Delayed Memory		Total Scale
Index Score	87	84	88	72	78		77
Confidence Interval ____%							
Percentile	19	14	21	3	7		6

Index Score	Percentile Rank	Total Scale Index Score
160	>99.9	160
155	>99.9	155
150	>99.9	150
145	99.9	145
140	99.6	140
135	99	135
130	98	130
125	95	125
120	91	120
115	84	115
110	75	110
105	63	105
100	50	100
95	37	95
90	25	90
85	16	85
80	9	80
75	5	75
70	2	70
65	1	65
60	0.4	60
55	0.1	55
50	<0.1	50
45	<0.1	45
40	<0.1	40

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PsychCorp

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Awareness Questionnaire
Patient Form

Name:_____ Patient #:_____ Date:_____

1	2	3	4	5
much worse	a little worse	about the same	a little better	much better

____ 1. How good is your ability to live independently now as compared to before your injury?

____ 2. How good is your ability to manage your money now as compared to before your injury?

____ 3. How well do you get along with people now as compared to before your injury?

____ 4. How well can you do on tests that measure thinking and memory skills now as compared to before your injury?

____ 5. How well can you do the things you want to do in life now as compared to before your injury?

____ 6. How well are you able to see now as compared to before your injury?

____ 7. How well can you hear now as compared to before your injury?

____ 8. How well can you move your arms and legs now as compared to before your injury?

____ 9. How good is your coordination now as compared to before your injury?

____ 10. How good are you at keeping up with the time and date and where you are now as compared to before your injury?

____ 11. How well can you concentrate now as compared to before your injury?

____ 12. How well can you express your thoughts to others now as compared to before your injury?

____ 13. How good is your memory for recent events now as compared to before your injury?

1	2	3	4	5
much worse	a little worse	about the same	a little better	much better

____ 14. How good are you at planning things now as compared to before your injury?

____ 15. How well organized are you now as compared to before your injury?

____ 16. How well can you keep your feelings in control now as compared to before your injury?

____ 17. How well adjusted emotionally are you now as compared to before your injury?

Acceptance and Action Questionnaire
Acquired Brain Injury (AAQ-ABI)

Read each sentence. Then, circle a number between 0-4 that tells how true each sentence is for you.

	Not at all true	A little true	Pretty true	True	Very True
1. I do things I care about even when I feel upset about my brain injury	0	1	2	3	4
2. I hate how my brain injury makes me feel about myself	0	1	2	3	4
3. I need to get rid of my anxiety about my brain injury	0	1	2	3	4
4. I stop doing things when I feel scared about my brain injury	0	1	2	3	4
5. My brain injury defines me as a person	0	1	2	3	4
6. I am moving forward with my life	0	1	2	3	4
7. It is OK for me to feel different after my brain injury	0	1	2	3	4
8. I would give up important things in my life if I could make the brain injury go away	0	1	2	3	4
9. My worries and fears about my brain injury are true	0	1	2	3	4
10. I try not to think about having a brain injury	0	1	2	3	4
11. Other people make it hard for me to accept myself	0	1	2	3	4
12. I don't need to be ashamed of my brain injury	0	1	2	3	4
13. I often pretend that I don't have a brain injury	0	1	2	3	4
14. Most people are doing better than me	0	1	2	3	4
15. Even with my brain injury, I can do good work	0	1	2	3	4

010610

Acceptance and Action Questionnaire
Acquired Brain Injury (AAQ-ABI)

Read each sentence. Then, circle a number between 0-4 that tells how true each sentence is for you

	Not at all true	A little true	Pretty true	True	Very True
2. I hate how my brain injury makes me feel about myself	0	1	2	3	4
3. I need to get rid of my anxiety about my brain injury	0	1	2	3	4
4. I stop doing things when I feel scared about my brain injury	0	1	2	3	4
5. My brain injury defines me as a person	0	1	2	3	4
6. I am moving forward with my life	0	1	2	3	4
8. I would give up important things in my life if I could make the brain injury go away	0	1	2	3	4
9. My worries and fears about my brain injury are true	0	1	2	3	4
11. Other people make it hard for me to accept myself	0	1	2	3	4
14. Most people are doing better than me	0	1	2	3	4

111112

AAQ-II

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
2. I'm afraid of my feelings.	1	2	3	4	5	6	7
3. I worry about not being able to control my worries and feelings.	1	2	3	4	5	6	7
4. My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
5. Emotions cause problems in my life.	1	2	3	4	5	6	7
6. It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
7. Worries get in the way of my success.	1	2	3	4	5	6	7

MOT-Q

Motivation for Rehabilitation Questionnaire

PARTICIPANT NUMBER: _____ TODAYS DATE: ____/_____/_____

Please rate your agreement with the following statements by placing an X in the appropriate square.

Rehabilitation Programs are designed to help injured persons recover from their illness. Rehabilitation includes: physical therapy, speech therapy, counselling or psychotherapy, occupational therapy, vocational services, and cognitive therapy.

		Strongly Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Strongly Agree	For Office Use Only LD	IR	LA	RH
1	If it was recommended, I would see a rehabilitation therapist.									
2	Given a choice I would spend more time in therapy.									
3	Rehabilitation will probably help me.									
4	Rehabilitation is very useful									
5	At first I had some problems, but I'm fine now									
6	I'm better now than I ever was									
7	Rehabilitation Therapists can't help me with my problems									
8	Rehabilitation has nothing to do with my needs.									
9	I have always had the problems I'm having now.									
10	I have some problems, but I'm doing fine.									
11	Rehabilitation therapists would probably treat me like a child.									
12	I'm very excited about getting treatment as soon as possible.									
13	There is nothing wrong with me.									
14	I'll be the same if I get treatment or not.									
15	Therapists would have me do things that are irrelevant.									
16	The head injury had minimal effect on my abilities.									
17	Rehabilitation is useful, but I don't think I need it.									
For Office Use Only	Subtotal Page 1									

		Strongly Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Strongly Agree	For Office Use Only LD	IR	LA	RH
18	I rely on doctors to help me with my problems.									
19	I don't have any problems worth mentioning									
20	I'd ask my therapists to do extra therapy tasks									
21	I always follow medical orders because I think they'll help me									
22	Doctors know what I need and I'll do what they say.									
23	I'd do what a therapist tells me even if it doesn't make sense.									
24	I'm very interested in rehabilitation, but it's not for me.									
25	I don't have time for rehab.									
26	It's fine to see a rehabilitation therapist.									
27	My problems are my own business.									
28	I don't like people prying too deeply.									
29	Therapists would waste my time.									
30	Going through rehabilitation will help me get (or keep) a job.									
31	Doctor's shouldn't say I have problems without knowing how I was before my injury.									
For Office Use Only						Subtotal Page 2				
						Subtotal Page 1				
						Total				

Values Card Sort

Participant Number: _____ Date: _____

Instructions:

Ask the participant to sort the cards into three piles.

1. Pile 1: These values are not very important to me
2. Pile 2: These values are of moderate importance to me
3. Pile 3: These values are of the highest importance to me
4. Discard pile 1, shuffle piles 2 & 3 and repeat steps 1-3
5. From Pile 3 (the highest importance), have the clients identify their top 10 values
6. Rank them in order
7. Rate how important that value is in your life at the present time
8. Rate how well you are acting in accordance to that value

0	1	2	3	4
not very		moderately		extremely

Value 1:	
How important is this value? 0 1 2 3 4	How consistently are you acting in accordance with your value? 0 1 2 3 4
Value 2:	
How important is this value? 0 1 2 3 4	How consistently are you acting in accordance with your value? 0 1 2 3 4
Value 3:	
How important is this value? 0 1 2 3 4	How consistently are you acting in accordance with your value? 0 1 2 3 4

Value 4:	
How important is this value? 0 1 2 3 4	How consistently are you acting in accordance with your value? 0 1 2 3 4
Value 5:	
How important is this value? 0 1 2 3 4	How consistently are you acting in accordance with your value? 0 1 2 3 4
Value 6:	
How important is this value? 0 1 2 3 4	How consistently are you acting in accordance with your value? 0 1 2 3 4
Value 7:	
How important is this value? 0 1 2 3 4	How consistently are you acting in accordance with your value? 0 1 2 3 4
Value 8:	
How important is this value? 0 1 2 3 4	How consistently are you acting in accordance with your value? 0 1 2 3 4
Value 9:	
How important is this value? 0 1 2 3 4	How consistently are you acting in accordance with your value? 0 1 2 3 4
Value 10:	
How important is this value? 0 1 2 3 4	How consistently are you acting in accordance with your value? 0 1 2 3 4

DASS21

Name: *Date:*

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of time
3 Applied to me very much, or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (eg, in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

Hospital Anxiety and Depression Scale (HADS)

Tick the box beside the reply that is closest to how you have been feeling in the past week.
Don't take too long over you replies: your immediate is best.

D	A		D	A	
		I feel tense or 'wound up':			**I feel as if I am slowed down:**
	3	Most of the time	3		Nearly all the time
	2	A lot of the time	2		Very often
	1	From time to time, occasionally	1		Sometimes
	0	Not at all	0		Not at all
		I still enjoy the things I used to enjoy:			**I get a sort of frightened feeling like 'butterflies' in the stomach:**
0		Definitely as much		0	Not at all
1		Not quite so much		1	Occasionally
2		Only a little		2	Quite Often
3		Hardly at all		3	Very Often
		I get a sort of frightened feeling as if something awful is about to happen:			**I have lost interest in my appearance:**
	3	Very definitely and quite badly	3		Definitely
	2	Yes, but not too badly	2		I don't take as much care as I should
	1	A little, but it doesn't worry me	1		I may not take quite as much care
	0	Not at all	0		I take just as much care as ever
		I can laugh and see the funny side of things:			**I feel restless as I have to be on the move:**
0		As much as I always could		3	Very much indeed
1		Not quite so much now		2	Quite a lot
2		Definitely not so much now		1	Not very much
3		Not at all		0	Not at all
		Worrying thoughts go through my mind:			**I look forward with enjoyment to things:**
	3	A great deal of the time	0		As much as I ever did
	2	A lot of the time	1		Rather less than I used to
	1	From time to time, but not too often	2		Definitely less than I used to
	0	Only occasionally	3		Hardly at all
		I feel cheerful:			**I get sudden feelings of panic:**
3		Not at all		3	Very often indeed
2		Not often		2	Quite often
1		Sometimes		1	Not very often
0		Most of the time		0	Not at all
		I can sit at ease and feel relaxed:			**I can enjoy a good book or radio or TV program:**
	0	Definitely	0		Often
	1	Usually	1		Sometimes
	2	Not Often	2		Not often
	3	Not at all	3		Very seldom

Please check you have answered all the questions

Scoring:

Total score: Depression (D) _____ Anxiety (A) _____

0-7 = Normal

8-10 = Borderline abnormal (borderline case)

11-21 = Abnormal (case)

PANAS-X Past few weeks

This scale consists of a number of words and phrases that describe different feelings and emotions.

Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way during the past few weeks. Use the following scale to record your answers:

1	2	3	4	5
Very slightly	**A little**	**Moderately**	**Quite a bit**	**Extremely**

_____	**attentive**	_____	**excited**
_____	**strong**	_____	**hostile**
_____	**irritable**	_____	**proud**
_____	**inspired**	_____	**jittery**
_____	**afraid**	_____	**ashamed**
_____	**alert**	_____	**scared**
_____	**upset**	_____	**enthusiastic**
_____	**active**	_____	**distressed**
_____	**guilty**	_____	**determined**
_____	**nervous**	_____	**interested**

General Health Questionnaire

Name				Date
Please consider the last four weeks and answer the following questions by selecting and circling one of the four answer options.				
Question	1	2	3	4
1. Been able to concentrate on what you're doing	Better than usual	Same as usual	Less than usual	Much less than usual
2. Lost much sleep over worry	Not at all	No more than usual	Rather more than usual	Much more than usual
3. Felt you were playing a useful part in things	More so than usual	Same as usual	Less useful than usual	Much less useful
4. Felt capable of making decisions about things	More so than usual	Same as usual	Less useful than usual	Much less useful
5. Felt constantly under strain	Not at all	No more than usual	Rather more than usual	Much more than usual
6. Felt you couldn't overcome your difficulties	Not at all	No more than usual	Rather more than usual	Much more than usual
7. Been able to enjoy your normal day-to-day activities	More so than usual	Same as usual	Less useful than usual	Much less useful
8. Been able to face up to your problems	More so than usual	Same as usual	Less useful than usual	Much less useful
9. Been feeling unhappy and depressed	Not at all	No more than usual	Rather more than usual	Much more than usual
10. Been losing confidence in yourself	Not at all	No more than usual	Rather more than usual	Much more than usual
11. Been thinking of yourself as a worthless person.	Not at all	No more than usual	Rather more than usual	Much more than usual
12. Been feeling reasonably happy, all things considered	More so than usual	About the same as usual	Less so than usual	Much less than usual

SF-12 Health Survey

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. **Answer each question by choosing just one answer**. If you are unsure how to answer a question, please give the best answer you can.

1. **In general, would you say your health is:**

☐1 Excellent ☐2 Very good ☐3 Good ☐4 Fair ☐5 Poor

The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	YES, limited a lot	YES, limited a little	NO, not limited at all
2. **Moderate activities** such as moving a table, pushing a vacuum cleaner, bowling, or playing golf.	☐1	☐2	☐3
3. Climbing **several** flights of stairs.	☐1	☐2	☐3

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	YES	NO
4. **Accomplished less** than you would like.	☐1	☐2
5. Were limited in the **kind** of work or other activities.	☐1	☐2

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	YES	NO
6. **Accomplished less** than you would like.	☐1	☐2
7. Did work or activities **less carefully than usual**.	☐1	☐2

8. **During the past 4 weeks, how much did pain interfere with your normal work (including work outside the home and housework)?**

☐1 Not at all ☐2 A little bit ☐3 Moderately ☐4 Quite a bit ☐5 Extremely

These questions are about how you have been feeling during the past 4 weeks.
For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks…

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
9. Have you felt calm & peaceful?	☐1	☐2	☐3	☐4	☐5	☐6
10. Did you have a lot of energy?	☐1	☐2	☐3	☐4	☐5	☐6
11. Have you felt down-hearted and blue?	☐1	☐2	☐3	☐4	☐5	☐6

12. **During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?**

☐1 All of the time ☐2 Most of the time ☐3 Some of the time ☐4 A little of the time ☐5 None of the time

SYDNEY PSYCHOSOCIAL REINTEGRATION SCALE (SPRS) – FORM B (CLINICIAN)

ROBYN TATE

DEVELOPED IN ASSOCIATION WITH
ADELINE HODGKINSON, AHAMED VEERABANGSA, ANNE PFAFF AND GRAHAME SIMPSON
BRAIN INJURY REHABILITATION UNIT, LIVERPOOL HOSPITAL, SYDNEY

Name:	**Sex:** _ / _	**ID**
Date: / /	**Date of injury:** / /	**DoB:** / /
Cause of injury:	**Duration of coma:**	**Duration of PTA**

OPTIONAL BACKGROUND INTERVIEW

1. What is present occupation?:
2. What are work duties at present?:
3. What was job at the time of the injury?:
4. What were work duties in that job?:
5. How many jobs has he/she had since the injury (not including work trials or voluntary work)?:
6. What are/were leisure interests, recreation, hobbies, and club membership, at present and at time of injury?:

AT TIME OF INJURY | PRESENT

7. What is/was weekly program of work, leisure/recreational activities at present and at time of injury?:

AT TIME OF INJURY | PRESENT

8. What is marital status at present?:
   What was it at the time of the injury?:
9. Who does he/she live with at present?:
   Who did he/she live with at the time of the injury?:

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WORK AND LEISURE

1. Current work: HOW DO YOU RATE WORK (OR STUDY), OR THE TYPE OF WORK (STUDY)?
(If a student, answer the question in this section in terms of changes in studies)

❑ **Very good:**		4
❑ **A little difficulty:**	Works (studies) less than average hours per week, OR work duties (studies) are easy/light ones.....	3
❑ **Definite difficulty:**	Works casually, OR has some help from others in doing some work (study)	2
❑ **A lot of difficulty:**	Unemployed, OR in rehabilitation, OR in a supported work program, OR do volunteer work, OR receives remedial assistance in studies	1
❑ **Very poor:**	Unable to work (study) at present	0

2. Work skills: HOW DO YOU RATE WORK (STUDY) SKILLS?

❑ **Very good:**		4
❑ **A little difficulty:**	For example, has to put in a lot of effort to get good results, gets tired easily, loses concentration	3
❑ **Definite difficulty:**	For example, sometimes makes mistakes.....	2
❑ **A lot of difficulty:**	For example, he or she is slow, work is of poor quality	1
❑ **Very poor:**	For example, needs constant supervision and/or reminders	0

3. Leisure: HOW DO YOU RATE THE NUMBER OR TYPE OF LEISURE ACTIVITIES OR INTERESTS?

❑ **Very good:**		4
❑ **A little difficulty:**	Has leisure activities and interests, but does not do them often	3
❑ **Definite difficulty:**	Definite difficulties in developing and doing leisure activities and interests	2
❑ **A lot of difficulty:**	A lot of difficulty developing and doing leisure activities and interests	1
❑ **Very poor:**	Does not have any leisure activities or interests at present	0

4. Organising activities: HOW DO YOU RATE THE WAY HE/SHE ORGANISE S WORK AND LEISURE ACTIVITIES?

❑ **Very good:**		4
❑ **A little difficulty:**	For example, needs prompts or supports from others.....	3
❑ **Definite difficulty:**	Fairly dependent on other people to organise activities, e.g. others suggest what to do and how to go about it.....	2
❑ **A lot of difficulty:**	Needs other people to do the organising, e.g. making arrangements, providing transport.....	1
❑ **Very poor:**	Dependent on other people to suggest and organise activities at present.....	0

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RELATIONSHIPS

5. Spouse or partner: DOES HE/SHE HAVE A PARTNER OR SPOUSE?
a) IF YES, HOW DO YOU RATE THE RELATIONSHIP?

❑ **Very good:**		4
❑ **A little difficulty:**	Not good, but still able to get along together, and if it broke down has the skills to form new relationship	3
❑ **Definite difficulty:**	Definite difficulties, but has the skills to form and also probably maintain a new relationship	2
❑ **A lot of difficulty:**	Might have the skills to form a new relationship.....	1
❑ **Very poor:**	Relationship is extremely limited (e.g., partner is a primary caretaker) and does not have the skills to form a new relationship.....	0

b) IF NO, HOW DO YOU RATE THE ABILITY TO FORM AND MAINTAIN SUCH A RELATIONSHIP?

❑ **Very good**		4
❑ **A little difficulty:**	Has the skills to form and maintain a new relationship	3
❑ **Definite difficulty:**	Has the skills to form and also probably maintain a new relationship.....	2
❑ **A lot of difficulty:**	Might have the skills to form a new relationship.....	1
❑ **Very poor:**	Does not have the skills to form a new relationship.....	0

6. Family: HOW DO YOU RATE THE RELATIONSHIPS WITH OTHER FAMILY MEMBERS?

❑ **Very good:**		4
❑ **A little difficulty:**	Not good, but still able to get along together	3
❑ **Definite difficulty:**	Definite difficulties, but still sees family	2
❑ **A lot of difficulty:**	A lot of difficulties getting along with some family members	1
❑ **Very poor:**	Relationship is extremely limited and there has been breakdown	0

7. Friends and other people: HOW DO YOU RATE THE RELATIONSHIPS WITH OTHER PEOPLE OUTSIDE FAMILY (SUCH AS CLOSE FRIENDS, WORK MATES, NEIGHBOURS)?

❑ **Very good:**		4
❑ **A little difficulty:**	Not good, but has close friends, makes new friends, and gets along with work mates and neighbours	3
❑ **Definite difficulty:**	Definite difficulties, but still sees some friends once a month or more and can make new friends	2
❑ **A lot of difficulty:**	Only sees a few friends (or other people outside family), and does not make new friends easily	1
❑ **Very poor:**	Does not see any friends (or other people outside the family).....	0

8. Communication: HOW DO YOU RATE THE COMMUNICATION SKILLS (THAT IS, TALK WITH OTHER PEOPLE AND UNDERSTAND WHAT OTHERS SAY)?

❑ **Very good:**		4
❑ **A little difficulty:**	For example, rambles and get off the point, talk is sometimes inappropriate, has some trouble finding the words to express himself/herself.....	3
❑ **Definite difficulty:**	For example, difficulties thinking of things to say, joining in talk with groups of people, only talks about himself/herself	2
❑ **A lot of difficulty:**	For example, has trouble understanding what people say.....	1
❑ **Very poor:**	Communication is almost impossible.....	0

© RL Tate 1996/2007: Sydney Psychosocial Reintegration Scale

LIVING SKILLS

9. Social Skills: HOW DO YOU RATE THE SOCIAL SKILLS AND BEHAVIOUR IN PUBLIC?

❑ **Very good:**		4
❑ **A little difficulty:**	For example, is awkward with other people, does not worry about what other people think or want	3
❑ **Definite difficulty:**	For example, can act in a silly way, is not as tactful or sensitive to other people's needs.....	2
❑ **A lot of difficulty:**	For example, is dependent on other people, is socially withdrawn, has difficulty interacting appropriately with other people	1
❑ **Very poor:**	For example, has temper outbursts in public, requires supervision when with other people	0

10. Personal habits: HOW DO YOU RATE THE PERSONAL HABITS (E.G. HIS/HER CARE IN CLEANLINESS, DRESSING AND TIDINESS)?

❑ **Very good:**		4
❑ **A little difficulty:**	For example, does not take much care	3
❑ **Definite difficulty:**	Attends to own hygiene, dress and tidiness, but has definite difficulties in this area; needs supervision	2
❑ **A lot of difficulty:**	Needs prompts, reminders or advice from others, but responds to these; needs stand-by assistance	1
❑ **Very poor:**	Needs prompts, reminders or advice from others, but is unwilling to respond to these; needs hands-on assistance	0

11. Community travel: HOW DO YOU RATE THE USE OF TRANSPORT AND TRAVEL AROUND THE COMMUNITY?

NOTE: Do not include the driver of transport, or other passengers using such transport, in rating whether a person can travel "on his/her own".

❑ **Very good:**		4
❑ **A little difficulty:**	Unable to use some forms of transport (e.g. driving a car) but can still get around in the community by using other forms of transport without help.....	3
❑ **Definite difficulty:**	Definite difficulty using transport, but after training can travel around the community on his/her own	2
❑ **A lot of difficulty:**	Needs assistance to plan use of transport, but with such help can travel around the community on his/her own	1
❑ **Very poor:**	Is unable to go out into the community on his/her own	0

12. Accommodation: HOW DO YOU RATE THE LIVING SITUATION?

❑ **Very good:**		4
❑ **A little difficulty:**	Lives in the community, but with emotional or social supports provided by other people, such as family, friends or neighbours. Could not be left alone without supports for a two-week period.....	3
❑ **Definite difficulty:**	Lives in the community, but could not be left alone for a weekend unless someone checked that everything was OK	2
❑ **A lot of difficulty:**	Lives in the community but in supported accommodation, such as a group home, boarding house, transitional living unit, in family home but requires daily supervision or assistance	1
❑ **Very poor:**	Needs care, which may be at home requiring extensive, daily supervision or other care OR in a facility, e.g., a nursing home, residential service, rehabilitation unit	0

Group/Session: _____ Therapist: Diane Whiting
Date Rated: _____ Rater: _____

ACT on Adjusting after your Brain Injury
Scale for Rating Therapist's Adherence to Treatment Manual *

ACT Items	
1) Session One – Introduction/Confronting the Agenda - Compliance with manual e.g. exercise followed, homework reviewed etc.	**1 2 3 4 5**
- Explores client's previous efforts at control and coping	**1 2 3 4 5**
2) Session Two - Normalcy of Suffering /Control is Problem - Compliance with manual e.g. exercise followed, homework reviewed etc.	**1 2 3 4 5**
- Explore client's efforts to control thoughts and feelings - Explore the impact of previous efforts to control or avoid	**1 2 3 4 5**
3) Session Three - Defusion/Acceptance - Compliance with manual e.g. exercise followed, homework reviewed etc.	**1 2 3 4 5**
- Experiential acceptance, exploration of feelings/sensations - Out of session acceptance skills practice (e.g., "physicalising the thought")	**1 2 3 4 5**
4) Session Four - Deliteralisation/Defusion - Compliance with manual e.g. exercise followed, homework reviewed etc.	**1 2 3 4 5**
- Deliteralisation/defusion - Feelings/thoughts DO NOT lead to actions - Self as context/mindfulness of self as separate from thoughts/feelings/sensations	**1 2 3 4 5**
5) Session Five - Values & Goals - Compliance with manual e.g. exercise followed, homework reviewed etc.	**1 2 3 4 5**
- Discussion of client's values and goals	**1 2 3 4 5**
6) Session Six - Committed Action - Compliance with manual e.g. exercise followed, homework reviewed etc.	**1 2 3 4 5**
- Making and keeping commitments to valued activities	**1 2 3 4 5**
7) Session Seven - Review and Relapse - Compliance with manual e.g. exercise followed, homework reviewed etc.	**1 2 3 4 5**
- Making and keeping commitments to valued activities	**1 2 3 4 5**
8) Challenging Cognitions - Changing content of thoughts - Substituting positive thoughts	**1 2 3 4 5**
9) Experientially Avoidant Change Strategies - Avoid or control - Reassurance in order to reduce experience	**1 2 3 4 5**
10) Cognitive Therapy Rationale - rationale provided for evaluating accuracy of thoughts - other reasons provided for behaviour	**1 2 3 4 5**
11) Thoughts and Feelings Cause Action - Feelings/thoughts lead to action - Relate improvement to cognitive change	**1 2 3 4 5**
General Items	

12) Individual Rapport - Sharing of individual experiences/appropriate self-disclosure - over friendly, caring stance, genuine interest	**1 2 3 4 5**
13) Strategies used to compensate for cognitive impairment - Repetition of material, additional explanation if required - Thorough review provided each session	**1 2 3 4 5**
14) Overall Therapist Competence - Feelings/thoughts lead to action - Relate improvement to cognitive change	**1 2 3 4 5**

*** RATE FOR FREQUENCY AND EXTENSIVENESS:**

A rating of:	*Would indicate:*
1 = Not at all	The variable never explicitly occurred.
2 = A little	The variable occurred at least once (and may have occurred a few times) but was not addressed in an in-depth manner.
3 = Somewhat	The variable occurred several times and/or was addressed at least once by the therapist in a moderately in-depth manner.
4 = Considerably	The variable occurred with relatively high frequency and was addressed by the therapist in a moderately in-depth manner.
5 = Extensively	The variable occurred with great frequency and was addressed by the therapist in a very in-depth manner.

For the frequency and extensiveness of ratings, the starting point for rating each item on the scale is "1." The rater should assign a rating of greater than "1" only if he/she hears examples of the behavior specified in the items. The rater should be careful not to start rating from the midpoint ("3") out.

Befriending Fidelity Checklist

Date _____

Assessor _____

Date & Session number _____

	None of the time 1	A little of the time 2	Some of the time 3	Most of the time 4	All of the time 5
Therapist redirects from unresolved conflicts to a neutral topic					
Therapist redirects from discussion about symptoms to a neutral topic					
Therapist chooses the most neutral line of questioning					
Therapist reacts minimally to loaded speech (e.g. symptoms, conflicts)					
Therapists redirects from identity issues to a neutral topic					
Client and therapist predominantly engage in neutral conversation on day to day topics					

Total Fidelity Score _____

Appraisal Threat and Avoidance Questionnaire (ATAQ)

Instructions: Read each question out to the participant, and ask whether, considering the previous month, was the statement true. If no, go to the next question. If yes, then ask whether because of this concern, they had avoided meeting people/going out/doing things (whichever is appropriate). Score their response on a yes/no basis.

	Threat		Avoidance	
	Yes	No	Yes	No
1. Sometimes I worry I might get attacked and injured while I'm out				
2. Sometimes I worry I might fall and injure myself while I'm out				
3. Sometimes I feel home is the only place where I'm safe				
4. Sometimes I worry that, if I'm attacked I won't be able to stick up for myself				
5. With regards to electrical appliances, or sharp knives or tools, I sometimes worry that I'm not safe to use them				
6. When crossing the road, I sometimes worry about getting knocked over				
7. When I am out, I sometimes worry that I might walk into someone, or that they might bump into me				
8. I sometimes worry that I might get another brain injury				
9. I sometimes worry that people will patronise me, or talk down to me				
10. I sometimes worry about getting tearful or upset in front of others				
11. I sometimes get fed up of people asking me about my brain injury				

12. I sometimes worry that people will get annoyed if I make mistakes, or take too long to do things				
13. I sometimes think that people will laugh at me				
14. I sometimes worry about losing my temper with other people				
15. Sometimes I don't like people seeing me using aids such as diaries, walking sticks or wheelchairs, etc				
16. I sometimes worry that people think there's something wrong with me				
17. I sometimes feel less sexually attractive since the brain injury				
18. I sometimes think that people don't tell me things because they think I don't understand				
19. I sometimes think that people prefer talking to others I'm with, rather than me				
20. I sometimes feel that people treat me differently because of the injury				
21. I sometimes feel that other people look down upon me				
22. I sometimes feel my injury makes people feel sorry for me				
23. I sometimes feel that other people are watching me				
24. I sometimes feel that I'm not very good company				
25. Sometimes when I'm with people, I feel like I don't fit in				
26. I sometimes think that people are comparing me to how I was before the brain injury				
27. I sometimes think that people fuss over me because of my brain injury				
28. I sometimes worry that people think I'm stupid				

29. I sometimes feel I would be uncomfortable meeting people I haven't seen since my injury				
35. I sometimes feel I make more mistakes now than I used to before the injury				
36. I sometimes get upset or frustrated if I do things wrong				
37. Sometimes when things go wrong it reminds me of the brain injury and all the problems it's caused me				
38. It sometimes bothers me that I can't do things like I used to				
39. If things go wrong when I'm doing something, I sometimes feel useless and stupid				
40. I sometimes get frustrated because it takes me too long to do things				
41. Doing some things sometimes reminds me of how different I have become since the injury				

Appendix D

Intervention Protocol: ACT

ACT on adjusting after your brain injury

Treatment Manual

Brain Injury Rehabilitation Unit

LIVERPOOL HOSPITAL

ACT on adjusting after a brain injury

A treatment manual of Acceptance and Commitment Therapy (ACT) to facilitate psychological adjustment following traumatic brain injury

Brain Injury Rehabilitation Unit
Liverpool Health Service
Sydney, Australia
August 2011

Information on Contributors

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Graphics:

Front Cover: Ms Rebecca Gentz
"I chose the window as it is symbolic of opening up to a new world and a garden scene to be positive and colourful."
Rebecca is an artist who sustained a TBI in 1998. She spent seven months in the Brain Injury Rehabilitation Unit at Liverpool hospital. Prior to her injury she had completed a BA (Hons) in Visual Arts and was engaged in further study. After her injury she completed Certificate IV in Digital Media and gained her Workplace Trainer qualification. Currently she teaches Art to the general population as well as to people with a disability. Rebecca regularly enters her work into exhibitions and is considering returning to university to train in Art Therapy.

Acknowledgements:

Ms Merry Sylvester, University of Reno, USA for her review of the protocol with regard to fidelity with ACT treatment principles

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1.2 Reasons for Attending the Group
1.3 Aims of the ACT Group
1.4 Session Summary
1.5 Confronting the Agenda
1.6 Reasons for Homework
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1.8 Homework Rating Sheet

Session Two
2.1 Control is the Problem
2.2 It is Normal to Suffer
2.3 Passengers on the Bus
2.4 Homework - Session Two
2.5 Homework Rating Sheet

Session Three
3.1 Physicalise the Thought
3.2 Don't-get-eaten Machine
3.3 Homework – Session Three
3.4 Homework Rating Sheet

Session Four
4.1 The Observing Self (I)
4.2 The Observing Self (II)
4.3 Chessboard Metaphor
4.4 Mindfulness
4.5 Homework – Session Four
4.6 Homework Rating Sheet

Session Five
5.1 Values
5.2 Values Card Sort
5.2 Funeral Exercise
5.3 Homework – Session Five
5.5 Homework Rating Sheet

Session Six
6.1 Setting Goals
6.2 Homework – Session Six
6.3 Homework Rating Sheet

Session Seven
7.1 Review

Session One

Introduction/ Confronting the Agenda

Introductions and name tags (5 minutes)

Administer measures (15 minutes)
AAQ-ABI
AAQ-II
DASS-21
PANAS-SF

Mindfulness Activity (5 minutes)
Mindfulness of the breath
Sit in your chair comfortably, close your eyes and start by bringing your attention to your breath. Notice your breathing as you slowly breathe in and out, perhaps imagining you have a balloon in your belly, noticing the sensations in your belly as the balloon inflates on the in-breath and deflates on the out-breath. Continue to notice your breathing feeling your belly rise and fall, when your attention wanders, just bring it back to the breath. Breathing in and out, in and out... (pause) now open your eyes.
Discuss rationale for activity; we will be practicing something similar every week as a way of beginning each session.
Have participants discuss their experiences.

Group discussion: Guidelines (5 minutes) 1.1
Confidentiality (Facilitator Note: Ensure that you reiterate confidentiality as this could a very emotional process for participants.
Ensure you get the participants' permission to discuss the taping of the sessions for treatment fidelity and how it is important not reveal any personal information
Respect for others in the group – even if you might disagree
Ensure you bring folders each week
Call Diane if you are going to be late or can't come
Doing home tasks each week. Can the group think why this would be important? Discuss how change won't happen just by sitting in the group – need to think about it at home and practise what is discussed.
Sometimes you may experience or see other show a lot of emotion, that's okay. We don't need to stop people from having these feelings but be respectful.
We also do not need to save people from their emotion; can anyone suggest what we mean by this? E.g. reassuring them if they are worried.

Handout 1.1

ACT Group Guidelines

1. Confidentiality

This means not talking about people in the group outside of the group. Diane however might need to discuss things with the BIRU team as needed.
The sessions will be recorded to ensure the treatment is going the right way, so please do not reveal any personal details in the sessions such as your last name or your address.

2. Respecting people in the group

Even if you disagree with someone in the group, everyone has the right to have their say. Sometimes Diane might need to chair the discussion to make sure everyone gets a chance to talk.

3. Bring your workbook each week

This makes it easier for you to remember what we did in previous sessions and you will need to fill it in as we go along.

4. Call or send a text to Diane – 9828 5495 or 0403128447– if you're going to be late or can't come

5. Do the home tasks each week

Things won't change just by coming to the group; you need to practise what we're talking about at home.

6. Any additional guidelines suggested by the group

Icebreaker activity (10 minutes)

Divide into pairs
Get each person to identify where they want to go in their rehabilitation,
What is important to them that they are currently not achieving (introduction of values).
Return to the group and each participant to feedback to the group what the other person's values.
If there is an odd number in the group, have each person express individually to the group. If only two in the group, do as a group exercise.

Discussion: Reasons for attending the group (5 minutes) 1.2

What reasons do clients have for wanting to come to the group
Write on whiteboard
Have the participants' write these reasons in their workbooks

Handout 1.2

Reasons for attending the group

Write down your own reasons for attending this group.

- ◇
- ◇
- ◇
- ◇
- ◇
- ◇
- ◇
- ◇
- ◇
- ◇

Education and Discussion: Group aims (10 minutes) 1.3

Discussion of the aims of the group

- To assist in the rehabilitation process
- Help with your emotional difficulties since your injury
- Learn some strategies to help your progress
- Also important to practise the home tasks outside of the group
- Working together in a supportive environment and respect others in the group
- This group is about helping you live the best life you can despite what has happened.
- It is about what you want, what you value and want to achieve in your life.
- This group is putting you back in the driver's seat, so we need to start thinking about where you might want to go.
- Discuss whether these aims fit with reasons clients have for attending.
- Add any additional aims that participants might suggest.
- Discuss these regarding their relevance

Handout 1.3

Aims of the ACT Group

To assist in the rehabilitation process

Help with your emotional difficulties since your injury

Learn some strategies to help your progress

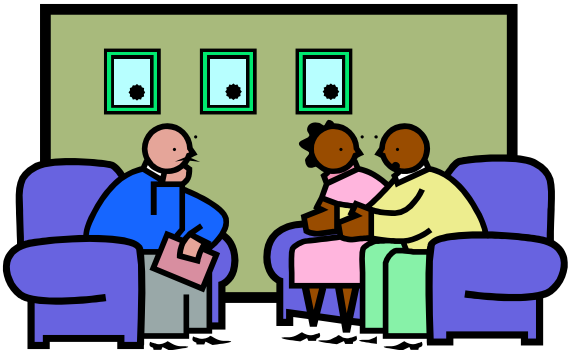
Also important to practise the home tasks outside of the group

Working together in a supportive environment and respect others in the group

This group is about helping you live the best life you can despite what has happened

It is about what you want, what you value and what you want to achieve in your life

This group is putting you back in the driver's seat, so we need to start thinking about where you might want to go



Programme Outline (5 minutes) 1.4

Discuss the number and content of therapy sessions

Handout 1.4

Session Summary

Session 1
- Introduction to the group
  - Introductions & name tags
  - Administer measures
  - Icebreaker activity
  - Group guidelines including confidentiality
  - Reason for attending
  - Group aims
  - Programme outline
- Confronting the agenda
  - Identifying individual issues
  - Workability
  - Breathing mindfulness activity
- Homework
  - Introduce concept of homework
  - Homework contract

Session 2
- Administer measures
- Review homework
- Review previous session
- Control is the problem
  - Normalcy of control
  - Human suffering
- Exercise – Let suffering get close
- Exercise – Passengers on the Bus
- Homework
  - Valued activity
  - Homework contract

Session 3
- Administer measures
- Review homework
- Review previous session
- Acceptance and Defusion
  - Defusion exercise – milk milk milk
  - Physicalise the thought
  - Don't get eaten machine
- Homework
  - Physicalising thoughts
  - Homework contract

Session 4
- Administer measures
- Review homework
- Review previous session
- The observing self
  - Separating self from thoughts/feelings/actions
  - Exercise: Observer
  - The Observing Self
  - Chessboard Metaphor
  - Mindfulness – eating a sultana
- Homework
  - Listing to mindfulness CD
  - Homework contract
  - Weekly diary

Session 5
- Administer measures
- Review homework
- Review previous session
- Introduction of values
  - Difference between goals and values
  - Exercise - Survey of Life Principles
  - Exercise - Funeral
- Homework
  - Principles and action
  - Homework contract

Session 6
- Review homework
- Values and committed action
  - Setting goals
- Committed action and goals
- Recap and review of each session
- Homework
  - Weekly diary
  - Homework contract

Session 7 (one month later)
- Administer measures
- Review of homework and progress
- Review course content
- Exercise – Leaves on a Stream
- Certificates
- Contacts for further assistance

Education - Confronting the Agenda (15 minutes) 1.5

Have each participant discuss their story, that is what has brought them to the group; this will usually involve the story of their injury.

Facilitator to write the story on whiteboard using the following headings:

Event	**Feelings**	**Thoughts (self evaluation)**	**[What I've done to feel better]**

Have each participant describe their story
(Facilitator Note: If clients become distressed telling their story, you could ask if they could make room for the distress when it is showing up. Thank them for showing up with those feelings. Show that you appreciate and respect the struggle. Physically, move closer to them when they are getting distressed---illustrating that the distress does not need to be avoided….)

Workability (15 minutes)

Discuss with group: What are you doing through the week to reduce your distress
As a group identify and discuss what strategies they have used to make them feel better.
Facilitator to write this on the whiteboard
Use an example on the whiteboard first especially if the group are unable to generate examples, e.g. if we feel stressed we might smoke a lot of cigarettes.
Get the clients to write this on their activity sheets
Discuss examples with the group
Explore with the participants:
Whether their current strategies have helped
The long term and short term outcomes of using the strategies
The costs of the behaviour, what have they given up
What are other people telling you to do? Have you noticed that everyone expects you to feel better, to feel good all the time? You might hear "Aren't you over this yet", "You just have to move on". Easy to say…
Externalising 'you have to feel good' voice
Does this behaviour move you towards where you want to go?
Introduce the concept of control, both internal and external sources of control. E.g. Lie detector, chocolate cake
Discuss other people's methods of control such as having a drink or a cigarette to calm down and relax. Avoiding things that make you feel uncomfortable.

Handout 1.5

Confronting the Agenda

Event	Feelings	Thoughts Self Evaluation	What I've done to feel better (workability)

Exercise: Breathing mindfulness exercise (10 minutes)

Finish session with a mindfulness exercise, focussing on their breathing.

Script: A lot of emotional distress people feel is because they are thinking about upsetting things that have already happened or thinking about bad things happening in the future. If we focus on the present moment, then emotions that are difficult such as anger, sadness and fear, become easier to bear. This exercise will increase your mindfulness of the present moment so that you can clear away those thoughts of the past or worries about the future.

Just sit comfortably in your chair, close your eyes and begin to focus on your breathing. Don't try to change anything about your breathing, just notice the air moving into and out of your body.
Allow your mind to just focus on your breathing. Notice the sensation of breathing the air in and then notice the sensation of breathing the air out.

Notice that your mind begins to wander away, don't be concerned, and just bring your attention back to your breathing.

As you breathe air in, fill your mind with the thought 'just this one breath in'
As you breathe air out, fill your mind with the though just this one breath out'

Just this one breath in
Just this one breath out

Just this one breath in
Just this one breath out

Continue to focus on the breath, on each breath in and on each breath out. Don't try to anticipate anything, only focus on one breath at a time.

Continue with the breathing until you hear the timer and then open your eyes.

Discuss with participants how they found the experience. Any difficulties, what their mind was doing.

Homework (5 minutes) 1.6

Introduce the concept of homework
It is necessary to undertake tasks at home as the group is only for 2 hours per week.
Participants need to do extra activities during the week.
Also helps with learning to repeat the activity especially if you are experiencing memory difficulties.

Handout 1.6

Reasons for Homework

Each week a number of homework tasks will be set

We need to complete the homework to practise what we have been learning during the session

Like learning a guitar, we can't learn how to play without practising, also talking about a skill doesn't help us to learn, we must actually do it

It also helps to practice so that we remember what we did especially if you are having memory problems

In order to get the most out of the treatment, you need to commit to your homework tasks

Get a family member to help you if you are having difficulty or give Diane a call

The important thing is to at least try to do something

Homework exercise (5 minutes) 1.7

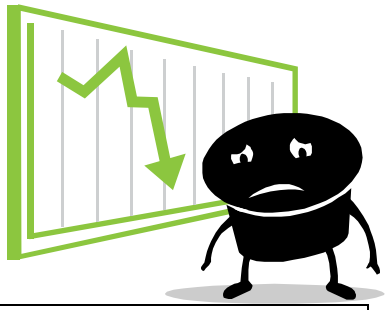
Complete monitoring during the week of any event when they became distressed, what happened, what you were thinking about and what you did to feel better e.g. yell at someone, go to your room.
Sign homework contract
Discuss homework with participants; get them to rate their confidence in understanding what is required and their ability to complete the task.
How committed are you?
How likely are you to complete the homework?
Complete Homework Assessment Part A

Conclusions: Brief summary of the session (5 minutes)

Review the main points of the session
Conclude with a reinforcement of their control moves
Point out examples of what the group participants have been doing to manage their distress from the first exercise
Suggest: if we let go of some these control moves that we may make room for something else but just because I suggest this, you don't have to believe me but try a little experiment over the week, look at your control systems and notice where it is happening. Once we notice when it happens we are in a better place to let go of the control, to make a choice.

Handout 1.7

Homework – Session One



Over the next week, monitor anytime you became upset, sad, angry, worried.

4. What happened?
5. What were you thinking about?
6. What did you do to feel better?

What happened?	**What were you thinking?**	**What did you do to feel better?**
Example: Your friend rang you and wanted you to go out that night. You said no.	I will get too tired, they will think I am stupid, I will just slow them down, I will spoil their night. What if I get hurt again	Had a cigarette Yelled at my younger brother Spend the night I my room on the internet

Handout 1.8

Homework Rating Sheet

Date _____ Week 1

Part A

After discussing the homework please answer the first two questions:

How confident are you about your ability to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely
How motivated are you to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Part B

Thinking about your homework over the past week: Are you satisfied with your performance on your homework tasks	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Barriers to completing your homework please tick as many which apply:

Forgot ☐

Too busy ☐

Homework too hard or didn't understand ☐

Didn't want to do it ☐

Seemed pointless ☐

Other reason, please state

_____

_____

_____

_____

Session Two

Control is the Problem

1. **Administer measures** (15 minutes)
   AAQ-ABI
   AAQ-II
   DASS-21
   PANAS-SF

2. Mindfulness Activity (5 minutes)

Sit comfortably in the chair with your back straight, and head resting evenly on your neck. Rest your hands gently in your lap, relaxing your shoulders.
You may close your eyes at any time during the exercise or keep them open. If you keep your eyes open, it helps to start off by focussing on a point across the room.
When thoughts or sensations come into your mind, allow them to 'pop' and then let them go.
It's just your mind keeping busy. It doesn't like to rest, moving quickly from one thought to another. A bit like a dog when you try to take it for a walk, darting here and there, pulling against the leash, sniffing at every bush, barking, playing around and running here and there.
Now let's start and observe what happens...
Gently observe what your mind does without making any judgements or opinions. It will come back to you, time and time again. Sometimes it may seem restless or irritated.
Relax, just let your mind play around and notice that part of you is observing.
You are the master and you are observing, learning, aware but not expecting anything. Free from judgment. Detached from your mind and whatever it may say. You're bigger than the mind, detached from it, let it go...
Be patient and just relax.
If your eyes are open, now try closing them for a couple of minutes. Take a deep breaths, relax *(pause).* Now open your eyes
Discussion on the difficulties of doing these exercises, how your mind ran all over the place, how people often fall asleep, all this doesn't mean you are bad at it, as there is not bad meditation.

3. Review homework (10 minutes)
   Discuss barriers to completing the homework and rate how they feel about their effort.
   Complete homework assessment sheet Part B

Review previous session – Confronting the Agenda (10minutes)
Identification of individual issues – Confronting the agenda, workability
Mindfulness of the breath exercise
Reasons for homework

Education & Discussion: Control as the Problem (15 minutes) 2.1

Discuss normalcy of control

We are taught all our lives to control things. When you were a child and you fell over, you were told to man up and not cry.

External sources of control e.g. walk to the back of the room saying "I can't walk to the wall." Have one of the participants undertake the above example. (ensure all participants are mobile; use another metaphor if any of the participants have mobility issues)

Internal sources of control e.g. don't think about chocolate cake. All participants attempt this exercise

Exercise: Chocolate Cake

"Suppose I tell you right now that I don't want you to think about something. I'm going to tell you very soon. And when I do, don't think it even for a second. Here it comes. Remember, don't think of it. Don't think of… warm chocolate cake! You know how it smells when it first comes out of the oven… Don't think of it! The taste of the chocolate icing when you bite into the first warm piece… Don't think of it! As the warm moist piece crumbles and crumbs fall to the plate… Don't think of it! It's very important; don't think about any of it!"

Discuss how they are telling themselves not to think about it but it still happens. Verbal control is very weak when applied to our internal experiences, what we are thinking.

Human Suffering (5 minutes)

Define the pervasiveness of human suffering

We have the expectation that life will be normal and we won't feel sadness, pain, disappointment…

How many of you have thought about wanting to die

Research has indicated 20% of people in the community have thoughts of suicide including a plan to carry it out, another 20% of people have had thoughts without a serious plan. That is nearly half of the population.

Look around the room, this means that half of the people in this room at some time have thought about suicide and half of those have planned how they would do it.

Handout 2.1

Control is the Problem

We like to be able to control things, this is quite normal, so we try to control what we experience in life.

We are told very early to control how we feel
Our parents may have told us to 'man up' when started to cry after we fell over. Stop crying and be a big boy/girl.
As we get older we learn other ways to control what is happening to us.

External sources of control

Exercise: Get a participant to either walk to the back of the room, saying "I can't walk to the back of the room", or walk down the hall saying "I can't walk down the hallway".

Internal sources of control

Chocolate Cake (Hayes, Strosahl & Wilson 1999:124)

> "Suppose I tell you right now that I don't want you to think about something.
>
> I'm going to tell you very soon. And when I do, don't think it even for a second. Here it comes. Remember, don't think of it. Don't think of… warm chocolate cake! You know how it smells when it first comes out of the oven… Don't think of it! The taste of the chocolate icing when you bite into the first warm piece… Don't think of it! As the warm moist piece crumbles and crumbs fall to the plate… Don't think of it! It's very important; don't think about any of it!"

Exercise – Let suffering get close (Wilson & DuFrene, 2009) (10 minutes)

Thinking about the fact that more than half of us have known pain and desperation so bad, so intense, that we have seriously considered taking our own life. Think about this as we begin the following exercise. As we go through the scenario, I will leave you with a few minutes to just sit with it, don't try to understand or solve the problem, or even sympathise with them. Just notice them, let them get close to you.
"Sit comfortably in your chair. Close your eyes and take a few deep, slow breaths."
Imagine someone you know casually – a chance acquaintance, an occasional co-worker, the friend of a friend – someone whose face you know but whose personal story might be less familiar to you. Picture this person sitting alone in a room, deep in sorrow. Imagine he has just learned of the loss of someone dear. Allow your awareness to come to rest on this person's face. Notice the details of his expression. Do you see tears? Trembling? Shallow or rapid breath? Is the hair in disarray across his forehead? Keep allowing your awareness to wash over this person like water, just appreciate his story and loss without doing anything with it until the buzzer goes off.
"Now just open your eyes and take a few breaths…, just get comfortable again in your chair close your eyes again and take a few deep, slow breaths."
Now, think about someone who you are concerned about, it might be another person with any injury who you have met during your rehab or the other person in the group. Someone who you might like to help but maybe you can't help them fast enough or even can't help them at all. Imagine this person sitting alone in a darkened room. Although he is in great pain, imagine that you can see a look of cold, determined resolve on his face. Allow yourself to slowly, slowly become aware that you're watching this person the last day of his life. Nothing you can say, nothing you can do will alter the course that, set in motion years and years ago, will now proceed to its conclusion. There is nothing to be solved now, no solutions to be found. Let yourself simply witness this person in these last hours. Noticed what your attention falls on in him, and also notice what comes up in you. Do you long to reach out to him? Do you want to figure out what has happened? Do you try to turn and run away? The only thing you can do is be a witness to this person, calm and present, until I tell you to open your eyes.

Discussion – How we try to reduce our suffering (5 minutes) **2.2**

What was the exercise like for people?
What did you feel?
What thoughts came into your head?
Write this up on the whiteboard

Conclude with:

It is normal to try to reduce our suffering
As we turn away from our suffering we miss other opportunities

Handout 2.2

It is Normal to Suffer

Feeing sad is a normal human emotion, we are not always happy

When something bad happens to us, it is normal to feel angry, upset, sad, scared or depressed.

We have the expectation that life will be normal and we won't feel sadness, pain, disappointment…

How many of you have thought about wanting to die

Research has indicated 20% of people in the community have thoughts of suicide including a plan to carry it out, another 20% of people have had thoughts without a serious plan. That is nearly half of the population.

Look around the room, this means that half of the people in this room at some time have thought about suicide and half of those have planned how they would do it.

List some of the things that arose for you during the exercise

◇

◇

◇

◇

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◇

If we always turn away from suffering or emotional pain, we may miss an opportunity to experience an important part of life.

Example: if we avoid getting close to people because we are worried about getting hurt or not being good enough, we may never have the opportunity to experience a loving relationship.

Exercise: Passengers on the bus (20 minutes) 2.3

(Hayes et al., 2003)

Explain the metaphor and then role play it if possible. Have a participant to volunteer to be the driver. Have them identify a thought that is causing them distress. Have the other participants take on the role of that thought, emotion or memory.
Discuss the exercise with the clients, generate ideas how this metaphor is applicable to their life.
Give other participants (you might need to bring in some confederates here to assist with the task) the opportunity to act out their "passengers on the bus".
May need to give suggestions and be quite directive about participant's passengers. Use a series of cards with typical passengers for TBI clients that participants may be able to select from then get someone to volunteer and be the bus driver.
Another idea is to have everybody in the room pick difficult passengers, barriers to them getting what they want. Then randomly pick one person to be the driver and let everybody else be the passenger. This way, the person who is driving has not had to admit that these are her voices. But they will be. People will identify voices that are universal, e.g., your pain will stop you…you have to feel more confident before you can do that….you'll never succeed at that…..who do you think you are etc.

Handout 2.3

Passengers on the Bus

Ciarrochi J, Blackledge JT & Mercer D. (2006) Images to accompany Acceptance and Commitment Therapy Interventions (Part 2). University of Wollongong, Australia.

Homework (10 minutes) 2.4

On a card write down your valued activity i.e. something that you really want to do

On the other side write down your private experiences (i.e. thoughts, feelings, things from your past) that stop to achieving that activity

Carry that card with you over the next week and sit with it

Notice when those private experiences come up

Notice if you are able to achieve your valued activity despite these private experiences

Complete Homework Assessment Part A

Handout 2.4

Homework - Session Two

On a card write down your valued activity

i.e. something that you really want to do

On the other side write down your private experiences

i.e. thoughts, feelings, things from your past that stop to achieving that activity

Carry that card with you over the next week and sit with it

Notice when those private experiences come up, and

Notice if you are able to achieve your valued activity despite these private experiences.

Handout 2.5

Homework Rating Sheet

Date _____ Week 2

Part A

After discussing the homework please answer the first two questions:

How confident are you about your ability to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely
How motivated are you to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Part B

Thinking about your homework over the past week:

Are you satisfied with your performance on your homework tasks	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Barriers to completing your homework please tick as many which apply:

Forgot ☐

Too busy ☐

Homework too hard or didn't understand ☐

Didn't want to do it ☐

Seemed pointless ☐

Other reason, please state

_____

_____

_____

_____

Session Three

Acceptance and Defusion

Administer measures (15 minutes)

AAQ-ABI
AAQ-II
DASS-21
PANAS-SF

Mindfulness exercise (5 minutes)

Breathing Meditation (Kabat-Zinn 1996)

Assume a comfortable posture lying on your back or sitting. If you are sitting, keep the spine straight and let your shoulders drop.

Close your eyes if it feels comfortable.

Bring your attention to your belly, feeling it rise or expand gently on the in breath and fall or recede on the out breath.

Keep your focus on the breathing, "being with" each in breath for its full duration and with each out breath for its full duration, as if you were riding the waves of your own breathing.

Every time you notice that your mind has wandered off the breath, notice what it was that took you away and then gently bring your attention back to your belly and the feeling of the breath coming in and out.

If your mind wanders away from the breath a thousand times, then your "job" is simply to bring it back to the breath every time, no matter what it becomes preoccupied with *(pause).*

Gently open your eyes and bring yourself back to the room.

Review Homework (5 minutes)

Discuss the content of the homework

- Valued activity
- Homework contract

Difficulty in completing.

Complete Homework Assessment Part B

Review previous session (5 minutes)

- Control is the problem
  - Normalcy of control
  - Human suffering
- Exercise – Let suffering get close
- Exercise – Passengers on the Bus

Exercise: The power of language (10 minutes)

Exercise: Milk milk milk

Have the clients repeat the word 'milk' repeatedly

Discuss with the group:

How the word changes, we become less focussed on the meaning of the word e.g. notice how our tongue works as we keeping saying the word, notice the emotions and thoughts that it brings up

Exercise: Physicalise the thought (15 minutes) 3.1

Facilitator Note:

This exercise assists in reducing the reactivity to the thought. It provides interceptive exposure to the thought. Monitor participants' reactions closely for any abreactions.

Think of a thought that causes you distress, makes you feel tight in the chest or churned up in the stomach, for example:

My life is over…I am a retard/defective/stupid…

Facilitator to write up on whiteboard, participants to write in work sheet

Reading through the list, what word hits you the hardest, circle it with your pen.

Take that thought, close your eyes and repeat it in your mind.

- Imagine holding the thought in your hands in front of you (model this behaviour and have participants undertake activity as well)
- If it had a shape, what shape would it be…etc? What shape is it
- What colour is it,
- What does it look like
- Does it have a smell
- Is it heavy
- What about the texture
- Run your hands over it

Group to discuss their experience and Facilitator to write on the blackboard

Handout 3.1

Physicalise the Thought

Think of a thought that causes you distress, makes you feel tight in the chest or churned up in the stomach, for example:
My life is over…
I am a retard/defective/stupid…

My thought is _____

Write down other thoughts that people may have experienced

◇
◇
◇
◇
◇
◇

Reading through the list…

- What word hits you the hardest?
- Circle it with your pen

Take that thought, close your eyes and repeat it in your mind

- Imagine holding the thought in your hands in front of you
- If it had a shape, what shape would it be
- What colour is it
- What does it look like
- Does it have a smell
- Is it heavy
- What about the texture
- Run your hands over it

Reflect:
I can't do this because…
It is reasonable to get rid of ugly things in our life, to want to change things. Metaphor – if we don't like the colour of our lounge room, we repaint it to something we find more attractive. Most people want to change things to make them 'nicer' or more pleasant.

I don't know how to stop unpleasant thoughts from showing up, everyone has them, and they are a part of life. But we can respond to them differently.

Exercise: The don't get eaten machine

(20 minutes) 3.2

Basically, you want them to physicalise the mind, see it as something apart from their self, as something that is checking for negative things, threats, etc, all the time, as something you can't turn off, ….

Education:
The story of life says that in the end we all die
This does not mean that we don't live our life or enjoy ourselves
It is inevitable but we don't let it weigh us down
Be a reporter, look at how your story (i.e. the story of your injury and ongoing pain/disability) has been directing your life.
The mind is like a thought salesman, it is always trying to sell you thoughts all the time and trying to get you to believe them. With any salesman we have a choice to buy from them or not. So when your mind tries to sell a thought to you, you can choose whether to buy the thought and keep it or not. This is the ultimate in human dignity we can have our fears, we can have our doubts, and yet we can still act courageously.

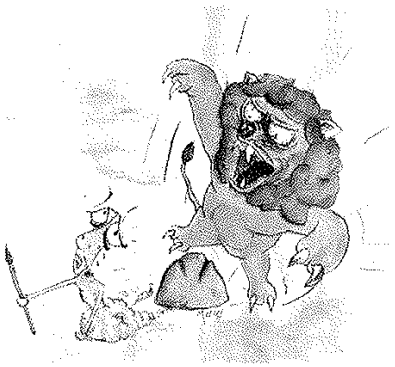
Handout 3.2

CLIENT HANDOUT: THE DON'T-GET-EATEN MACHINE

Humans evaluate themselves all the time—more so than any other animal. The mind constantly makes evaluations ("Am I good enough?" "Am I in danger?") and comparisons ("Am I as good as you?" "Am I stronger than you?")

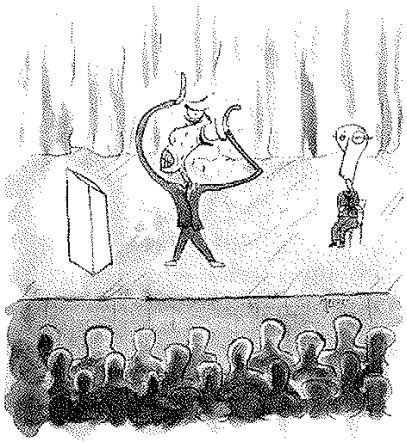
These evaluations and comparisons can be quite painful. We might be tempted to try to "turn them off." Sometimes we don't want these painful thoughts going through our heads.

But what if we could look at these thoughts a bit differently? Let's look at them as being produced by a machine in our heads. So, for now, let's think of our minds as a "don't-get-eaten machine." Its primary purpose is to prevent us from getting eaten. It is always looking for threats.



We all would like to "turn off" this machine sometimes. But imagine if we could turn it off. Then we would not be able to detect "real" threats. We would probably be killed.

So we can't turn off the machine. This is great if we want to stay alive. Unfortunately there is a downside. The machine can be turned on the self. It can evaluate the self as being "not good enough." It can find problems and threats that are not really there. It is like the image to the right, where the man is trying to give a speech and is reacting as if his very life is at stake.



It is not that the mind is good or bad. It is sometimes helpful and sometimes unhelpful.

Sometimes the closer we get to something we value, the faster the "don't-get-eaten machine" runs. It just keeps generating more and more evaluations.

The machine is painful, and we can't turn it off. However, there is good news: we don't always have to *believe* the evaluations. For example, we can have the evaluation "I am to anxious to give this speech" *and* still give the speech. We can think "I am unlovable" *and* still take actions to find love.

Can you think of times where you thought you couldn't do something but you did it anyway? That is an example of not listening to the "don't-get-eaten machine."

(Ciarrochi & Bailey, 2008:18)

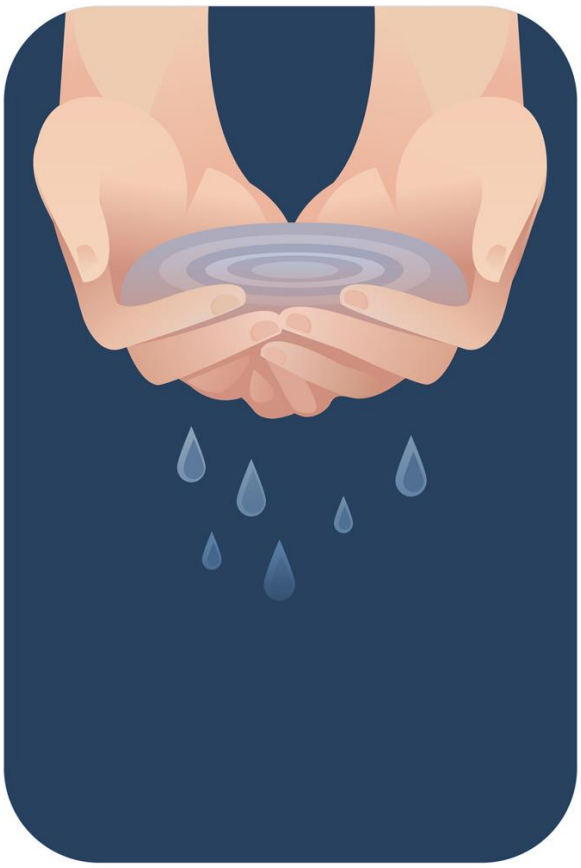
Homework: 3.3

1. Practise thinking about thoughts over the week that you find distressing. Close your eyes, picture the thought, give it a shape.
2. Try to undertake this exercise at least 3 times.
3. Complete Homework Assessment Part A

Handout 3.3

Homework – Session Three

Practise thinking about thoughts over the week that you find distressing.
Close your eyes, picture the thought, give it a shape.
Try to undertake this exercise at least 3 times.



Handout 3.4

Homework Rating Sheet

Date _____ Week 3

Part A

After discussing the homework please answer the first two questions:

How confident are you about your ability to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely
How motivated are you to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Part B

Thinking about your homework over the past week: Are you satisfied with your performance on your homework tasks	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Barriers to completing your homework please tick as many which apply:

Forgot ☐

Too busy ☐

Homework too hard or didn't understand ☐

Didn't want to do it ☐

Seemed pointless ☐

Other reason, please state

_____

_____

_____

_____

Session Four

The Observing Self

1. Administer measures (15 minutes)

AAQ-ABI
AAQ-II
DASS-21
PANAS-SF

2. Mindfulness Activity

Mindfulness of the breath

Sit in your chair comfortably, close your eyes and start by bringing your attention to your breath. Notice your breathing as you slowly breathe in and out, perhaps imagining you have a balloon in your belly, noticing the sensations in your belly as the balloon inflates on the in-breath and deflates on the out-breath. Continue to notice your breathing feeling your belly rise and fall, when your attention wanders, just bring it back to the breath. Breathing in and out, in and out... (pause) now open your eyes.

4. Review homework (10 minutes)

Discuss barriers to completing the homework and rate how they feel about their effort.

Complete homework assessment sheet Part B

Review previous session (5 minutes)

Acceptance and Defusion

Defusion exercise – milk milk milk
Physicalise the thought
Don't get eaten machine

Discussion: Separating the self from thoughts, feelings & actions
(20 minutes)

We tend to not be able to separate our self from what we think, how we feel and what we do.

There is always a part of us that watches… **4.1**

So there is a part of you that is always noticing, watching.

Draw on the board four overlapping circles:

(Eifert, McKay, Forsyth, 2006)

Using an example from someone's homework session 1 with their permission. If an example is not available generate another example of when someone became distressed.

Example:
When you went home from hospital, you were probably very excited and thought this is it, my life will now move forward and get back to 'normal' or how it was before my injury. As days and weeks moved on though, you began to realise that being home presented new problems. You still cannot drive, or go back to work, you find your family are less understanding and you can't seem to cope as well as before.
What are your thoughts about this?
How are you feeling?
What do you do when you have these feelings?

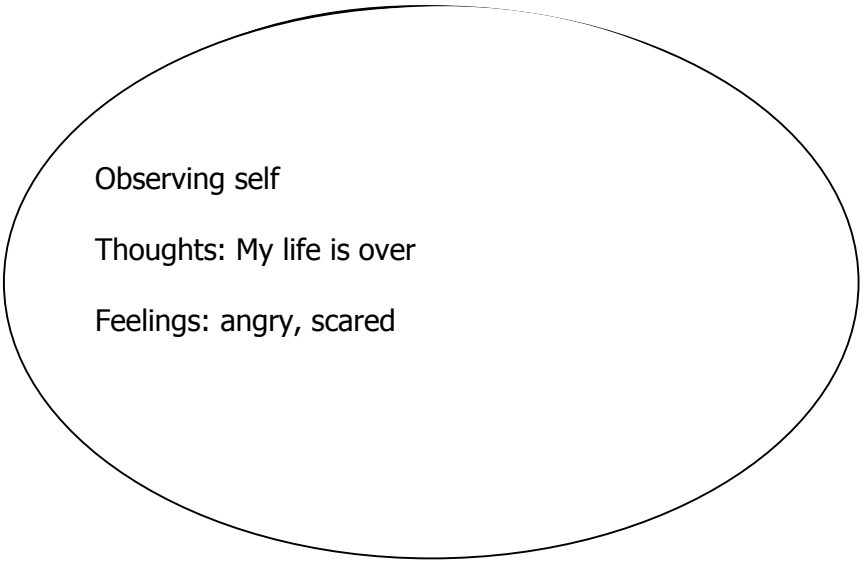
Handout 4.1

The Observing Self (I)

Separating the self from thoughts, feelings and actions
We tend to not be able to separate our self from what we think, how we feel and what we do. There is always a part of us that watches…

When you went home from hospital, you were probably very excited and thought this is it, my life will now move forward and get back to 'normal' or how it was before my injury. As days and weeks moved on though, you began to realise that being home presented new problems. You still cannot drive, or go back to work, you find your family are less understanding and you can't seem to cope as well as before.
What are your thoughts about this?
How are you feeling?
What do you do when you have these feelings?

(Eifert, McKay & Forsyth, 2006)



Exercise: Observer (eyes closed) 15 minutes

(Hayes, Strosahl & Wilson, 1999:193)

Now we try to separate those parts so we can try to look at the situation as an observer.

We are going to do an exercise that will help you experience yourself as an observer. Get comfortable in your chair and close your eyes and then listen to my voice. If you find your mind wandering, just gently pull it back to my voice. Now, just turn your attention to yourself sitting in this room. See yourself sitting in the chair, picture yourself. Now begin to go inside your skin and get in touch with your body. Notice how you are sitting in the chair. See if you can notice how your body imprints on the chair, the shape it forms on your skin. Notice any body sensations where your body touches the chair. As you see each one, just sort of acknowledge that feeling and allow your consciousness to move on (pause). Now notice any emotions you are having and if you have any, just acknowledge them (pause). Now get in touch with your thoughts and just quietly watch them for a few moments (pause). Now I want you to notice that you noticed these things, a part of you noticed them. You noticed those sensations…those emotions…those thoughts. And that part of you we will call the "observer you". There is a person in there, behind those eyes, who is aware of what I am saying right now. And it is the same person you've been your whole life. In some deep sense, this observer you is the you that you call you.

Now I want you to try to remember one of your first memories after your accident, something that really sticks in your mind.
Raise you index finger once you have a memory.
Good. Now look around, remember all the things that were happening then. Remember the sights, the sounds, your feelings and as you do that, see whether you can notice that you were there then, noticing what you were noticing. See whether you can catch the person behind your eyes who saw, and heard, and felt. You were there then, and you are here now. I'm not asking you to believe this. I'm not making a logic point. I am just asking you to note the experience of being aware and check and see whether it isn't so that in some deep sense the you that is here now was there then. The person aware of what you are aware of is here now and was there then. See whether you can notice the essential continuity, in some deep sense at the level of experience, that you have been you for your whole life. *(pause)*

Again picture yourself in this room, see yourself sitting in the chair. Picture *(describe the room).* And when you are ready, come back to the room. Open your eyes.

Discuss: Ask participants about their experience with this exercise. This is not for analysis or interpretation, just discussion.

Exercise: The Observing Self (II) (20 minutes) 4.2

Each participant to work on their own issue
Discuss with the group what they would put in each circle
Write on whiteboard
Participants to transfer to their own workbooks
If the participant is unable to generate ideas make some suggestions

- How they feel when their brain injury stops them from doing something
- What happens when they lose their temper or feel frustrated

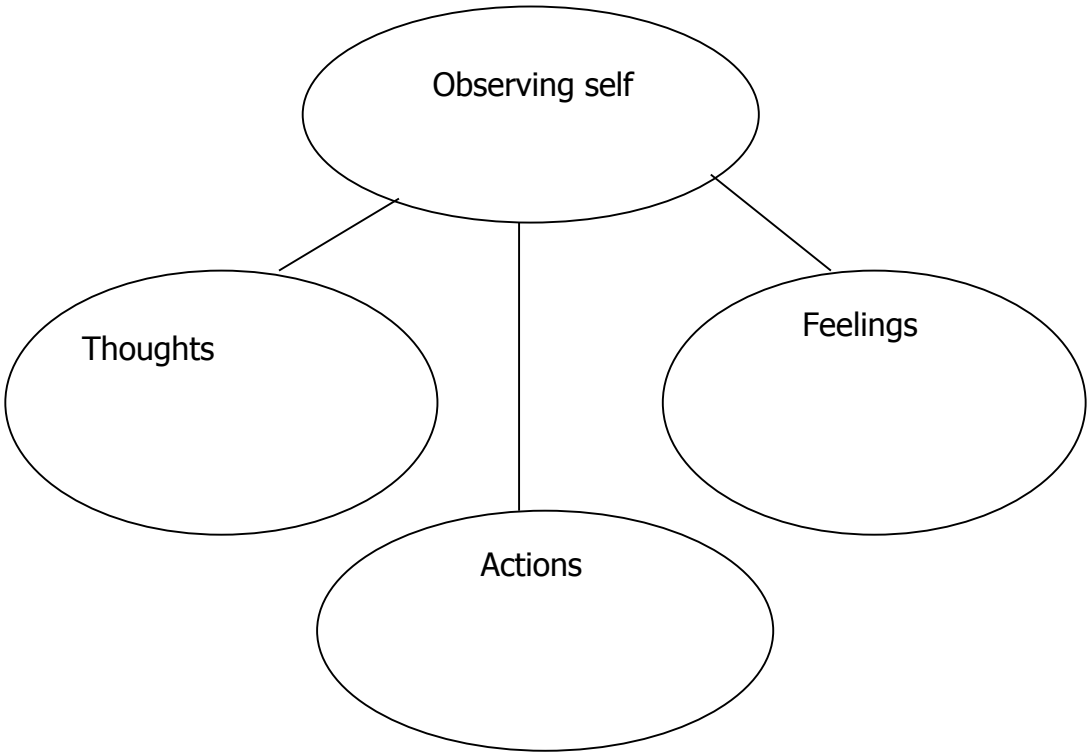
Handout 4.2

The Observing Self (II)

Identify an issue that has been causing you some concern.

_____

_____



Thoughts:

_____

_____

_____

Feelings:

_____

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_____

Actions:

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_____

Chessboard Metaphor (10 minutes) 4.3

Discuss the metaphor of the chess board, how as individuals we are like a chess game, made up of the board and the black and white pieces.

Think of your thoughts and feelings as chess pieces on a chessboard. Think of the white pieces as the thoughts and feelings you want (e.g., "confidence", "happiness", "self-esteem"), and the black pieces as the thoughts and feelings you don't want (e.g., "anxiety", "fear", "self-doubt", "hopelessness"). If you prefer, you can think of the white pieces as the desired thoughts and feelings, and the black pieces as the undesired ones.

One thing we humans do is try to defeat the black pieces. We want to get rid of our negative thoughts and feelings. So we go to war. At difficult times in our lives, it looks like we're losing—the black pieces knock most of the white pieces off the board. At other times it may look like we are winning. We knock many of the black pieces off the board.

But look closely at your experience. What happens when you knock those black pieces off the board? Do they stay off forever, or do they come back sooner or later? Or do you find sometimes that new black pieces take the place of some of the old ones? It's like a war that rages forever, with no end in sight.

The problem is, when we wage this war, we wage it against ourselves. When we battle the black pieces, we battle a part of our experience, a part of ourselves. We literally set up a situation where, in order to get on with life, large parts of our actual experience must disappear forever. This war carries a heavy cost. We can become absorbed with our internal struggles, and disconnected from the outside world and the things in life that matter most to us. We can become so absorbed with our internal struggles that we don't "see" the outside world.

But what if it's possible to let go of the fight? What if you are the chessboard in this metaphor? Regardless of how the war between the black pieces and white pieces turns out, is the chessboard affected or damaged in any way? Or is the chessboard simply an arena where match after match can play itself out—and the board remains solid and intact, ready for whatever comes next. What if you could focus your energy on doing what you want, and carrying the positive and negative thoughts with you?
Remember, there is a distinction between your thoughts and your observer self. Think of the observer as being the chess-board—as being you. Think of your thoughts and feelings as being the chess pieces. The chess board carries the pieces, but it is not equal to the pieces. Similarly, you carry your difficult thoughts, you observe those thoughts, but you are not equivalent to those thoughts.

Handout 4.3

The Chessboard Metaphor

Think of your thoughts and feelings as chess pieces on a chessboard. Think of the white pieces as the thoughts and feelings you want (e.g., "confidence", "happiness", "self-esteem"), and the black pieces as the thoughts and feelings you don't want (e.g., "anxiety", "fear", "self-doubt", "hopelessness"). If you prefer, you can think of the white pieces as the desired thoughts and feelings, and the black pieces as the undesired ones.

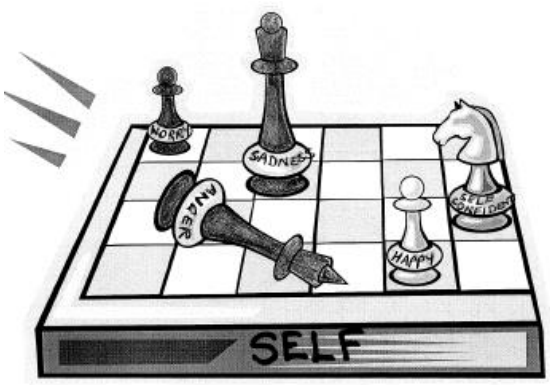
One thing we humans do is try to defeat the black pieces. We want to get rid of our negative thoughts and feelings. So we go to war. At difficult times in our lives, it looks like we're losing—the black pieces knock most of the white pieces off the board. At other times it may look like we are winning. We knock many of the black pieces off the board.

But look closely at your experience. What happens when you knock those black pieces off the board? Do they stay off forever, or do they come back sooner or later? Or do you find sometimes that new black pieces take the place of some of the old ones? It's like a war that rages forever, with no end in sight.

The problem is, when we wage this war, we wage it against ourselves. When we battle the black pieces, we battle a part of our experience, a part of ourselves. We literally set up a situation where, in order to get on with life, large parts of our actual experience must disappear forever. This war carries a heavy cost. We can become absorbed with our internal struggles, and disconnected from the outside world and the things in life that matter most to us. We can become so absorbed with our internal struggles that we don't "see" the outside world.

But what if it's possible to let go of the fight? What if you are the chessboard in this metaphor? Regardless of how the war between the black pieces and white pieces turns out, is the chessboard affected or damaged in any way? Or is the chessboard simply an arena where match after match can play itself out—and the board remains solid and intact, ready for whatever comes next. What if you could focus your energy on doing what you want, and carrying the positive and negative thoughts with you?

Remember, there is a distinction between your thoughts and your observer self. Think of the observer as being the chess-board—as being you. Think of your thoughts and feelings as being the chess pieces. The chess board carries the pieces, but it is not equal to the pieces. Similarly, you carry your difficult thoughts, you observe those thoughts, but you are not equivalent to those thoughts.



Mindfulness exercises (30minutes) 4.4

Introduction to Mindfulness - Mindfulness is an ancient Buddhist practice which is very relevant for life today. Mindfulness is a very simple concept. Mindfulness means paying attention in a particular way: on purpose, in the present moment, and non-judgementally. This increases awareness, clarity and acceptance of our present-moment reality.

We can practice mindfulness our everyday lives: for example we can mindfully walk, if you had walking difficulties after your injury you probably noticed how much effort it took to walk, noticing how you had to place one foot in front of the other. Prior to your injury, you would walk 'automatically' without being aware of what you were doing. In the same way we may not really be present in our everyday lives. We can be miles away without even realising it. When we are on automatic pilot, we lose the ability to make choices; we are not actually experiencing the here and now.

Exercise: Mindfully walking

Have the participants get up and mindfully walk down the corridor.

Return to the room and discuss.

Exercise: Eating a sultana

Take the sultana, spend a minute looking at the sultana, noticing its colour, texture, and all the little folds in its skin. Rub it between your fingers; notice how it feels between fingers, is it soft, sticky. Then take a moment to smell the sultana; is the scent sweet or tangy, strong or unnoticeable?

Next, put the sultana to your lip, just rest it there, and don't eat it yet. Notice what happens in your mouth, how your mouth starts to salivate, and you feel a strong desire to just eat. Resist for a moment longer.

Now put the sultana in your mouth but don't chew. Just roll it around a bit and feel the texture of it with your tongue. Can you taste anything yet? Can you notice the saliva in your mouth?

Then, take one small bite out of the sultana. Notice the difference between the taste and the texture on the inside and outside. What does it feel like? How does it taste?

Once you've noticed everything there is to be noticed this time, try chewing the sultana and don't swallow. Noticing how the texture changes as you chew, notice how the taste changes. Try to stay aware of everything you can taste and feel. Now swallow...

Discuss participants' responses to the exercise.

How we can translate this activity in our daily lives

What does it mean to them?

How are they not enjoying or focussing on their activities.

Notice how sometimes you will eat something or even have a drink and not even notice that you are eating or drinking.

Bring in the observer, how there is a part of themselves that is watching them eat the sultana, engage in the exercise.

Handout 4.4

Mindfulness

Mindfulness is an ancient Buddhist practice which is very relevant for life today. Mindfulness is a very simple concept. Mindfulness means paying attention in a particular way: on purpose, in the present moment, and non-judgementally. This increases awareness, clarity and acceptance of our present-moment reality.
We can practice mindfulness our everyday lives: for example we can mindfully walk, if you had walking difficulties after your injury you probably noticed how much effort it took to walk, noticing how you had to place one foot in front of the other. Prior to your injury, you would walk 'automatically' without being aware of what you were doing. In the same way we may not really be present in our everyday lives. We can be miles away without even realising it. When we are on automatic pilot, we lose the ability to make choices; we are not actually experiencing the here and now.

Exercise: Eating a sultana
Take the sultana, spend a minute looking at the sultana, noticing its colour, texture, and all the little folds in its skin. Rub it between your fingers; notice how it feels between fingers, is it soft, sticky. Then take a moment to smell the sultana; is the scent sweet or tangy, strong or unnoticeable?

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Now put the sultana in your mouth but don't chew. Just roll it around a bit and feel the texture of it with your tongue. Can you taste anything yet? Can you notice the saliva in your mouth?

Then, take one small bite out of the sultana. Notice the difference between the taste and the texture on the inside and outside. What does it feel like? How does it taste?

Once you've noticed everything there is to be noticed this time, try chewing the sultana and don't swallow. Noticing how the texture changes as you chew, notice how the taste changes. Try to stay aware of everything you can taste and feel. Now swallow...

Homework 4.5

Listen to the mindfulness CD at least 3 times over the next week
Practice mindful eating or drinking
Try to mindfully walk at least once per day
Homework contract

Handout 4.5

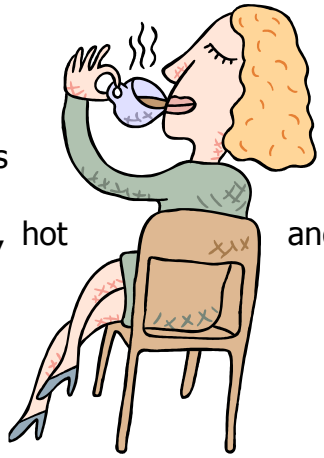
Homework Session Four

Listen to the mindfulness CD at least 3 times over the next week
Practice mindful eating or drinking
Try to mindfully walk at least once per day

Mindfulness Exercise

Next time you drink a cup of coffee, or tea or hot chocolate…

Hold the cup in both hands,
Focus your attention on the warmth you feel
Bring your face close to the cup take a really deep breath,
Notice any warmth, steam or aroma
Notice the sensation of what is happening inside your nose.
Place you lip on the edge of the cup but don't take a sip.
Stay there for about 5-10 seconds,
Notice what is happening inside your mouth,
Notice the feel of the cup against your lip
Take a small sip, **don't swallow**
Hold the liquid in your mouth for at least 30 seconds
Focus on the sensations
The taste, sweetness, bitterness, smooth, creamy, hot and then cooling to the temperature of your mouth
What part of the tongue is being affected
Notice how the liquid moves around your mouth
Swallow
Feel the liquid moving down your oesophagus.
Then you can drink the rest in a mindful way.



Think about what the experience felt like, how much more you were able to gain from drinking your coffee (or tea, or hot chocolate)

You can use mindfulness in all parts of your life,

- When you shower,
- When you are engaged in talking to someone,
- Going for a walk.

It allows you to bring your attention to the moment and allow distracting thoughts to move away.

This is helpful if you feel worried or sad, when you maybe experiencing discomfort or pain.

Handout 4.6

Homework Rating Sheet

Date _____ Week 4

Part A

After discussing the homework please answer the first two questions:

How confident are you about your ability to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely
How motivated are you to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Part B

Thinking about your homework over the past week:

Are you satisfied with your performance on your homework tasks	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Barriers to completing your homework please tick as many which apply:

Forgot ☐

Too busy ☐

Homework too hard or didn't understand ☐

Didn't want to do it ☐

Seemed pointless ☐

Other reason, please state

_____

_____

_____

_____

Session Five

Values

Administer measures (15 minutes)

AAQ-ABI
AAQ-II
DASS-21
PANAS-SF

Mindfulness Activity (5 minutes)

Sit comfortably in the chair with your back straight, and head resting evenly on your neck. Rest your hands gently in your lap, relaxing your shoulders.

You may close your eyes at any time during the exercise or keep them open. If you keep your eyes open, it helps to start off by focussing on a point across the room.

When thoughts or sensations come into your mind, allow them to 'pop' and then let them go.

It's just your mind keeping busy. It doesn't like to rest, moving quickly from one thought to another. A bit like a dog when you try to take it for a walk, darting here and there, pulling against the leash, sniffing at every bush, barking, playing around and running here and there.

Now let's start and observe what happens...

Gently observe what your mind does without making any judgements or opinions. It will come back to you, time and time again. Sometimes it may seem restless or irritated.

Relax, just let your mind play around and notice that part of you is observing.

You are the master and you are observing, learning, aware but not expecting anything. Free from judgment. Detached from your mind and whatever it may say. You're bigger than the mind, detached from it, let it go...

Be patient and just relax.

If your eyes are open, now try closing them for a couple of minutes. Take a deep breaths, relax *(pause).* Now open your eyes

Review Homework

5. Mindfulness activities, how easy they found the task, discuss their experiences, the barriers for completing the homework etc.

Complete Homework Assessment Part B

Review previous session – Self as content

Separating self from thoughts/feelings/actions
Exercise: Observer
The Observing Self
Chessboard Metaphor

Mindfulness – eating a sultana

Education: Introduction of values 5.1

Not being able to achieve your goals does not cancel out your values
Values are usually never realised but are what we direct our lives towards.

Describe how values are different from goals.

They are like a lighthouse that guides us to where we want to go.

If we want to get to the Penrith from Liverpool we know that we can travel there by car or by train. We have a specific destination - this is what we call a goal.

If I said to travel west, you would know what direction to go, but you wouldn't know how far or how long to travel you would just keep going west until you reached Perth and then travel across the ocean. You don't have a final destination, but will continue to move west, this is a value. There is no expectation you will achieve the value but it gives your life a direction.

Handout 5.1

Values

A value is like a lighthouse in the distance.
It guides you through the storm.

- Not being able to achieve your goals does not cancel out your values
- Values are usually never realised but are what we direct our lives towards.

If we want to get to the Penrith from Liverpool we know that we can travel there by car or by train. We have a specific destination - this is what we call a goal. If I said to travel west, you would know what direction to go, but you wouldn't know how far or how long to travel you would just keep going west until you reached Perth and then travel across the ocean. You don't have a final destination, but will continue to move west, this is a value. There is no expectation you will achieve the value but it gives your life a direction.

Ciarrochi J, Blackledge JT & Mercer D. (2006) Images to accompany Acceptance and Commitment Therapy Interventions (Part 2). University of Wollongong, Australia.

Exercise: Value Card Sort Exercise 5.2

Facilitator Note: If the client has difficulty in reducing the pile, you may need to repeat the exercise with more input from the facilitator.

Step 1: Sort the cards into three piles

6. The most important
7. Unsure or of moderate importance
8. Irrelevant or not important

Step 2: Discard the Irrelevant or not important pile

Step 3: Sort the remaining cards again into three piles

Step 4: Take the cards in the important pile

Handout 5.2

Values Card Sort

Step 1: Sort the cards into three piles

1. The most important
2. Unsure or of moderate importance
3. Irrelevant or not important

Step 2: Discard the Irrelevant or not important pile

Step 3: Sort the remaining cards again into three piles i.e. repeat Step 1

Step 4: Take the cards in the important pile

Step 5: Sort through and identify the five that seem to be the most important

Step 6: Discuss with the group the reasons for selecting these cards

1	
2	
3	
4	
5	

Activity: Values identification

From the card sort exercise, write up people's values on the whiteboard. Discuss the barriers that stop them from working toward their values. Use an arrow to demonstrate the movement towards the value.

Exercise: Funeral exercise 5.3

Imagine you are at your own funeral; you have died at a very old age. At your funeral you can walk around but no one can see you. You have the opportunity to hear what people are saying about you. What would you like to hear? What sort of things about you as a person would you want people to be saying?
Have participants generate ideas and write them on the whiteboard.

Handout 5.3

Funeral exercise

Imagine you are at your own funeral; you have died at a very old age. At your funeral you can walk around but no one can see you. You have the opportunity to hear what people are saying about you.

What would you like to hear?
What sort of things about you as a person would you want people to be saying?

◇

◇

◇

◇

◇

◇

◇

◇

◇

◇

Homework: 5.4

Principles and Action

Ask each participant to select a value (principle) they would like to work on over the coming week.

NB: May need to assist them in their choice for something realistic. They should use their own words and keep it simple. Then assist the participants to select concrete actions that allow them to know the principle is in play.
Complete homework assessment part A

Handout 5.4

Homework Week Five

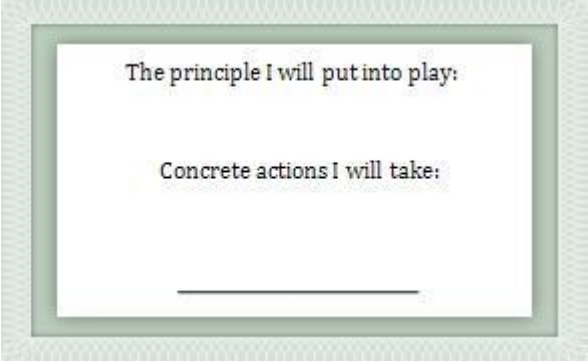
Principles and Action homework

On the card below, ask the client to write down a principle they would like to put into play during a given time period. They should use their own words, and don't need to write in complete sentences. I simple phrase will do. Then work with the client to choose concrete actions that would let them know the principle was in play.

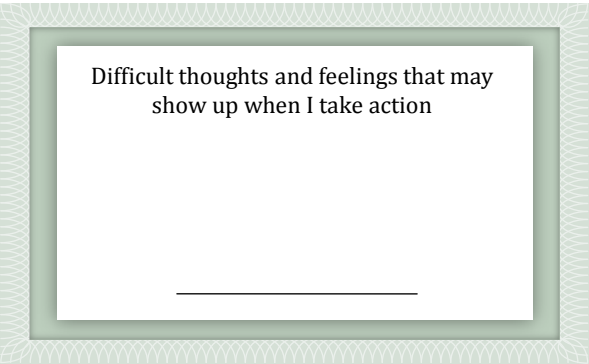
The back of the card relates to the "control is the problem" intervention in ACT. Essentially, clients are asked to list difficult thoughts and feelings that might show up as a result of their principled action. They may list things like "anxiety", "I'm not good enough", "doubt", or "anger." The key question for them is always the same. "Are they willing to carry the difficult thoughts and feeling with them, in order to live their principles."

The homework involves carrying this card in their wallet or purse during the next week or two. It illustrates how principles, actions, and distressing thoughts often go together. Clients can "carry" these thoughts and take effective action.

Front of Card:



Back of card:



(Ciarrochi & Bailey 2009:75)

Handout 5.5

Homework Rating Sheet

Date _____ Week 5

Part A

After discussing the homework please answer the first two questions:

How confident are you about your ability to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely
How motivated are you to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Part B

Thinking about your homework over the past week:

Are you satisfied with your performance on your homework tasks	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Barriers to completing your homework please tick as many which apply:

Forgot ☐

Too busy ☐

Homework too hard or didn't understand ☐

Didn't want to do it ☐

Seemed pointless ☐

Other reason, please state

_____

_____

_____

_____

Session Six

Values and Committed action

Administer measures (15 minutes)

AAQ-ABI
AAQ-II
DASS-21
PANAS-SF

Mindfulness Exercise

As you settle into relaxation pose, relax the weight of your body into the support of the floor. Notice how the body makes contact with the support of the floor. Relax the back of your legs … the back of your hips … your lower back, middle back and upper back. Relax the back of your shoulders … the back of your arms … the back of your neck … and the back of your head. Make any adjustments you need to, to relax the body into the ground more fully. Relax into the support of floor, completely.

"Relax the muscles of your face. Relax your eyes and your forehead. Relax your temples and cheeks. Relax your mouth and jaw. Relax your whole face. Place your hands on your belly. Feel the rise and fall of your belly as you breathe. Notice each inhalation as it enters the body, and each exhalation as it exits the body. Let your breathing be soft, full and easy. No effort. Let the body be breathed. As you inhale, say silently in your mind, 'Let.' As you exhale, silently say 'Go.' Inhale, 'Let.' Exhale, 'Go.'

"Continue to observe the breath, letting the body sink deeper and deeper into relaxation. Let your arms rest by your side. As you exhale, make a soft fist with each hand. As you inhale, relax the fist, and let your hands remain softly curled and relaxed. Let the body sink deeper and deeper into the support of the floor.

"Now, bring your awareness to your feet. Feel the soles of your feet, and all 10 toes. Imagine that you could inhale and exhale through the soles of your feet. Imagine the breath entering the body through the soles of the feet, and exiting the body through the soles of the feet. Inhale. Exhale.

"Now, bring your awareness to your hands. Feel the backs of the hands, the palms of the hands and all 10 fingers. Imagine that you could inhale and exhale through the palms of your hands. Imagine the breath entering the body through the palms of your hands, and exiting the body through the palms of your hands. Inhale. Exhale.

"Now, bring your awareness to your belly. Feel the belly rise and fall as you breathe. Imagine that you could inhale and exhale through the navel.

Imagine the breath entering the body through the navel and filling the belly. Imagine the breath exiting the body through the navel. Inhale. Exhale.
"Now, let your mind relax deeper, below awareness of the breath. Let the mind relax below the level of concentration on anything, including the breath. Let the body and mind let go. Let go, completely.

[Let the client relax. When you are ready, continue.]

"Notice your breathing. Notice each inhalation as it enters the body and each exhalation as it exits the body. Bring your hands back to the belly, and feel the belly rise and fall. Let your breathing be soft, full and easy. Notice the whole body. Notice the whole body supported by the floor. Notice how easy it is to be in *your* body, in *this* moment. Feeling fully supported, in this pose, and in all areas of your life.
"When you're ready to begin moving out of relaxation, gently move the fingers and toes. Let some sensation spread into the hands and feet. Stretch or move in any way that feels good. Then roll onto your right side, and rest there. Breathe easily. Take the best feeling of this relaxation with you."

Review homework and previous session - Review of Values
(30 minutes)

- For homework we carried a card around that had a principle written on it.
- Discuss what internal experiences came up for them in the achievement of that concrete action.
- Group to discuss this issue further. If people had difficulty completing the homework. Take the time to review situations in the past week with participants where they were unable to engage in their concrete action.
- Complete Homework Assessment Part B

Exercise: Setting goals **6.1** (20 minutes)

Seeing goals in conjunction with our values.
E.g. being a good father may mean taking the children to the park at least twice a week.
What is likely to show up in the achievement of your goals?
What is a barrier to you moving towards your values?

Reinforce metaphor describing the difference between values and goals.
If we want to get to the Penrith from Liverpool we know that we can travel there by car or by train. We have a specific destination this is what we call a goal. If I said to travel west, you would know what direction to go, but you wouldn't know how far or how long to travel you would just keep going west until you reached Perth and then travel across the ocean. You don't have a final destination, but will continue to move west, this is a value. There is no expectation you will achieve the value but it gives your life a direction.

Education (20 minutes)

Discuss each session in brief detail what has been covered,
What have the participants been able to generate from the exercises.
What have they found most useful

Handout 6.1

Setting goals

Seeing goals in conjunction with our values.
E.g. being a good father may mean taking the children to the park at least twice a week.
What is likely to show up in the achievement of your goals?
What is a barrier to you moving towards your values?

Remember the metaphor describing the difference between values and goals.
If we want to get to the Penrith from Liverpool we know that we can travel there by car or by train. We have a specific destination this is what we call a goal. If I said to travel west, you would know what direction to go, but you wouldn't know how far or how long to travel you would just keep going west until you reached Perth and then travel across the ocean. You don't have a final destination, but will continue to move west, this is a value. There is no expectation you will achieve the value but it gives your life a direction.

Group discussion: What happens next? (10 minutes)

Discuss importance of continuing to practise the skills.

Take home message: You need to commit yourself to changing otherwise the same issues will continue.

You have tended to avoid difficult situations, emotions, thoughts and triggers rather than living your life despite these issues.

Discuss ups and downs – don't expect to manage every situation perfectly, nobody can. Important thing is look back on difficult situations and think about what could do better next time.

Homework (5 minutes) 6.2

Daily diary

Complete the weekly diary at least six times over the next four weeks.

This will help put into play your values and assist in you in practising what we have learned over the past six weeks.

Use the manual to assist with you and also a family member to help you complete the daily diary.

Complete Homework Assessment Part A

Handout 6.2

Homework Week Six

Complete the daily diary at least six times over the next month and bring along to the final session. This puts into practice what we have learned over the past six weeks. Go back over the workbook if you are struggling to complete the diary.

Daily Diary

Date_____

Beginning of the Day

On this day, what value would you like to put into play?

_____

_____

What concrete action(s) would you like to take to put the value into play?

_____

_____

What thoughts and feelings come to mind that might seem like barriers to this action?

_____

_____

Are you willing to make room for the thoughts and feelings that show up as a result of your committed action?

Yes Go forward with your journey today and experience it!
No Go back, choose a different valued action, and repeat this exercise.

End-of-the-Day Rating

During this day, I have acted consistently with my valued direction:

1	2	3	4	5
Not at all	A little bit	Moderately so	Quite a bit	Very much so

(Ciarrochi & Bailey 2008)

Handout 6.3

Homework Rating Sheet

Date _____ Week 6

Part A

After discussing the homework please answer the first two questions:

How confident are you about your ability to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely
How motivated are you to complete the homework	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Part B

Thinking about your homework over the past week:

Are you satisfied with your performance on your homework tasks	**1** Not at all	**2**	**3** Moderately	**4**	**5** Extremely

Barriers to completing your homework please tick as many which apply:

Forgot ☐

Too busy ☐

Homework too hard or didn't understand ☐

Didn't want to do it ☐

Seemed pointless ☐

Other reason, please state

_____

_____

_____

_____

Session Seven

Review and Relapse Prevention

(one month later)

Administer measures (15 minutes)
AAQ-ABI
AAQ-II
DASS-21
PANAS-SF

Mindfulness Exercise
"As you settle into relaxation pose, relax the weight of your body into the support of the floor. Notice how the body makes contact with the support of the floor. Relax the back of your legs … the back of your hips … your lower back, middle back and upper back. Relax the back of your shoulders … the back of your arms … the back of your neck … and the back of your head. Make any adjustments you need to, to relax the body into the ground more fully. Relax into the support of floor, completely.
"Relax the muscles of your face. Relax your eyes and your forehead. Relax your temples and cheeks. Relax your mouth and jaw. Relax your whole face. Place your hands on your belly. Feel the rise and fall of your belly as you breathe. Notice each inhalation as it enters the body, and each exhalation as it exits the body. Let your breathing be soft, full and easy. No effort. Let the body be breathed. As you inhale, say silently in your mind, 'Let.' As you exhale, silently say 'Go.' Inhale, 'Let.' Exhale, 'Go.'
"Continue to observe the breath, letting the body sink deeper and deeper into relaxation. Let your arms rest by your side. As you exhale, make a soft fist with each hand. As you inhale, relax the fist, and let your hands remain softly curled and relaxed. Let the body sink deeper and deeper into the support of the floor.
"Now, bring your awareness to your feet. Feel the soles of your feet, and all 10 toes. Imagine that you could inhale and exhale through the soles of your feet. Imagine the breath entering the body through the soles of the feet, and exiting the body through the soles of the feet. Inhale. Exhale.
"Now, bring your awareness to your hands. Feel the backs of the hands, the palms of the hands and all 10 fingers. Imagine that you could inhale and exhale through the palms of your hands. Imagine the breath entering the body through the palms of your hands, and exiting the body through the palms of your hands. Inhale. Exhale.
"Now, bring your awareness to your belly. Feel the belly rise and fall as you breathe. Imagine that you could inhale and exhale through the navel. Imagine the breath entering the body through the navel and filling the belly. Imagine the breath exiting the body through the navel. Inhale. Exhale.

"Now, let your mind relax deeper, below awareness of the breath. Let the mind relax below the level of concentration on anything, including the breath. Let the body and mind let go. Let go, completely.
[Let the client relax. When you are ready, continue.]
"Notice your breathing. Notice each inhalation as it enters the body and each exhalation as it exits the body. Bring your hands back to the belly, and feel the belly rise and fall. Let your breathing be soft, full and easy. Notice the whole body. Notice the whole body supported by the floor. Notice how easy it is to be in *your* body, in *this* moment. Feeling fully supported, in this pose, and in all areas of your life.
"When you're ready to begin moving out of relaxation, gently move the fingers and toes. Let some sensation spread into the hands and feet. Stretch or move in any way that feels good. Then roll onto your right side, and rest there. Breathe easily. Take the best feeling of this relaxation with you."

Review Homework (10 minutes)
Discussion of the how difficult they found the task
How have things changed
Complete Homework Assessment Part B

Review of course (20 minutes) 7.1
Review content of the course
Have the participants generate what they remember
Write on whiteboard what has been covered
Have participants fill in their workbooks

Group discussion – Your story (30 minutes)
Have each participant talk about their story and discuss how the story may have changed.

Mindfulness Exercise (15 minutes)
Leaves on a Stream
Discussion of experience

Issuing of Certificates

Handout 7.1

Review

What do you remember from the previous weeks?
Write below, what you remember and what you have found useful in the four weeks since the last session.

- ◇
- ◇
- ◇
- ◇
- ◇
- ◇
- ◇
- ◇
- ◇
- ◇

Appendix I
Administration of Measures

Pre Treatment Assessment

Participant

- Demographic and background information
- Acceptance & Action Questionnaire – Acquired Brain Injury (AAQ-ABI)
- Hospital Anxiety and Depression Scale (HADS)
- Depression Anxiety and Stress Scale (DASS-21)
- General Health Questionnaire – 12 (GHQ-12)
- SF-12 Questionnaire
- Acceptance and Action Questionnaire-II (AAQ-II)
- Motivation for Traumatic Brain Injury Questionnaire (MOT-Q)
- Awareness Questionnaire
- The Survey of Life Principles (version 2.2)

Clinician/Family Member

- SPRS
- Awareness Questionnaire

Weekly Measures

Pre Session

- AAQ-II
- DASS-21
- AAQ-ABI
- PANAS-SF

Post Session

- Homework Rating Sheet
- Weekly Diary

Post treatment Assessment

Participant

- Acceptance & Action Questionnaire – Acquired Brain Injury (AAQ-ABI)
- Hospital Anxiety and Depression Scale (HADS)
- Depression Anxiety and Stress Scale (DASS-21)
- General Health Questionnaire – 12 (GHQ-12)
- SF-12 Questionnaire
- Acceptance and Action Questionnaire-II (AAQ-II)
- Motivation for Traumatic Brain Injury Questionnaire (MOT-Q)
- Awareness Questionnaire
- The Survey of Life Principles (version 2.2)

Clinician/ Family Member

- SPRS
- Awareness Questionnaire

Appendix II
Scripts and Metaphors

Scripts

- Mindfulness Activities:
    - Controlled Breathing
    - Eating a sultana
- Confidentiality Script
- Leaves on a stream
- Let suffering get close

Metaphors

- Chocolate cake
- Passengers on a bus
- Don’t get eaten machine
- Milk Milk Milk
- Chessboard
- Funeral
- Physicalising the thought

Appendix E

Intervention Protocol: Befriending (Active control)

Facilitator Instructions: Befriending

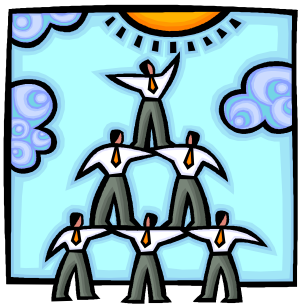
1. Commence each week with completing the questionnaires
    a. AAQ-II
    b. DASS-21
    c. PANAS
    d. AAQ-ABI

2. Undertake the allocated activity, allow each person to have equal discussion time. Group participants should prepare their topic before they attend and are permitted to use handouts, pictures or props.
3. Befriending rules
    a. No discussion about feelings or problems
    b. Keep the topics fairly neutral
    c. Redirect clients if they begin talking about personal issues. E.g. the point of this group is to discuss the current topic and not to talk about our problems.

(Befriending participant manual)

Psychology Treatment Group

Week 1:



- Rationale for group,
  - We are exploring how social contact influences our mood and recovery. The goal of the session is to **NOT** talk about how we feel but to engage in topics that are interesting and removed from your present worries or concerns. If you begin to talk about feelings and emotions, the group facilitator will redirect you back onto to the chosen topic.
- Discussion of group rules and aims
- Introduction of each group member
- Identification of what we will cover each week

Group Guidelines

1. Confidentiality

This means not talking about people in the group outside of the group. The facilitator however might need to discuss things with the BIRU team as needed. The sessions will be recorded to ensure the treatment is going the right way, so please do not reveal any personal details in the sessions such as your last name or your address.

2. Respecting people in the group

Even if you disagree with someone in the group, everyone has the right to have their say. Sometimes the facilitator might need to chair the discussion to make sure everyone gets a chance to talk.

3. Call– 9828 5495 if you're going to be late or can't come

4. Turn off mobile phone

We are only here for 90 minutes, it will be helpful if you can focus on the group for this period.

5. Any additional guidelines suggested by the group

Suggested Activities

- Going for a coffee
- Watch a movie over the week and discuss next session
- Teach the other members to play a card game
- Each person in the group speak about their favourite hobby/activity

Brain Storm other ideas

Timetable for programme

Week	Date	Activity