School of Psychology

MAJOR RESEARCH DISSERTATION

Quality of life and well-being after acquired brain injury: the role of social identity, use of coping strategies and cognitive functioning

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Finally, thank you to my fellow trainees for their words of support and encouragement and to my partner who provided the strength to help get through the tough times.

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Table of Full Contents

Part One: Manuscript

Part Two: Extended Appendices
A. Introduction

A1 Extended Introduction 50

B. Method

B1 Participants 62
B2 Measures 64
B3 Test Materials Used 77

Background/Demographic Questionnaires:
- ABI Participant Version 78
- ABI Significant Other Version 80
- Chronic Pain Participant Version 82

Neuropsychological measures/questionnaire (ABI only)
- Dysexecutive Questionnaire (DEX) 84
- Examples sheet with Trails B sample and Logical Memory 85
- 1 & 2 Story

Psychosocial Questionnaires
- Brief COPE 86
- Exeter Identity Transition Exit Scales (EXITS) 92
- Hospital Anxiety and Depression Scale (HADS) 93
- Satisfaction With Life Scale (SWLS) 94
- WHOQOL-BREF 98
- Example Communication Aid for Brief COPE (ABI group)

B4 Recruitment Procedures 99
B5 Power Analyses 10

C. Results

C1 Data Analysis and Data Screening 10
C2 Cognitive Functioning in ABI group 11
C3 Comparisons Between Groups 11
C4 Extension of Main Results 11

Additional Project Documentation

D1 Approval Letters from Ethics and Research Committees 11
- Letter from Somerset Research Ethics Committee 9
D2 Invitation Letters to Participate in Study

- Invitation letter for Chronic Pain Group from Superintendent Physiotherapist
- Invitation Letter for Chronic Pain Group from Researcher
- Invitation Letter for Significant Other for ABI Group from Researcher

D3 Project Information Sheet and Consent Form

- Project Information Sheets
- Example Information Sheet for ABI Group
- Consent Forms
- Example Consent Form for ABI Group

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Quality of life and well-being after acquired brain injury: the role of social identity, use of coping strategies and cognitive functioning

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ABSTRACT

Objective: The aim of this study was to examine the impact of social identity, coping style and cognitive impairment, on quality of life and well-being in a group of people with head injury compared to patients with chronic pain.

Design: A correlational design using sixty participants recruited from Devon was employed: thirty adults with acquired brain injuries (ABI) were recruited from a charity and thirty adults with chronic pain difficulties from a NHS pain management service.

Results: Analysis showed that there was little difference between the two groups on the variables measured. The role of social identity was not associated with better psychosocial outcome or coping style. Maladaptive coping strategies were associated with poorer adjustment in the ABI group and support-seeking strategies were correlated with improved outcomes in the chronic pain group. Objective neuropsychological variables were not associated with coping style, however, a relationship was observed between maladaptive coping styles and self-reported executive functioning.
**Conclusions:** The results add to the literature on social identity, coping and quality of life post-ABI including improved understanding of how cognitive impairment might influence the use of particular coping strategies. The findings are discussed in relation to improved interventions to increase the use of more adaptive coping strategies.

**INTRODUCTION**

The long lasting and serious effects of acquired brain injury (ABI)\(^1\) impact upon many areas of a person’s life including cognition, physical health, personality and mood\(^1\). As greater physical improvements are seen in the recovery stage, psychosocial difficulties become the dominant cause for concern in rehabilitation. However, research shows that people with ABI still have unmet needs within the psychosocial domain\(^1\) which in turn creates a “cascade of indirect effects” leading to poorer outcomes and adjustment difficulties.

Some psychosocial outcomes after ABI that are found in the literature are decreased quality of life (QOL) and life satisfaction, increased anxiety and depression levels, as well as a reduction in returning to employment and reduced perceived social support.

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\(^1\) Text link to supplementary information in the appendices.
Demographic and cognitive factors have shown to impact upon psychosocial outcomes. For example, injury severity, prior educational attainment, gender and age. An area that has received particular attention in the literature is the use of personal coping strategies. However, social variables have been considered less and even excluded by some authors as “beyond the control of the rehabilitation team”.

Primarily, this study examines the concept of social identity after ABI and its relationship with coping and improved psychosocial outcome. Increased understanding may have applications for community rehabilitation and inform bio-psycho-social models of recovery after ABI. Additionally, this study further explores relationships between use of coping style and outcomes in quality of life (QOL), life satisfaction and mood after ABI. Finally, relationships between neuropsychological variables and use of coping styles are explored.

*Individual Adaptation to ABI: Coping Style*

Underpinning studies on coping strategies are theories of stress and adjustment; in a review of coping after stroke the most consistently used theory was the Transactional Theory of Stress and Coping. It states, stressful life events are initially appraised by an individual in terms of personal significance (*primary appraisal*) and subsequently resources available to deal with the stressor are evaluated (*secondary appraisal*). The final process is *coping*, defined as “the
constantly changing cognitive and behavioural efforts to manage the specific external or internal demands that are appraised as taxing or exceeding the resources of the person”.

When facing stressors, people generally use one of three particular coping strategies more than others: problem-engagement, social/emotional or avoidance-orientated coping. Problem-engagement strategies involve doing something active, gaining more information to deal with the problem or altering the situation in some way. Social/emotional strategies regulate the emotional consequences of the stressor and use social support. Avoidance-orientated strategies include denial, substance use and behavioural disengagement. Each style can be useful at different times in recovery, although active, task-orientated and inter-personal strategies are considered more adaptive, whilst avoidance strategies more maladaptive.

Coping and Psychological Adjustment after ABI

Studies have shown that using particular coping styles affects psychological outcome after head injury. Active, interpersonal and problem focused strategies are associated with higher self esteem, lower levels of anxiety and better outcome. Strategies such as escape, avoidance and self-blame are associated with higher levels of anxiety, depression and post-traumatic stress disorder. Some evidence shows only small differences in use of coping style between people who have a head injury and non-neurological controls.
A recent study of coping and emotional adjustment examined thirty-three individuals following traumatic brain injury (TBI). With correlational analysis they compared measures of coping, psychosocial outcome, mood, trait anger, self-esteem and self-awareness and included a small cognitive battery of tests. They found that coping strategies characterised by avoidance, worry, wishful thinking, self-blame and using drugs and alcohol were associated with higher anxiety, depression and psychosocial dysfunction and lower self-esteem. Coping strategies characterised by active problem solving, and using humour and enjoyable activities to manage stress, were associated with higher self-esteem.

Factors Associated with Use of Coping Strategies after ABI

Some evidence suggests that demographic variables may influence coping style; associations between age, gender, time since injury, premorbid intellectual functioning and premorbid personality have been found.

It is unclear whether neuropsychological impairments influence an individual’s use of coping strategies. For example, deficits in executive functioning after ABI could interfere with a person’s ability to successfully recognise a stressful situation, logically analyse it, formulate goals or generate alternative solutions, and finally to initiate, plan and regulate coping. Therefore, if adaptive
problem-focused strategies are cognitively unavailable, then maladaptive strategies might be used by default. The few authors who have looked at this relationship report mixed results\textsuperscript{A1, p52}. Curran et al. found no relationship between a cognition subscale (measured by a subjective measure of handicap), and coping strategy employed. Anson & Ponsford found measures of memory and executive function were not significantly associated with coping style. Whereas, Krpan et al. found better executive performance was related to greater use of problem-solving strategies and poorer executive performance was associated with using escape-avoidant coping strategies. This mix of methodologies and varied findings suggests further exploration is needed.

\textit{Coping and Social Support}

A number of authors have developed models in which coping is an important mediating variable between the stressor, ‘experiencing ABI’ and quality of life \textsuperscript{A1, p53}. Godfrey et al.’s Stress-Appraisal-Coping (SAC) model of emotional adjustment to TBI, is based on Lazarus and Folkman’s earlier work. The SAC model proposes three mediators of people’s psychological reactions to experiencing TBI; appraisal (insight), coping and social support. Godfrey et al. also places a strong emphasis on neuropsychological variables and pre-injury coping skills influencing coping style. This model has found some support in the literature.
Already mentioned in Godfrey et al.’s SAC formulation, social support is an important mediating variable to outcome “Social support is essential for an individual to develop a sense of belonging and is known to buffer the individual from the effects of adverse life events” (p35). Social support is multi-dimensional, but can be defined as the existence or availability of people on whom one can rely and who provide a sense of being cared for and valued.

Researchers that have examined the impact of social support after ABI, consistently show that higher levels of perceived social support are associated with positive outcomes. Research also shows that social networks and contacts become significantly disrupted post-ABI.

Whilst the ABI literature provides insights into the impact of social support, absent from the literature is evidence about the mechanisms by which social support plays a role. Including, how a person’s sense of social identity might influence outcomes. As Tomberg et al. conclude in their study of coping, social support and QOL, the quality of the relationships and support is more important than the size of the group. More research is needed to extricate the specific benefits an individual receives in belonging to groups so these may be enhanced in rehabilitation settings.

In her review on stress, coping and social support, Thoits points out that: “despite considerable theorizing about how social support
works to reduce ill health and psychological disturbance...very few studies to date have examined the actual influences of perceived or received support on individuals' [sic] choice of coping strategies” (p65). She continues to suggest that “until supportive processes and intervening mechanisms are better understood, the goal of designing effective interventions for people coping with specific stressors or attempting health-behavior changes will elude us”. The authors in this study propose that one such way of improving understanding is by applying the framework of social identity.

**Social Identity**

Social Identity Theory defines social identity as “that part of an individual’s self-concept which derives from his knowledge of his membership in a social group (or groups), together with the value and emotional significance attached to that membership”. Looking at an individual’s sense of belonging and shared beliefs, social identity is a concept that goes further than social support, and perhaps is one way of exploring how social support works to buffer individuals from stressors. Social identity also differs from personal identity, although some overlap exists: personal identity can be described as an individual’s sense of self, who they are and how they see themselves. Qualitative studies on personal identity after ABI also identify the importance of rehabilitation services providing
meaningful social identities. An individual’s sense of social identity is critical, particularly in terms of psychosocial adjustment.

Social identity studies in the clinical domain are emerging but still scarce, the main evidence base is provided by social and organisational psychology. However, a recent study (Haslam, Holme, Haslam, Iyer, Jetten & Williams, in press) investigated social identity in stroke patients, finding that life satisfaction was associated with belonging to multiple groups pre-stroke and the maintenance of those group membership’s post-stroke. Using meditational analysis, the researchers concluded that belonging to multiple groups is associated with enhanced well-being because there is a greater likelihood that group memberships will be maintained in the context of a significant life transition. They also found that cognitive failures also compromise well-being suggesting such failures make it harder for people to maintain group memberships.

Haslam et al. (in press) highlight the need for further research including more measures of mental health, more sophisticated measures of cognitive function and further use of the newly developed social identity measure (EXITs). This would supplement clinicians’ understanding of the role of group membership in rehabilitation.
In summary, the literature has shown that experiencing ABI frequently impacts negatively upon psychosocial well-being and quality of life. As well as coping style, social support has been implicated as an important protective factor. The literature is still unclear as to what it is about social support specifically that is protective. In social psychology, social identity is one such factor that has shown to have a protective role when people are facing stressors. More recently, in the clinical domain social identity has been associated with enhanced well-being in a sample of stroke patients.

This small exploratory study is of a correlational design, comparing an ABI group drawn from a community rehabilitation setting, to a chronic pain group from a local NHS pain management clinic. Chronic pain groups have been used as non-neurological comparisons in previous research, as they experience similar chronicity, functional loss and associated handicap, socio-economic factors and effects on mood and well-being. Using the EXITS as a measure of social identity, the relationship between social identity and coping style, well-being and quality of life are explored. This study also contributes to the literature on relationships between coping and quality of life and well-being in ABI and chronic pain groups and finally relationships between neuropsychological functioning and coping.
Research Hypotheses and Aims

The concept of social identity has not yet been quantitatively studied in an ABI population. It could have important implications for rehabilitation services and bio-psycho-social models of adjustment post-ABI. As previous research shows, people who have experienced an ABI have compromised levels of social support, therefore:

Hypothesis 1a. There will be a difference between the ABI group and the chronic pain group on group maintenance and new group membership post injury/onset.

Previous research has demonstrated a relationship between cognitive functioning and maintenance of group membership in a stroke sample, therefore this study will investigate whether this is true of an ABI sample:

Hypothesis 1b. There will be an association between the overall level of cognitive functioning in the ABI group and maintenance of group membership.

Following Godfrey et al.’s SAC model which proposes that social support and coping interact with each other, the following hypothesis is designed to test this relationship in an ABI and a chronic pain sample:
Hypothesis 1c. There will be a relationship between maintenance of group membership post injury/onset and using specific coping strategies (maladaptive, problem-focused, support-seeking).

Haslam et al. (in press) found that maintenance of group membership was associated with improved life satisfaction in a stroke population. The final social identity hypothesis examines this relationship in an ABI population compared with a chronic pain population:

Hypothesis 1d. Maintenance of group membership post injury/onset will be associated with overall quality of life (WHOQL-BREF), life satisfaction (SWLS) and mood (HADS) in both groups.

As discussed in the literature above, coping has been consistently found to influence psychosocial outcomes for people after ABI. This study aims to replicate this finding in an ABI group compared with a chronic pain group, in order to support the growing evidence base. Therefore drawn from previous studies the following hypotheses are made:

Hypothesis 2a: Adaptive coping strategies (support-seeking and problem-focused coping) will be positively associated with improved psychological outcome in quality of life (WHOQOL-
Hypothesis 2b: Maladaptive coping strategies will be negatively associated with poorer psychological outcome in quality of life (WHOQOL-BREF), life satisfaction (SWLS) and mood (HADS) in both groups.

Godfrey et al. suggest that neuropsychological variables will impact on coping style. The authors of this study propose that coping requires an appropriate level of insight about the stressor so that an appropriate coping strategy can be applied. Intact executive functioning and memory are essential to achieving this. As the literature has reported mixed findings about the impact of cognitive functioning on coping style, a final aim of this present study, using exploratory correlational analyses, is to investigate any relationships between neuropsychological variables and coping style.

Hypothesis 3: There will be a relationship between neuropsychological variables (overall cognitive functioning; executive functioning; memory; self/other reported executive functioning; and insight) and using specific coping styles in the ABI group.
METHOD

Design

This study employs correlations to explore the relationships between a number of variables including social identity, coping and quality of life; in people who have experienced an acquired brain injury (ABI), compared to people with another chronic health condition without a head injury (chronic pain).

Participants

Sixty participants (as determined by a priori power analysis aiming for 80% with a medium effect size, $0.5^{p<0.05}$) from across Devon were recruited into the study. Of these, 30 had ABI and 30 had chronic pain problems. The majority of participants described their ethnic background as White British ($n=58$, 97.6%).

Acquired Brain Injury Group. The ABI group were recruited through day centres run by the charity Headway Devon $^{B1, p<0.05; B4, p<0.01}$. Twenty were male and 10 were female. The cause of injury for these
participants was obtained through self-report and corroborated by significant others and/or medical records. Fourteen participants (46.7%) sustained their injury traumatically (road traffic accidents, falls, assaults), nine participants (30%) had had a vascular event and seven participants’ injuries (23.3%) were the result of other acquired brain injuries (tumour, viral infections, hydrocephalus). Table 1 displays the core demographic data for both participant groups. Glasgow Coma Scale scores were available for 15 participants (see Table 1).

Participants were recruited from the age range of 18-65 years and excluded if they were unable to speak fluent English. They were also excluded if they were unable to take part in the assessment due to profound motor, cognitive or communication problems or they were identified as having current mental health difficulties or severe and enduring challenging behaviour (e.g. including a high risk of irritability, anger or sexual disinhibition). This was decided between the centre managers and the researcher.

Chronic Pain Group. A sample of people with chronic pain was used as a comparison group in this study. Recruited from a pain management service within a local general hospital, they were either currently receiving a service or had been within the last year and a half. Eleven were male and 19 were female. All participants in this group had musculo-skeletal pain, the majority of which had
back/spinal pain as their presenting problem (n = 17, 56.7%). Additionally, seven participants (23.3%) recorded ‘other specific sites of pain’ (e.g. in limbs) and six (20%) recorded generalised pain as their problem. Table 1 shows the reason participants attributed to their onset of pain.

Participants in this group were also recruited from the age range of 18-65 years and excluded if they were unable to speak fluent English. Additionally, participants were excluded if they had ever been knocked unconscious through a head injury.

Of 80 research packs sent out, 34 (42.5%) were completed and returned. Four participants in this group recorded their onset of pain as more than 20 years ago (ranging between 26-46 years) so it was decided to exclude them from the study, this also made the group equal for comparisons to the ABI group (N=30).

Table 1. Demographic information for participants in each group. Including GCS scores for the ABI group and reason for pain in the chronic pain group.

<table>
<thead>
<tr>
<th>Information</th>
<th>ABI n (%)</th>
<th>Chronic Pain n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
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<tr>
<td>Male</td>
<td>20 (67%)</td>
<td>11 (37%)</td>
</tr>
<tr>
<td>Female</td>
<td>10 (33%)</td>
<td>19 (63%)</td>
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</table>

Employment
<table>
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<tr>
<th>Status</th>
<th>Count (Percentage)</th>
<th>Count (Percentage)</th>
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<tr>
<td>Full time work</td>
<td>0 (0%)</td>
<td>8 (27%)</td>
</tr>
<tr>
<td>Part time work</td>
<td>1 (3%)</td>
<td>4 (13%)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>23 (77%)</td>
<td>12 (40%)</td>
</tr>
<tr>
<td>Voluntary/unpaid</td>
<td>5 (17%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Student</td>
<td>1 (3%)</td>
<td>1 (3%)</td>
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<tr>
<td>Retired</td>
<td>0 (0%)</td>
<td>5 (17%)</td>
</tr>
</tbody>
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**GCS Score**

<table>
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<tr>
<th>Severity</th>
<th>Count (Percentage)</th>
<th>Count (Percentage)</th>
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</thead>
<tbody>
<tr>
<td>Severe</td>
<td>7 (23%)</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>4 (13%)</td>
<td>n/a</td>
</tr>
<tr>
<td>Mild</td>
<td>4 (13%)</td>
<td></td>
</tr>
<tr>
<td>No loss of consciousness</td>
<td>4 (13%)</td>
<td></td>
</tr>
<tr>
<td>Unavailable/not recorded</td>
<td>11 (37%)</td>
<td></td>
</tr>
</tbody>
</table>

**Cause of Pain**

<table>
<thead>
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<th>Category</th>
<th>Count (Percentage)</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traumatic (falls, lifting injury)</td>
<td>16 (53%)</td>
<td></td>
</tr>
<tr>
<td>Rheumatic diseases (e.g. osteoarthritis)</td>
<td>3 (10%)</td>
<td></td>
</tr>
<tr>
<td>Degenerative conditions (e.g. disc degeneration)</td>
<td>3 (10%)</td>
<td>n/a</td>
</tr>
<tr>
<td>Generalised pain syndromes (e.g. fibromyalgia)</td>
<td>3 (10%)</td>
<td></td>
</tr>
<tr>
<td>Other (e.g. illnesses)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Age (years)**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean (SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>48.2 (9.7)</td>
<td>26-64</td>
</tr>
<tr>
<td>Years of education</td>
<td>12.2 (2.5)</td>
<td>9-19</td>
</tr>
<tr>
<td>Mean</td>
<td>13.2 (2.7)</td>
<td>11-19</td>
</tr>
<tr>
<td>Range</td>
<td>9-19</td>
<td>11-19</td>
</tr>
<tr>
<td>Years since injury/pain onset</td>
<td>9.3 (6)</td>
<td>0.83-23</td>
</tr>
<tr>
<td>Mean</td>
<td>8.1 (6.2)</td>
<td>1-20</td>
</tr>
<tr>
<td>Range</td>
<td>0.83-23</td>
<td>1-20</td>
</tr>
</tbody>
</table>

**Measures**

*Neuropsychological Measures*[^2] p64; p84-5. Four standardised neuropsychological tests[^2] were given to the ABI participants only.

[^2] Information about the neuropsychological measures is kept to a minimum in the manuscript; this is in keeping with the target journal, Neuropsychological Rehabilitation, whose readership will be familiar with these widely used tests.
These were used as a level of current functioning and provided an overall cognitive functioning score. As is typical in many studies with people with brain injury there was a lack of medical detail available, therefore this underlined the need for collecting neuropsychological data. A fifth measure was also used with the ABI participants, to give a measure of self-/other-reported executive functioning and insight.

*Controlled Oral Word Association Test*. The COWAT is a language and speed based measure of verbal fluency and lexical retrieval. It is also commonly thought to tap into the executive functions of generality, self-monitoring and rule following and additionally short-term memory.

*The Trail Making Test B*. Trails Part B is a test of complex visual scanning and measures attention and attention shifting, concentration and motor speed.

*Logical Memory 1 and 2* from the Wechsler Memory Scale III Abbreviated. The logical memory tests examine verbal memory, both immediate (Logical Memory 1) and delayed (Logical Memory 2).

*The DEX Questionnaire* from the *Behavioural Assessment of the Dysexecutive Syndrome*. The DEX is a 20-item questionnaire looking at broad areas of likely changes (emotional, motivational, cognitive

More detail for the examiners can be found in appendix B2, p66.
and behavioural) after executive disturbances. One version of the questionnaire was completed by the ABI participant and one by a partner, relative or carer. A bi-directional discrepancy score was created by subtracting the participant’s score from the significant other’s score; the nearer to zero the higher the agreement. This was used as a measure of insight and a measure of self/other reported levels of executive functioning.

Psychosocial Measures\textsuperscript{B2, p66; B3, p86}

All participants completed five psychosocial measures:

\textit{The Coping Orientation to Problems Experience}. This scale has 14 subscales and 28 items and asks participants to rate how much they use different coping strategies (1 = I haven't been doing this at all, 4 = I’ve been doing this a lot). Principal Component Analysis was used to obtain composite scores representing the use of \textit{problem-focused coping}, \textit{support-seeking} and \textit{maladaptive coping}\textsuperscript{B2, p67}.

\textit{Exeter Identity Transition Scale}. This scale is a social identity measure currently in development at the University of Exeter, which has been used in a previous study with stroke patients. Participants are asked about the number of groups that they considered themselves members of before and after their injury. Additionally, 15 items ask participants to rate their agreement with statements on a seven-point Likert scale from: do not agree at all (1) to agree completely (7). The items measured \textit{multiple group memberships}
pre-injury; multiple group support pre-injury; maintenance of group membership post-injury; new group membership; and maintenance of group support post-injury.

The World Health Organisation Quality of Life assessment. This scale contains 24 items measuring four domains of QOL: physical health, psychological health, social relationships and environments and two questions relating to overall QOL and health. Mean overall quality of life was also calculated from the domain scores; higher scores denote better QOL.

The Satisfaction With Life Scale. The SWLS is a global measure of life satisfaction that is intended to assess a person’s subjective QOL. It comprises five items, rated on a seven point scale from strongly agree (7) to strongly disagree (1).

The Hospital Anxiety and Depression Scale. The HADS measures anxiety and depression on a scale of 0-21. There are 14 items for each scale, with a four point Likert response for each. Scores from 0-7 represent ‘normal’, 8-10 ‘mild’, 11-14 ‘moderate’ and 15-21 ‘severe’ levels of anxiety or depression.

Procedure
Ethical approval for this study was obtained through a Local Research Ethics Committee prior to commencing the study and
separate approval obtained from the Headway Research Committee\textsuperscript{D1, p120, 126}. All participants (including the partners/family members for the ABI group) gave written consent to take part in the study\textsuperscript{D3, p137}.

\textit{Acquired Brain Injury Group}. The neuropsychological tests and self-report questionnaires were completed in a meeting with the researcher at the Headway centre. The tests and measures were intended to be filled in on the same day, however due to fatigue, some measures had to be completed a week apart. Varying levels of support were needed from the researcher to help this group participate, including verbally reading the questions and offering the use of communication aids\textsuperscript{B3, p98}. With consent, further information about the participant’s ABI and the DEX questionnaire were sent out with a pre-paid return envelope to a person who the participant identified as a ‘significant other’. Where this was not possible or if it could not be obtained, a Headway staff member, who knew the person well, supplied the information on their behalf. The Glasgow Coma Scale Score was obtained from medical records with the participant’s prior consent.

\textit{Chronic Pain Group}. Those people who responded to an invitation letter from the Pain Management team\textsuperscript{D2, p128} were mailed an information pack, consent form, questionnaires and pre-paid return envelope\textsuperscript{B3, p77; D2, p129; D3, p133}. 

- 21 -
RESULTS

Data Analysis and Screening

All data collected were analysed using SPSS for Windows Version 14.0. Before analysis, all variables were screened for any violations of the assumptions associated with parametric tests, as recommended by Tabachnick and Fidell. The EXITS measure, maladaptive coping variable and three neuropsychological variables did not conform to these assumptions; therefore non-parametric tests were used in analyses involving these variables.

Independent \( t \)-tests and Mann-Whitney tests were used to compare the acquired brain injury group (ABI) to the chronic pain group (CP). Correlations were used to examine any relationships between coping and quality of life and well-being. Finally, correlations were used to explore relationships between neuropsychological variables and coping style. Alpha levels (set at 0.05) were adjusted using Bonferroni’s correction to control for the increased likelihood of making Type 1 errors when using multiple comparisons.
Cronbach’s alpha levels for all the scales and subscales used are shown in Table 3. The majority of scales have acceptable values between .7 and .94. As can be seen, there were four subscales that did not meet the recommended alpha level. These were ‘problem-focused coping’ for the CP group (α = .64); ‘maladaptive coping’ for the ABI group (α = .59); ‘physical QOL’ for the ABI group (α = .64) and ‘social QOL’ for the ABI group (α = .64). Therefore, results involving these scales should be interpreted with caution.

**EXITS Measure**

After data collection, concerns arose about the validity of the EXITS measure where data were collected by post (i.e. for the CP group). This was due to the relatively high amount of missing data in some cases, resulting in five CP participants being removed from analyses involving the EXITS. However, as the Cronbach’s alpha levels were acceptable (ABI α = .77 to .94, CP α = .83 to .94), it was decided to continue to use the EXITS data but to employ caution when interpreting results.

**Cognitive Functioning in ABI group**

As shown in Table 2, the ABI group profile is in keeping with the profile of moderate to severe brain injury. To make the raw scores on the neuropsychological tests comparable for each participant, z-
scores (z-score = raw test score-mean test score/SD) were calculated for each of the tests (Trails B, COWAT, Logical Memory 1 & 2). The mean of these z-scores was then used to allocate participants a mean overall cognitive score for use in later analysis. The mean of Trails B and COWAT z-scores were computed to create a mean executive functioning score and the mean of the scaled scores on logical memory 1 & 2 were computed to create a mean memory score for the purpose of analysis.

Table 2. Scores on standardised tests of cognitive functioning of ABI participants

<table>
<thead>
<tr>
<th>Test</th>
<th>n</th>
<th>Mean</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trails Part B</td>
<td>23</td>
<td>136.39</td>
<td>60-270</td>
</tr>
<tr>
<td>COWAT (FAS)</td>
<td>30</td>
<td>27.90</td>
<td>12-45</td>
</tr>
<tr>
<td>Logical Memory (scaled score)</td>
<td>30</td>
<td>6.93 (3.34)</td>
<td>1-13</td>
</tr>
<tr>
<td>Part 1</td>
<td></td>
<td>7.07 (3.34)</td>
<td>1-12</td>
</tr>
<tr>
<td>Part 2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Comparisons Between Groups\textsuperscript{c3, p114}

Independent $t$-tests showed no significant differences between the two groups in terms of age, years of education and years since injury/onset of pain. As can be seen in Table 1, there was a significant difference in gender between the two groups ($\chi^2(1) = 5.41, p = .038$), with more males in the ABI group and conversely more females in the CP group; a result which one would expect to find considering these clinical populations.

Post hoc comparisons were made between the groups on the various measures (see Table 3). The non-parametric Mann-Whitney test was used for data involving the EXITS measure and maladaptive coping variable as previously stated, otherwise independent $t$-tests were used. As the table shows, the two groups scored similarly on all variables with only one significant difference at the adjusted alpha

<table>
<thead>
<tr>
<th>DEX</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>32.97</td>
</tr>
<tr>
<td>Other</td>
<td>(12.77)</td>
</tr>
<tr>
<td>Insight (discrepancy score)</td>
<td>28.27</td>
</tr>
<tr>
<td></td>
<td>(16.66)</td>
</tr>
<tr>
<td>16.37(12.4)</td>
<td></td>
</tr>
</tbody>
</table>

† physical/motor impairments prevented seven participants from completing this test
level (0.05/20 = 0.0025), this difference is recorded as part of Hypothesis 1a.

**Table 3. Mean (SD) and Cronbach’s alpha levels of measures used including differences between means for ABI and chronic pain groups**

<table>
<thead>
<tr>
<th>Measure</th>
<th>α</th>
<th>Mean (SD)</th>
<th>Difference between groups</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EXITS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group membership pre</td>
<td>.9</td>
<td>.8</td>
<td>13.03</td>
<td>12.24</td>
</tr>
<tr>
<td>Group support pre</td>
<td>4</td>
<td>3</td>
<td>(6.03)</td>
<td>(6.19)</td>
</tr>
<tr>
<td>New groups post</td>
<td>.8</td>
<td>.9</td>
<td>10.97</td>
<td>9.72 (5.61)</td>
</tr>
<tr>
<td>Maintenance of groups post</td>
<td>3</td>
<td>3</td>
<td>(5.73)</td>
<td>7.72 (6.62)</td>
</tr>
<tr>
<td>Maintenance of support post</td>
<td>.8</td>
<td>.9</td>
<td>15.50</td>
<td>9.60 (6.77)</td>
</tr>
<tr>
<td>WHOQOL-BREF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall QOL</td>
<td>.7</td>
<td>.7</td>
<td>57.50</td>
<td>53.13</td>
</tr>
<tr>
<td>Physical QOL</td>
<td>1</td>
<td>2</td>
<td>(13.36)</td>
<td>(14.66)</td>
</tr>
<tr>
<td>Psychological QOL</td>
<td>.6</td>
<td>.7</td>
<td>52.14</td>
<td>42.62</td>
</tr>
<tr>
<td>Social QOL</td>
<td>4</td>
<td>2</td>
<td>(16.40)</td>
<td>(16.75)</td>
</tr>
<tr>
<td>Environmental QOL</td>
<td>.7</td>
<td>.7</td>
<td>55.28</td>
<td>54.58</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>8</td>
<td>(16.98)</td>
<td>(18.61)</td>
</tr>
<tr>
<td></td>
<td>.6</td>
<td>.7</td>
<td>54.03</td>
<td>62.78</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>7</td>
<td>(25.06)</td>
<td>(22.61)</td>
</tr>
</tbody>
</table>
SWLS §

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall life satisfaction</td>
<td>18.2 (6.5)</td>
<td>15.3 (7.6)</td>
<td>1.60</td>
</tr>
</tbody>
</table>

HADS

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>8.1 (4.6)</td>
<td>9.9 (5.2)</td>
<td>-1.41</td>
</tr>
<tr>
<td>Depression</td>
<td>6.6 (3.6)</td>
<td>8.3 (4.6)</td>
<td>-1.65</td>
</tr>
</tbody>
</table>

COPE-Brief

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>t</th>
<th>U</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support-seeking coping</td>
<td>18.77</td>
<td>20.30</td>
<td>-1.10</td>
<td>.28</td>
</tr>
<tr>
<td>Problem-focused coping</td>
<td>27.97</td>
<td>25.83</td>
<td>449.50</td>
<td>.99</td>
</tr>
<tr>
<td>Maladaptive coping</td>
<td>17.73</td>
<td>18.37</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

§ = Satisfaction With Life Scale;  t = t-test  U = Mann Whitney
* significant at p<.05  *** significant at adjusted alpha level p = 0.0025

Main Results

The Role of Social Identity.

H1a. There will be a difference between the ABI group and the chronic pain group on group maintenance and new group membership post injury/onset.
The ABI participants (Mdn = 7; $M = 8.33$; $SD = 5.11$) did not seem to differ from the CP participants (Mdn = 7; $M = 9.60$; $SD = 6.77$) in maintenance of groups post injury/onset ($U = 360.50$, $p = .81$, effect size, $r = -.03$). However, the ABI participants (Mdn = 16; $M = 15.50$; $SD = 4.38$) scored significantly higher than the CP participants (Mdn = 3; $M = 7.72$; $SD = 6.62$) on new group membership post injury/onset ($U = 144.00$, $p < .001$), this represented a large effect size ($r = -.53$). This effect remained significant even after using the Bonferroni correction to adjust alpha levels ($0.05/20 = 0.0025$).

**H1b. There will be an association between the overall level of cognitive functioning in the ABI group and maintenance of group membership.**

There was no significant relationship between higher cognitive functioning (mean z-score) and maintenance of group membership ($r_s = -.19$, $p = .30$).

**H1c. There will be a relationship between maintenance of group membership post injury/onset and using specific coping strategies (maladaptive, problem-focused, support-seeking).**

There was no significant relationship between maintenance of groups post injury/onset and maladaptive coping (ABI, $r_s = -.24$, $p = .19$ / CP, $r_s = .004$, $p = .99$); problem-focused coping (ABI, $r_s = -.13$, $p = .51$ / CP, $r_s = -.24$, $p = .25$); or support-seeking (ABI, $r_s = -.07$, $p = .73$ / CP, $r_s = .12$, $p = .58$).
**H1d. Maintenance of group membership post injury/onset will be associated with overall quality of life (WHOQL-BREF), life satisfaction (SWLS) and mood (HADS) in both groups.**

There was no significant relationship between maintenance of group membership and mean quality of life scores (ABI, \( r_s = .04, p = .84 \) / CP, \( r_s = .34, p = .10 \)); anxiety (ABI, \( r_s = -.16, p = .41 \) / CP, \( r_s = -.06, p = .78 \)); depression (ABI, \( r_s = -.22, p = .22 \) / CP \( r_s = .08, p = .69 \)); or satisfaction with life (ABI, \( r_s = .21, p = .26 \) / CP, \( r_s = .26, p = .21 \)).

**Demographic Variables and Coping**

Post hoc analysis examined any relationships between age, gender, time since injury and years of education and coping style, as previously reported in the literature. In the CP group males were more likely to use maladaptive coping styles (\( r_s = -.50, p = .005 \)). The number of years in education was negatively correlated with maladaptive coping, also in the chronic pain group (\( r_s = -.40, p = .03 \)). Finally, there was a positive relationship between problem-focused coping and years of education in the ABI group (\( r_s = .38, p = .04 \)). However, none of these results remained significant at the adjusted alpha level (ABI: \( p = .0027 \); CP: \( p = .0041 \)). There were no significant relationships between time since injury or age with coping style.

**Coping and Quality of Life, Life Satisfaction and Mood**
H2a: Adaptive coping strategies (support-seeking and problem-focused coping) will be positively associated with improved psychological outcome in quality of life (WHOQOL-BREF), life satisfaction (SWLS) and mood (HADS) in both groups.

There was a positive relationship between coping using support-seeking strategies (e.g. using emotional and instrumental support, religion) and satisfaction with life (r = .53, p = .003), overall quality of life (r = .52, p = .003) and the social domain of quality of life (r = .65, p = .000) in the CP group only (see Table 4). These were significant at the adjusted alpha level (p = .0041). There were no other significant relationships between using support-seeking and mood, or the physical, psychological and environmental domains of quality of life in either group (see Table 4).

There were no significant relationships between using problem-focused coping strategies (e.g. positive reframing, planning, acceptance) and life satisfaction, quality of life or mood in either group (see Table 4).

H2b: Maladaptive coping strategies will be negatively associated with poorer psychological outcome in quality of life (WHOQOL-BREF), life satisfaction (SWLS) and mood (HADS) in both groups.
Maladaptive coping strategies (e.g. denial, self-blame, behavioural disengagement) were positively correlated with higher scores of anxiety (i.e. poorer outcome)\(^3\) in both the ABI (\(r_s = .63, p = <.001\)) and CP group (\(r_s = .53, p = .001\)); these were significant at the adjusted alpha level (ABI: \(p = .0027\); CP: \(p = .0041\)). Maladaptive coping also had significant negative correlations with overall quality of life (\(r_s = -.53, p = .002\)) and physical quality of life (\(r_s = -.51, p = .002\)) in the ABI group (significant at the adjusted alpha level, \(p = .0027\)). Maladaptive coping was not significantly associated with depression, life satisfaction or quality of life (excluding overall and physical QOL for the ABI group) in either of the groups at the adjusted alpha levels (ABI: \(p = .0027\); CP: \(p = .0041\)) (see Table 4).

### Table 4. Pearson’s and Spearman’s correlations showing the relationships between coping, quality of life and well being (one-tailed)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Group</th>
<th>Maladaptive (\rho)</th>
<th>Support-seeking (r)</th>
<th>Problem-focused (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHOQOL-BREF</td>
<td></td>
<td>(\rho)</td>
<td>(p)</td>
<td>(r)</td>
</tr>
<tr>
<td>Overall QOL</td>
<td>ABI(^a)</td>
<td>-.52**</td>
<td>.002</td>
<td>.23</td>
</tr>
<tr>
<td></td>
<td>CP(^b)</td>
<td>*</td>
<td>.06</td>
<td>.52**</td>
</tr>
<tr>
<td>Physical QOL</td>
<td>ABI(^a)</td>
<td>-.29</td>
<td>.002</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>CP(^b)</td>
<td>-.51**</td>
<td>.06</td>
<td>-.06</td>
</tr>
<tr>
<td>Psychological QOL</td>
<td>ABI(^a)</td>
<td>*</td>
<td>.003</td>
<td>.03</td>
</tr>
<tr>
<td></td>
<td>CP(^b)</td>
<td>-.29</td>
<td>.02</td>
<td>.16</td>
</tr>
</tbody>
</table>

\(^3\) Higher scores on WHOQOL-BREF and SWLS indicate positive outcomes whereas higher scores on HADS represent poorer outcomes, therefore use of maladaptive coping would be negatively associated with poorer mood.
<table>
<thead>
<tr>
<th>Social QOL</th>
<th>ABI(^a)</th>
<th>-.50**</th>
<th>.12</th>
<th>.45**</th>
<th>.004</th>
<th>.15</th>
<th>.22</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CP(^b)</td>
<td>-.38*</td>
<td>.34</td>
<td>.48**</td>
<td>.000</td>
<td>.26</td>
<td>.09</td>
</tr>
<tr>
<td>Environmental QOL</td>
<td>ABI(^a)</td>
<td>-.22</td>
<td>.02</td>
<td>.65**</td>
<td>.47</td>
<td>.19</td>
<td>.15</td>
</tr>
<tr>
<td></td>
<td>CP(^b)</td>
<td>-.08</td>
<td>.10</td>
<td>*</td>
<td>.05</td>
<td>-.11</td>
<td>.29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.38*</td>
<td></td>
<td>-.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.24</td>
<td></td>
<td>.30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SWLS**

| Overall life satisfaction | ABI\(^a\) | -.40** | .01  | .31*  | .05  | .23  | .11  |
|                         | CP\(^b\)  | -.26   | .08  | .53** | .001 | .28  | .06  |

**HADS**

| Anxiety    | ABI\(^a\) | .63*** | .000 | .17   | .17  | .11  | .29  |
|            | CP\(^b\)  | .53*** | .001 | -.37* | .02  | -.10 | .31  |
| Depression | ABI\(^a\) | .35*   | .03  | -.22  | .12  | -.13 | .25  |
|            | CP\(^b\)  | .29    | .06  | -.41* | .01  | -.32 | .04  |

\(^*\) adjusted alpha = .0027 (.05/18) \(^b\) adjusted alpha = .0041 (.05/12) \(^*\)

\(^p<.05\) **\(^p<.01\) ***\(^p<.001\)

\(\rho\) = Spearman’s correlations \(r\) = Pearson’s correlations

*Neuropsychological Variables and Coping Style*

**H3:** There will be a relationship between neuropsychological variables (overall cognitive functioning; executive functioning; memory; self/other reported executive functioning; and insight) and using specific coping styles in the ABI group.

There were no significant relationships between any of the neuropsychological variables tested and coping style when using adjusted alpha levels (see Table 5). Although self-rated executive
problems (DEX-Self score) were significantly associated with maladaptive coping ($r_s = .41$, $p = .025$), once the alpha level was adjusted this significant relationship disappeared.

Table 5. Pearson’s and Spearman’s correlations showing the relationships between neuropsychological variables and use of coping styles

<table>
<thead>
<tr>
<th>Neuropsychological Variables</th>
<th>COPE-Brief</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maladaptive</td>
</tr>
<tr>
<td>Mean cognitive score</td>
<td>$-.10^\rho$ $p = .59$</td>
</tr>
<tr>
<td>(z-scores: Trails B, Logical Memory 1 &amp; 2, COWAT)</td>
<td></td>
</tr>
<tr>
<td>Mean executive score</td>
<td>$-.08^\rho$ $p = .71$</td>
</tr>
<tr>
<td>(z-scores: Trails B &amp; COWAT) †</td>
<td></td>
</tr>
<tr>
<td>Mean memory score</td>
<td>$-.26^\rho$ $p = .17$</td>
</tr>
<tr>
<td>(scaled scores: Logical Memory 1 &amp; 2)</td>
<td></td>
</tr>
<tr>
<td>DEX</td>
<td>$\ldots$</td>
</tr>
<tr>
<td>Self</td>
<td>$0.41^#$ $p =$</td>
</tr>
<tr>
<td>Other</td>
<td>$\rho$</td>
</tr>
<tr>
<td>Insight (DEX discrepancy score)</td>
<td>$-.17^\rho$ $p = .38$</td>
</tr>
<tr>
<td></td>
<td>$0.16^\rho$ $p = .41$</td>
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<tr>
<td></td>
<td>$\ldots$</td>
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</tbody>
</table>

$^\#$Significant at $p<.05$ but this did not remain significant when Bonferroni correction was used adjusting the alpha to .0027 (.05/18). † $n = 23$

$^\rho =$ Spearman’s correlation $^r =$ Pearson’s correlation

DISCUSSION

This study investigated relationships between social identity, coping, quality of life and emotional well-being in people with acquired brain...
injuries or chronic pain. The ABI group were on average nine years post-ABI and scores obtained on measures of quality of life (QOL) and emotional well-being were consistent with previous research. Thus providing further evidence for ongoing negative psychological effects after brain injury.

**Main findings**

In summary, there was little difference between the two groups on the variables measured with one exception; the ABI group belonged to more new groups post-injury than the chronic pain group. There were no relationships between the maintenance of group memberships and cognitive functioning, specific coping strategies or QOL and well-being. The demographic variables of gender and prior education had a relationship with the use of coping strategy, although these relationships were not consistent in both groups. Those people in the chronic pain group who favoured support-seeking strategies reported higher life satisfaction, better overall QOL and better social relationships. In both the ABI and chronic pain groups, people who used more maladaptive coping strategies reported higher anxiety levels; and in the ABI group also reported poorer QOL (overall & physical). Finally, there were no significant relationships between neuropsychological variables and coping style but an interesting association between self-rated executive functioning and maladaptive coping emerged. The important findings will now be discussed in relation to the literature and
clinical implications drawn from the results, in the context of the limitations of this study.

The similarities found between the responses of the two groups on all the measures (except one) are consistent with Curran et al., who found participants with ABI did not significantly differ from controls who had sustained serious orthopaedic injuries with regards to mood (depression and anxiety), handicap (physical independence, mobility, occupation, social integration), self-esteem or coping style. These findings might represent the fact people with acquired brain injury do not necessarily experience more or less psychological distress than other people with chronic health conditions.

The Role of Social Identity.
With regards to the impact of social identity, it was interesting that the brain injured participants reported that they felt part of more new groups since their injury compared to the chronic pain group. This could be a result of the recruitment procedures used in this study, as the brain injured participants all came from a Headway centre (already one new group that they belonged to since their injury). Headway services also gave them access to and knowledge of other groups, which might help to explain this finding. Headway also offers an outreach service for those who would not be able to attend a group setting or who did not want to. This might have created a sampling bias, whereby only those people that were
motivated and able to join new groups, took part in this study. In comparison, the chronic pain group were accessed via a clinical setting where no group support sessions are run and signposting to community groups is minimal. This was evident by only one chronic pain participant recording that they belonged to a support-related group, in comparison with all the brain injured participants recording Headway as a social identity group.

The finding of no relationship between cognitive functioning and maintenance of groups is in opposition to work by Haslam et al. (in press); possibly due to the difference in cognitive measures used. In their study they used a 25-item self-report questionnaire to assess the frequency of cognitive errors participants made in their daily lives, whereas this study used objective measures of cognitive functioning, including measures of executive functioning and memory. These results taken together suggest further exploration is needed. It might suggest that both subjective and objective measures should be used when considering social outcomes. Subjective measures may be influenced by a person’s comparison of how they felt they were before their injury, rather than how they actually are functioning now. This awareness may affect people’s self-confidence or self-esteem, leading to poorer maintenance of groups.
Godfrey et al. (1996) suggest that social support acts as a coping resource and both coping and social support are related to outcome, yet the results from this study did not support this prediction. The result could suggest that another model that places less emphasis on social processes is more helpful, for example Moore and Stambrook (1995). However, due to methodological reasons, caution should be used when interpreting this result; it should be considered as exploratory until further examined using other social measures beyond the EXITS. The participants in this study were on average eight years post-injury, it could be that relationships between coping and social identity did exist in early recovery stages but have changed over time. Longitudinal data is required to further investigate this relationship.

Haslam et al. (in press) found that maintenance of groups was associated with improved life satisfaction in stroke patients; this finding was not supported in this study for either group. In the stroke study, participants were on average eight months post-stroke, whereas in this study the average for both groups was over eight years; with the minimum length of time post-injury at 10 months. This could suggest that relationships between well-being and maintenance of groups changes over time as people continue to struggle with their health problem. However, it could also be reflecting a natural change in social groups and identity over time. Longitudinal data is needed to see if group membership does change
over time in people with chronic health conditions, compared with a healthy control group.

This finding also might reflect difficulties in accurate recall for people in this study, especially as participants were recalling social identities they had on average over eight years ago. This might be more pertinent for the brain injured participants who were impaired on memory functioning, although measures of autobiographical memory were not used in this study. An additional complication of the time since injury in this study and the above finding, is perhaps due to adaptive changes in people’s perception over time. For example, people who might have lost social identities and groups due to their health condition may ‘downplay’ the importance of that group to them in order to avoid cognitive dissonance associated with losing friendships and support.

Coping and Quality of Life, Life Satisfaction and Mood

This current study found no relationships between coping and age or time since injury. This is different to some authors but in line with others. Increased use of problem-focused coping was related to increased years of education in the brain injured participants, whilst increased years of education was related to a decrease in using maladaptive coping in the chronic pain group. This supports similar findings that higher premorbid intellectual functioning and educational attainment is associated with problem-focused coping.
and maladaptive coping is associated with lower premorbid functioning. Anson and Ponsford (2006b) suggest that higher educational attainment might help people to develop more problem-solving skills prior to their injury than those with less time in education. The finding that males were more likely to use maladaptive coping styles in the chronic pain group is difficult to explain, as this trend is not supported in the literature, except for stressors involving other people. This may be related to the small sample size of men in the chronic pain group.

The findings from this study partially support the hypotheses stating that using specific coping strategies is related to quality of life and well-being. It is of particular note that the results that show maladaptive coping is associated with poorer outcomes in the brain injured group but not the chronic pain group, while adaptive coping is associated with improved outcomes in the chronic pain but not the brain injured group. This is despite no differences found between the two groups on the measured used. Perhaps this is because maladaptive coping includes strategies such as substance use and venting. The negative outcome of these strategies may be amplified in the brain injured group, as substance use can exacerbate cognitive, behavioural and emotional difficulties. Particularly of note are frontal lobe problems, which are frequently associated with brain injury, including disinhibition and self-monitoring. For example, venting may more easily lead to anger, or substance use
may be increased due to impulsiveness or poor self-monitoring. This study did not examine neuropsychological functioning in the chronic pain group, but it was presumed that it would be higher than in the brain injured group. This considered, adaptive coping involves much more subtle and complex ways of coping (e.g. planning, seeking out instrumental support, positive reframing), the cognitively better functioning participants (i.e. chronic pain) may have been better at implementing these adaptive coping strategies leading to better outcomes.

One final consideration is that the coping measure in this study recorded self-reported coping, the above results potentially suggest that there may be merit in additionally measuring actual coping strategies and exploring any differences between brain injured and other clinical populations.

*Neuropsychological Variables and Coping Style*

The literature showed mixed results of the impact of neuropsychological variables and coping style, and in this study cognitive variables and use of coping strategy did not appear to be significantly related. This provides support for Anson and Ponsford but not for Krpan’s et al. . The differences in findings could be explained by the measures in each of the different studies. Krpan et al. (2007) used a larger test battery compared to Anson and Ponsford (2006a) and this study, which may have been more
sensitive to specific effects in executive functions. However, an interesting association became apparent between higher scores on self-reported executive functioning (DEX) and the increased use of maladaptive coping strategies. Although this was not significant once the alpha level was adjusted, it is worth further consideration in future studies. It suggests that those people who rate their executive functioning as poor, also use more maladaptive coping. This is the first study to examine self-rated executive functioning and coping (as far as the authors are aware) and it seems that the subjective nature of the measure has a relationship with coping style whereas objective measures do not.

Implications for Rehabilitation

McColl et al. found that the most common feature reported as important to community integration is meeting new people and making new friends. The results of this study suggest that the brain injured group have been able to do this more successfully than the chronic pain group. This might be partly through their membership at Headway, suggesting the benefits of attending such a centre. It would have been interesting to have compared participants from the centres with those who received one-to-one outreach support from Headway. Also, to look at people who had experienced milder ABI who might be living without support in the community. The lack of new group membership in the chronic pain group warrants further investigation. Participants with chronic pain appeared to be less able
to make new group memberships after the onset of their chronic pain despite no differences in anxiety or depression levels. Perhaps this might be due to a lack of community support groups or awareness of groups in this area.

The results suggest that it would be helpful to identify people with brain injuries who are using maladaptive coping styles (e.g. blame, behavioural disengagement, substance use, venting and denial), so that they may be helped to learn more adaptive strategies, particularly support-seeking strategies. This could be done in in-patient rehabilitation but is also suited to community settings such as Headway centres. Findings from Anson and Ponsford suggest how it might be possible to modify adaptive coping strategy use by using cognitive behaviour therapy. The results of this study also suggest that perhaps by employing strategies that improve emotional well-being, the use of maladaptive coping might be lessened, with beneficial effects on QOL and satisfaction with life.

The results of this study tentatively suggest the importance of considering how a person perceives their cognitive functioning and not just using objective measures of functioning, in identifying those at risk of using maladaptive coping strategies. The inclusion of self-report measures like the DEX, could be a useful addition to neuropsychological batteries in rehabilitation settings. Additionally, it would be interesting to see if a rehabilitation group that is focused
on teaching strategies for improved executive functioning (e.g. planning skills) results in any changes in coping style and in turn decreased anxiety.

Limitations of the Current Study

There are limitations with this study which should be addressed in the future. The sample size was small and this combined with using parametric tests, limits the power of the study to find significant results which may exist. This may account for the lack of support for some of the hypotheses. Multiple tests meant that the adjusted alpha level was highly conservative, which increased the likelihood of making a Type II error. Therefore some of the non-significant results should not be used as confirmatory evidence but as interesting findings needing further exploration. The correlational design of this study makes it impossible to draw inferences about the nature of the causal relationships. More experimental and longitudinal research should be carried out to further explore the nature of the relationships found.

The disappointing lack of findings regarding social identity could be due to concerns regarding the EXITS measure (an early version, although similar to Haslam et al., in press). As previously discussed, the EXITS had never been used to collect postal data before. Some of the responses suggested that participants’ understanding of the questions may have not been optimal in the chronic pain group. Additionally, a more semi-structured interview approach was needed
when collecting EXITS data from the brain injured group. This highlighted the need for further development of the measure and feedback about the validity of using a postal version to the developers\textsuperscript{4}. These concerns suggest the need for further exploration, using an updated version of the EXITS or other social measures with health populations. The results of this study also suggest that perhaps further use of the EXITS is more applicable in the immediate rehabilitation period post-injury and not many years post-injury as was the case in this study. The limitations with this measure meant the focus of the study altered somewhat from the original design, with less emphasis on the social identity hypotheses and a more in-depth exploration of neuropsychological variables and coping.

The original design also aimed to obtain an orthopaedic control group matching for factors such as age, gender and time since injury. This group has been used as an appropriate comparison group because of the comparable traumatic nature of the injury. However, it became clear in the data collection stage that the comparison group respondents were from a much wider category (chronic pain), and delays in getting research approval meant that it was too late to access different participants. This unanticipated comparison group of chronic pain participants meant that potentially relevant factors were not measured in both groups.

\textsuperscript{4}This information has been fed back to the developers of the measure. A newer version is now available.
Specifically, a measure of pain status in both groups was not recorded, which would have enabled comparison within and between groups. It was evident when talking to participants in the brain injured group that some of them had additional chronic pain problems that may or may not have been associated with their acquired brain injury. Pain is commonly missed in people with head injuries for a number of reasons; if a significant number of the brain injured group also had chronic pain this may explain the lack of difference when comparing the two groups. So, although this study excluded head injury for the chronic pain group, chronic pain was not excluded for the brain injury group. Furthermore, although the exclusion criteria for the comparison group ruled out any loss of consciousness through a head injury, not measured (due to the postal data collection for this group), were any cognitive impairments in the chronic pain group.

Time constraints for this doctoral research meant that using cognitive measures with the comparison group was not possible. In the original research design with an orthopaedic control it would have been more acceptable to assume that the participants would have performed in the normal ranges of the cognitive tests. However, there is evidence to suggest that in chronic pain samples, the experience of pain affects cognitive abilities, particularly attention. In the future, measuring neuropsychological variables in
both groups and perhaps using healthy comparisons would be beneficial.

Unfortunately, the change in comparison group also meant that the sex ratio now mirrored the ABI group, with more females reporting chronic pain problems and more males experiencing ABI as reported in the literature.

Finally, the participants in this study were from a rural population which is less ethnically diverse than other areas in the UK; this is an important factor to consider when extrapolating from the results. Pierce and Hanks found that ethnicity was significantly correlated with scores on life satisfaction. In this study only two participants described themselves as belonging to an ethnic group other than White British. These issues need further examination within studies located in other areas in the UK to achieve a more representative sample.

**Conclusion**

This study showed increased use of maladaptive coping was significantly associated with higher levels of anxiety in both groups. Maladaptive coping was also associated with poorer quality of life (overall, physical, psychological and environmental QOL), poorer life satisfaction and increased depression in the acquired brain injury group. Increased support-seeking coping was associated with
improved life satisfaction, QOL (overall, social and psychological QOL) and better mood (depression and anxiety) in the chronic pain group. Results also suggested that measures of self-reported executive functioning might play a role in identifying those likely to develop maladaptive coping styles. This study found no support for the hypothesis that social identity impacts on coping or QOL and well-being. Findings from this study build upon the current literature and provide some implications for rehabilitation, but more work needs to be done to explore more comprehensively the impact of social identity and self-reported executive functioning on coping and well-being.