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A Preliminary Investigation into Empathic Responding after Traumatic Brain

Injury

&

Clinical Research Portfolio

Volume I

(Volume II bound separately)

Nicole Susanne Paterson

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Submitted in part fulfilment of the requirements for the Degree of

Doctorate in Clinical Psychology (D. Clin. Psy.)

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Dedicated in loving memory to my mum, Eileen.

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Chapter 1: Systematic Literature Review

What works? Psychological interventions after Acquired Brain Injury: A Systematic Review

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Abstract

Objective Acquired brain injury (ABI) often leads to a mixture of physical, cognitive, communicative, emotional and behavioural changes, which can make survivors vulnerable to a range of psychosocial difficulties, predominantly anxiety and depression. The aim of this review is to identify psychological interventions for defined psychosocial difficulties, particularly anxiety and depression, that have been used for people with ABI and to establish the effectiveness of these interventions.

Methods Studies were identified by searching eight online databases (All Evidence Based Medicine Reviews, OVID Medline, Embase, CINAHL, PSYCHInfo, Behavioural Sciences Collection, Education Resources Information Centre and Health Management Information Consortium) hand searching key journals, and reviewing the reference lists of included papers. Studies that were eligible for review had a primary or secondary measure of anxiety or depression, assessed only a psychological intervention and included participants aged 16 years and older who had ABI. Eligible studies were appraised for effectiveness of the interventions assessed and for methodological quality by use of a rating scale devised for the review.

Results Ten studies were eligible for review, of which six were of high methodological quality and four were of moderate quality. The interventions investigated were group cognitive behavioural therapy (CBT), online CBT, telephone CBT, individual CBT, mindfulness, motivational interviewing and general psychotherapy. The papers reviewed provided inconclusive evidence for the use of these interventions in people with ABI.

Conclusions Rigorously controlled research is needed to identify effective interventions for ABI. Clinical implications are discussed

Introduction

In Scotland it is reported that 100,000 people attend accident and emergency (A&E) per year, 15,000 people are admitted with a traumatic brain injury, (TBI) of whom 1,100 are diagnosed as moderate to severe (ABI – NMCN, 2010). Each year in England and Wales, about 700,000 people attend A&E with a TBI (NHS website, 2011). Although most of these are mild, about 5-7% are moderate or severe. Mild TBI usually results in brief disorientation, headache, nausea and/or dizziness with recovery within hours, days or a few weeks (NHS Choices, 2010a). A more severe TBI often results in persistent cognitive and emotional problems and personality change (NHS Choices, 2010b).

The term acquired brain injury (ABI) has no universally agreed definition. The ABI National Managed Clinical Network (2010) is used here and defines ABI as: “traumatic brain injuries such as open or closed head injuries and non-traumatic brain injuries such as those caused by stroke, tumours, infectious diseases (e.g. encephalitis or meningitis), hypoxic injuries (e.g. asphyxiation, near drowning, anaesthetic incidents or severe blood loss), metabolic disorders (e.g. insulin shock or liver or kidney disease) and toxic products taken into the body through inhalation or indigestion. The term does not include brain injuries that are congenital or brain injuries induced by birth trauma.”

It is well documented that difficulties can result from an ABI including physical, cognitive, communicative, emotional and behavioural changes. Specifically, TBI can result in a number of psychosocial difficulties; the most common reported being depression and anxiety (Gracey, 2002). Motivation, characterised by apathy, indifference or lack of concern, and lowered initiation, verbal output and libido (Andersson, Krogstad, & Finset, 1999) can also be affected by brain injury and can lead to psychosocial difficulties (Gracey, 2002). Attention is another area which can be disrupted following TBI and again can lead to psychosocial difficulties. (von Cramon. & Matthes-von Cramon,1994). The presence of psychosocial difficulties, particularly anxiety and depression, and impairments that can lead to these difficulties can places individuals who experience brain injury at an increased risk of a poorer outcome (Fleminger, Oliver, Williams, & Evans, 2003; Vickery, Gontkovsky, & Caroselli, 2005). MacNiven & Finlayson (1993) reported that the presence of

psychosocial difficulties, such as depression, can negatively affect a person's ability to benefit from rehabilitation. A third of patients who have had a stroke are estimated to have a mood disorder in the first year after onset (Hackett, Yapa, Paraf & Anderson, 2005). The incidence of anxiety after TBI has been estimated at ranging from 18% to 60% (Hibbard, Uysal, Kepler, Bogdany & Silver, 1998).

Psychological treatments are often used in the management of psychosocial problems in the general population. A Guide to Delivering Evidence-based psychological Therapies in Scotland – The Matrix(Scottish Government & NHS Education Scotland, 2008) highly recommends 8 – 16 sessions of Cognitive Behavioural Therapy (CBT) for Generalised Anxiety Disorder that is moderate to severe. For individuals with mild to moderate and also severe depression CBT is highly recommended. In particular, CBT might seem appropriate for people with ABI because it is highly structured and therefore decreases organisational demands on patients who have difficulty with planning and organising. Kahn-Bourne and Brown (2003) state that CBT has an intuitive appeal in the management of depression after brain injury for three reasons: “(1) it accommodates and seeks to tackle the many personal and social sequelae that may contribute to psychological morbidity acutely and chronically, (2) it provides the therapist with a wide range of tools, and (3) it is inherently flexible with potential for accommodating individual differences and limitations” (pg 98).

Morton and Wehman (1995) recommend that community rehabilitation services prioritise psychological health in those with TBI. To do this a review of the evidence base for psychological interventions for psychosocial problems after TBI is needed. Hence the aim of this review is to identify studies where psychological interventions for defined psychosocial difficulties, in particular anxiety and depression, have been utilised for people with ABI and to establish their effectiveness. As there is already an extensive literature investigating psychological treatments that target challenging behaviour (Ylvisaker, Turkstra, Coehlo, Yorkston, Kennedy, et al. 2007; Worthington & Wood, 2008) it will not be included in this review.

Methods

Search strategy

Relevant studies were identified by searching the following electronic databases:

- All Evidence Based Medicine reviews
 - Cochrane Database of Systematic Reviews (2005–April, 2011)
 - ACP Journal Club (1991–April, 2011)
 - Database of Abstracts of Reviews of Effects (second quarter, 2011)
 - Cochrane Central Register of Controlled Trials (second quarter, 2011)
 - Cochrane Methodology Register (second Quarter, 2011)
 - Health Technology Assessment (second Quarter, 2011)
 - NHS Economic Evaluation Database (second Quarter, 2011)
- Ovid Medline(R) In-Process and Other Non-Indexed Citations and Ovid Medline(R) (1948–April 2011)
- Embase (1980–week 20, 2011)
- Embase Classic (1947–73)
- ERIC Education Resources Information Centre (1965–April, 2011)
- HMIC Health Management Information Consortium (1979–March, 2011).

The following terms were entered in textword searches in the above databases

- ((mood disorder* OR affective disorder* OR psychosocial problem* OR psychological problem* OR social problem OR depression OR depressive OR depressed OR anx* OR mental health OR memory OR cognit* disorder*))
- (((brain injur*) OR TBI OR ABI OR stroke OR (cranial injur*) OR (cerebrocranial injur*) OR (cranial trauma*) OR (cerebrocranial trauma*) OR (craniocerebral injur*) OR (craniocerebral trauma*) OR (head injur*) OR (head trauma*) OR (head wound*)))

- ((psycho* therap* OR psychotherap* OR CBT or behavio*r* therap* OR group therap* OR cognitive rehab* OR mindfulness OR motivational interviewing OR cognitive analytic* OR CAT)).

The three textword searches were then combined by use of the Boolean operator AND.

The following databases were searched using the same terms matched to the database thesaurus:

- Embase (1980–week 20, 2011)
- Embase Classic (1947–73)
- Ovid MEDLINE(R) In-Process and Other Non-Indexed Citations and Ovid MEDLINE(R) (1948–April, 2011)
- Psychinfo (1997–2011)
- CINAHL Plus with Full Text and Psychology (April, 2011)
- Behavioural Sciences Collection (April, 2011)

This search was supplemented by searching the reference list of included papers and by hand searching key journals – *Brain Injury*, *Neuropsychological Rehabilitation*, *Stroke*, *Archives of Physical Medicine and Rehabilitation*, from 2000-2011. These journals were chosen because they were the journals in which at least two of the papers included in the review were published.

Selection criteria

Studies identified by the search were then screened for relevance. Studies were eligible for inclusion if they met the following criteria:

- participants were aged 16 years and older and had a diagnosis of ABI, either traumatic or non-traumatic, including stroke, hypoxia, ruptured aneurysm or metabolic encephalopathy
- printed in English
- used a pre–post design or a control group
- targeted a psychosocial problem for intervention

- included a description of the psychological intervention used.

Studies were excluded if they met any of the following criteria:

- used a single case design
- were unpublished dissertation articles
- targeted challenging behaviour or post-concussion syndrome for intervention assessed interventions that targeted numerous outcomes, e.g. cognitive rehabilitation, neuropsychological rehabilitation.

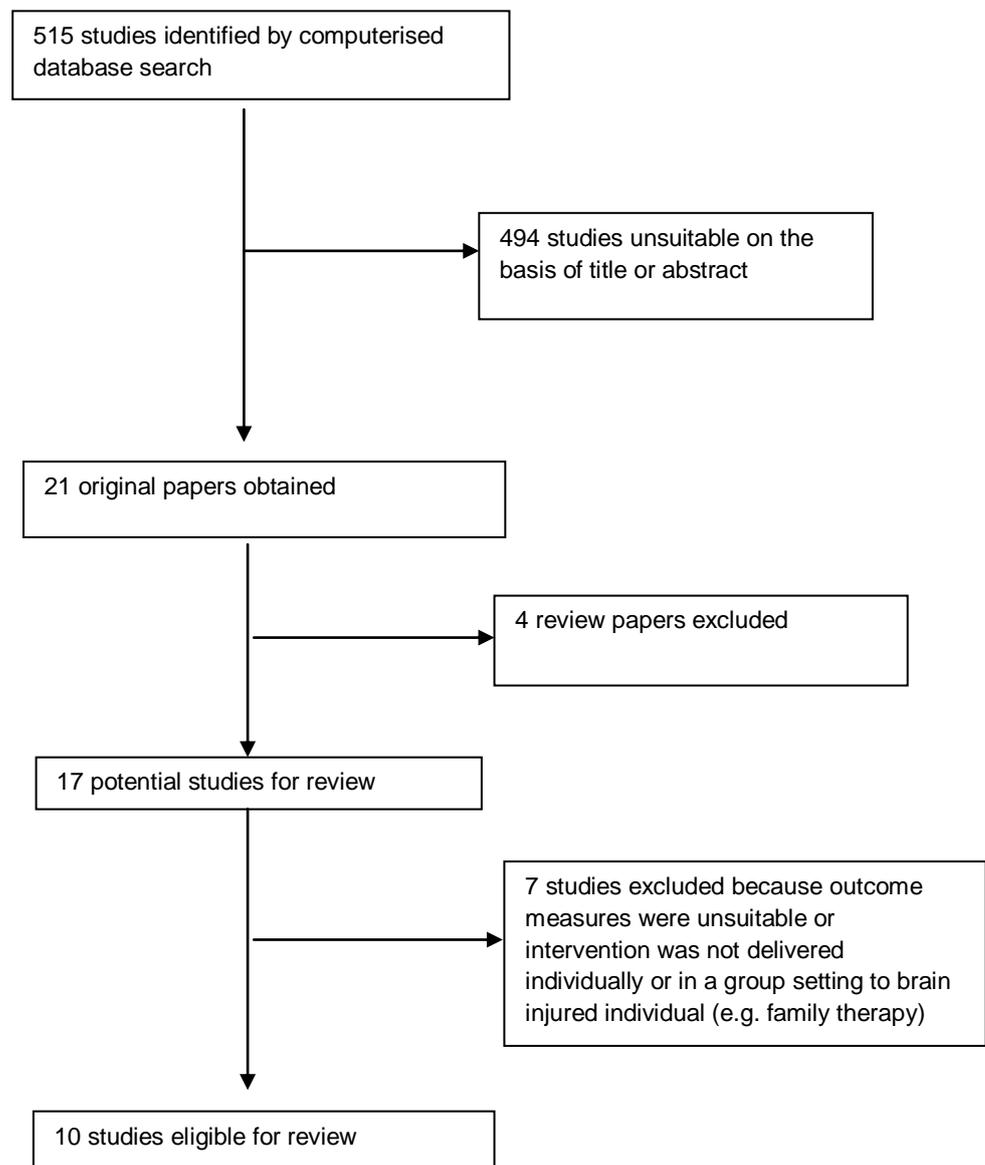
Assessment of Methodological Criteria

The author assessed the quality of the studies with a rating scale devised for the review. The introduction, methods, results and discussion of each study were assessed with a checklist devised by the author and based on the CONSORT guidelines (Moher, Hopewell, Schultz, Montori, Gøtzsche et al., 2010) and Scottish Intercollegiate Guidelines Network Methodology Checklist 2: Randomised Controlled Trials (SIGN, 2008) Items were selected from these guidelines and combined with additional items deemed relevant to ensure that the checklist was sensitive to the inclusion and exclusion criteria and the brain injury sample. The checklist has 25 items, of which 18 had a maximum score of 1, five had a maximum score of 2, and one had a maximum score of 0.5, resulting in a total maximum score of 29.5 (see appendix A.2) for the checklist). To review the reliability of this tool, a fellow trainee clinical psychologist rated these studies with the checklist. Overall individual agreement was high, 93.5%, disagreement was resolved by discussion.

Results

Search results

The electronic database search retrieved 515 potentially relevant papers after duplicates were removed. All 515 titles or abstracts were reviewed and 494 papers were deemed unsuitable. 21 original papers were obtained, of which ten examined the effectiveness of a psychological intervention for an identified psychosocial problem in people with ABI and met all inclusion criteria (figure 1). Two of these papers (Anson & Ponsford 2006a; Anson & Ponsford 2006b) were based on the same data however had two separate analyses.



Study characteristics

Several psychological interventions were examined in the ten papers: a CBT-based coping skills group, mindfulness-based interventions, general psychotherapy with a focus on coping mechanisms, CBT techniques used in a group setting and on the telephone, one to one CBT sessions, online CBT, group CBT and motivational interviewing. These interventions were used to target a range of psychosocial problems, including symptoms of depression, anxiety, adjustment disorders and attentional problems, note that the attentional problems were addressed in relation to anxiety and depression (table 1).

Table 1 Summary of the psychological interventions used and the target psychosocial problems.

| | Depression | Anxiety | Adjustment/coping | Psychological Distress | Attentional Problems |
|----------------------------------|--|--|---|---|-----------------------------------|
| Individual CBT | Lincoln et al. 2003 (stroke) | | | | |
| Group CBT | Anson & Ponsford 2006a & 2006b (TBI) Bradbury et al. 2008 (ABI - trauma and non trauma) | Anson & Ponsford 2006a & 2006b (TBI) Bradbury et al. 2008 (ABI - trauma and non trauma) | Backhaus et al. 2010 (ABI - traumatic and non traumatic ABI) Anson & Ponsford 2006a & 2006b (TBI) Bradbury et al. 2008 (ABI - traumatic and non traumatic ABI) | Backhaus et al. 2010 (ABI - traumatic and non traumatic ABI) | |
| Telephone CBT | Bradbury et al. 2008 (ABI - traumatic and non traumatic) | Bradbury et al. 2008 (ABI - traumatic and non traumatic) | Bradbury et al. 2008 (ABI - traumatic and non traumatic) | | |
| Online CBT | Topolovec-Vranic et al. 2010 (TBI) | | | | |
| Motivational Interviewing | Watkins et al. 2007 (stroke) | | | | |
| Mindfulness | Bedard et al. 2003 (TBI) | | | | McMillan et al. 2002 (TBI) |
| General Psychotherapy | Hofer et al. 2010 (stroke and TBI) | | | | |

Methodological Quality Rating

The studies had ratings of 69.4–93.2%. High quality papers were rated as 75% and above and moderate papers as less than 75%. Six papers were rated as high quality (Backhaus, Ibarra, Klyce, Trexler & Malec, 2010; Watkins, Auton, Deans, Dickinson, Jack et al., 2007; McMillan, Robertson, Brock & Chorlton, 2002; Bradbury, Christensen, Lau, Ruttan, Arundine et al., 2008; Lincoln and Flannaghan, 2003; and Bedard, Felteau, Mazmanian, Fedyk, Klein, et al. 2003) and four papers were rated as moderate (Hofer, Holtforth, Frischknecht & Znoj, 2010; Topolovec-Vranic, Cullen, Michalak, Ouchterlony Bhalerao et al., 2010; Anson & Ponsford, 2006b; and Anson & Ponsford, 2006a). Four of the six high quality studies were randomised controlled trials (RCTs) and two had a pre–post design with a control group. None of the moderate studies was an RCT. When Cohen's *d* effect size was not included in the study it was calculated by the author, if the data provided in the paper were adequate. Table 2 shows the characteristics of the studies and their findings. Descriptions of the studies are provided in decreasing methodological quality.

Watkins et al. (2007) – 91.5%

This study investigated the effects of motivational interviewing (MI) early after acute stroke to help individuals recognise the importance of making psychological adjustments. The authors did an RCT in a sample of individuals who had suffered a stroke; the treatment group received one to four individual sessions of MI, with at least one per week, and the control group received treatment as usual. The primary outcome was effect of treatment on psychological health, which was measured with the General Health Questionnaire with 28 items (GHQ-28). The authors showed that MI significantly improved mood compared with usual care at 3 months follow up, and MI had a protective effect on a depression screen, as measured by the Yale depression screen. MI did not have a significant effect on function as measured by the Barthell Index. Large effect sizes for these differences were reported. This study had a particularly high methodological quality scoring highest of all the papers reviewed, however, it failed to report the reliability and validity of the measures used, and further description of the participant would allow comparison of studies.

Backhaus et al. (2010) – 89.8%

This RCT was done in people with traumatic or non-traumatic ABI and their caregivers. Participants were randomised to receive treatment (brain injury coping skills group) or no treatment (control group), and caregivers were assigned to the same group. The intervention was given in weekly group sessions, each lasting 2 hours, for 12 weeks. The primary outcome measure was psychological distress, (Brief Symptom Inventory-18). Measures of psychological distress did not differ significantly between the two groups. However, the treatment group scored significantly higher on the Brain Injury Coping Skills questionnaire. This study had a high methodological quality. A large effect size was calculated for the difference between groups on the Brain Injury Coping Skills questionnaire, however, it should be noted that this questionnaire was designed specifically for the authors to measure the effect of the group and was not validated. The BICS questionnaire used a Likert scale to measure agreement with statements such as “I know what kind of automatic thoughts I have and catch myself when I have an automatic thought”. The findings using this questionnaire need to be interpreted with caution as no measure of social desirability was included and it is not known if participants scored higher post treatment because they thought it was desirable to improve. In this study, the sample did not report psychological distress and the authors propose that the Brain Injury Coping Skills group is a preventative measure for psychological difficulties rather than a treatment so it is unlikely that this treatment would be effective in an ABI group with psychological difficulties. Also, the reliability and validity of the measures for use with an ABI sample was not reported, making it difficult to assess whether the measures were suitable.

Lincoln and Flannaghan (2003) – 88.1%

In this RCT, the effects of cognitive behavioural psychotherapy on depression were compared with an attention placebo intervention and no intervention in a stroke sample. The authors measured depressive symptoms by use of the Wakefield Self Assessment of Depression Inventory and the Beck Depression Inventory (BDI). The treatment was delivered as individual sessions of 1 hour per week for 10 weeks. The groups did not differ significantly at baseline, 3 months or 6 months in those recruited early (1–3 months) or late (>6 months) after stroke. Mood significantly improved over time,

but this finding was independent of intervention received. This study used a robust design. The authors failed to include the reliability and validity of the measures used.

McMillan et al. (2002) – 86.4%

This study assessed the effect of brief mindfulness training for attentional control difficulties after TBI. The authors did a RCT with three groups: a treatment group (five sessions of attentional control training), a physical exercise control group (the same amount of time with a therapist), and a control group (no contact with a therapist). Outcome measures were Sunderland Memory Questionnaire, Hospital Anxiety and Depression Scale (HADS), Test of Everyday Attention, Paced Auditory Serial Addition Test, Trail Making Test, Adult Memory and Information Processing Battery, GHQ, Cognitive Failures Questionnaire, and Rivermead Post Concussion Symptoms Questionnaire. The groups did not differ significantly on measures recorded at intake or those recorded immediately after training and at 12-month follow-up. This study had a high methodological quality rating, but did not report the reliability and validity of the measures used.

Bradbury et al (2008) – 86.4%

In this pre–post design study, 20 patients with traumatic or non-traumatic ABI, suffering from emotional distress, were equally assigned to receive treatment or control. The treatment group was subdivided so that five patients received CBT in a group format and five received CBT by telephone. Treatment was given in weekly sessions, each lasting about 1 hour, for 10 weeks. The control group received the same duration of contact, but were provided with education. The CBT group showed significant reduction in distress, as measured by a decrease in symptoms on the Depression Anxiety Stress Scale with 21 items (DASS-21) and Symptom Checklist-90-Revised (SCL-90-R). Improvements in symptoms were demonstrated in both CBT formats with large effect sizes. It had a high methodological quality rating, however, limitations of the study were that the sample size was not informed by a power calculation and seemed relatively small and the non random allocation of participants to group, clients who lived further away were assigned to the telephone group. This limits

the conclusions that can be drawn from these results, because the group format may not have been as successful with people who lived further away.

Bedard et al. (2003): 79.6%

Investigated a mindfulness-based intervention to improve quality of life. They used a sample of TBI n=10 individuals with a pre-post design. The n=3 who dropped out of the study were used as a control. The primary outcome measure was quality of life (Short Form Health Survey; SF-36). Their secondary outcome measure was depressive symptoms as measure by the Beck Depression Inventory (BDI-II). The treatment group received a 12 week group intervention. They found a significant change in the cognitive – affective domain of the BDI-II but no change was noted in the somatic domain. On the SF-36 mental health score showed improvement however the physical health score was unchanged. This study scored highly on the methodological quality rating. It should be highlighted though that it was a pilot study and the sample size was not based on a power calculation and the inclusion of a control group of dropouts appeared to be an addition to the original design.

Hofer et al. (2010) – 72.8%

This study examined whether psychotherapeutic interventions are effective both for treatment of emotional distress reactions and for fostering the adjustment processes after ABI. The authors used a pre–post design, with no control group, to investigate an unselected clinical sample (n=11), including stroke and TBI. Treatment was based on the principles of general psychotherapy. The duration of the treatment was not limited but was instead adapted to individual needs, with an average of 20 sessions per patient and 50 minutes per session. At the end of therapy, no patients fulfilled diagnostic criteria of an adjustment disorder (as measured by the Structured Clinical Interview for Diagnostic and Statistical Manual-IV Axis I Disorders [SCID-I] interview), and Beck Depression Inventory (BDI) results showed a significant lowering of depressive symptoms with a large effect size. This study had moderate methodological quality because it had a fairly small sample size that was not based on a power calculation, and no control group was used. Therefore, it was difficult to assess whether the

significant effects reported were due to the intervention, a placebo effect or whether the participants would have spontaneously improved over time.

Anson and Ponsford (2006a) – 72.8%

This study differed from the others included in the systematic review because it assessed the variables associated with positive psychological outcome after a group intervention. They used the data from Anson and Ponsford (2006b) and analysed the data for the two groups as one group, as the two groups had received the same intervention. The primary outcome measure was depressive symptoms, as measured by HADS. The authors found that better outcomes after intervention, as indicated by lower depression scores on HADS, were associated with greater self-awareness of injury-related deficits, less severe injury, higher pre-morbid intellectual functioning, and greater anxiety before intervention. Poorer outcomes were associated with better memory performance and greater depression before intervention. Therefore, the participants who were more severely depressed or had better memories, or both, were less likely to benefit from the group intervention. This study had a moderate methodological quality rating. The sample size was not based on a power calculation and seems small (n=33) given the multiple regression analysis, indicating that the results and conclusions should be interpreted with caution.

Topolovec-Vranic et al. (2010) – 72.8%

This pre–post study assessed online CBT for depression after TBI. No control group was used. Depressive symptoms were measured with the Centre for Epidemiological Studies Depression Scale (CES-D) and the Patient Health Questionnaire (PHQ-9). The treatment was delivered by use of the MoodGYM website. Depressive symptoms had significantly decreased at 12-month follow-up, with large effect sizes for both questionnaires. However, there was a high dropout rate 36 % failed to complete the 6-week intervention and not all participants found the website easy to use because of difficulties with reading, due to concentration problems that are common with a TBI sample. This study had a lower methodological quality rating than several studies included in the systematic

review, predominantly because of the absence of a control group. The effect size calculation was based on the change from baseline to 12-month follow-up, but the 12-month follow-up data does not control for spontaneous improvement over time. Additionally, the sample size was not based on a power calculation and the hypotheses were not clear.

Anson and Ponsford (2006b) – 69.4%

This pre–post study investigated the impact of a CBT-based intervention on coping strategy and emotional adjustment in participants with TBI. Participants were assigned to one of two groups that differed by length of baseline (5 weeks for group A, 10 weeks for group B). Coping strategy was measured with the Coping Scale for Adults and emotional adjustment was measured with HADS (depression and anxiety), the Rosenberg Self-Esteem Scale and the Sickness Impact Scale (psychosocial dysfunction). Adaptive coping increased significantly after the intervention for both groups, although this was not stable over time. Participation did not have a significant effect on anxiety, self-esteem, depression or psychosocial dysfunction. This study had the lowest score for methodological quality rating because description of the study design was unclear. The authors stated that the participants were used as their own controls because of the difficulty with matching a control group, but then they reported that a wait list control design was used with the two groups differing by length of baseline. The analysis compared the two groups at baseline, before intervention, after intervention, at follow-up and at long-term follow-up, so it was not clear why the length of baseline differed for the two groups. Additionally, the time since injury for the two groups exceeded 1 year, so the rationale for a 5-week delay for treatment was unclear. Effect sizes were not reported and could not be calculated from the information provided. The lack of an appropriate control group was a major limitation, especially as the groups were followed up for 6–24 months, because the design of this study did not control for spontaneous recovery.

Summary

The studies differed in the types of design they use; 4 out of the 10 studies were RCTs and two used a pre-post design, papers with these designs scored higher on the methodological quality rating scale. Four studies used a pre-post design with no control group. The studies also differed on the sample size used, with the RCTs having the bigger sample sizes. 7 out of the 10 papers measured the effects of their treatment on symptoms of depression (Anson & Ponsford, 2006a, 2006b, Bedard et al. 2003, Bradbury et al. 2008, Hofer et al. 2010, Lincoln & Flannaghan, 2006 and Watkins et al, 2007) three measured anxiety (Anson & Ponsford 2006a, 2006b and Bradbury et al. 2008) , four measured adjustment (Anson & Ponsford, 2006a, 2006b, Backhaus et al. 2010 and Bradbury et al. 2008) , one psychological distress (Backhaus et al. 2010) and one attentional problems (McMillan et al. 2002) (but also assessed change on the HADS). They mainly used variants of a CBT approach, including individual, group, telephone and online. Motivational interviewing, mindfulness and general psychotherapy were also employed in some studies. Three papers did not find an effect of intervention on psychological symptoms these studies investigated group CBT (Backhaus et al. 2010), mindfulness (McMillan et al. 2002) and individual CBT (Lincoln & Flannaghan, 2003). The remaining 7 papers did report effects of intervention for psychological symptoms.

Table 2 Summary of main characteristics and findings of identified studies

| | Quality | Sample | Intervention | Outcome measures | Findings | Effect Size |
|----------------------------|---------|--|---|--|--|--|
| Anson and Ponsford (2006a) | 72.8% | N=33 with TBI; 85% injured in motor vehicle accidents Mean PTA of 32 days Mean of 69 days in inpatient rehabilitation (range 1–210 days). Mean age of 36.7 years | Coping skills group which ran for 90 minutes twice a week for 5 weeks, this group was based on a CBT model Outcome measures were completed at four timepoints, baseline (5 weeks before intervention), 1 week before intervention, 1 week after intervention, and follow-up (5 weeks after intervention) | <u>Anxiety and depression</u> HADS <u>Coping</u> Coping Scale for Adults <u>Self-Esteem</u> Rosenberg Self-Esteem Scale <u>Psychosocial dysfunction</u> Sickness Impact Profile <u>Anger</u> State-Trait Anger Expression Inventory, 2nd edn. <u>Cognitive functioning</u> NART–premorbid IQ RAVLT–learning and memory BADS <u>Self-awareness</u> Patient Competency Rating Scale Self-Awareness of Deficits Interview | Better outcomes after intervention were associated with greater self-awareness of injury-related deficits, less severe injury, higher pre-morbid intellectual function on the NART and greater anxiety before intervention By contrast, poorer outcomes after intervention, as indicated by a greater percentage increase in depression, were associated with better memory performance on the RAVLT and greater depression before intervention | Insufficient data reported to calculate effect size. |
| Anson and Ponsford (2006b) | 69.4% | N=31 with TBI participants; 84% injured in a motor vehicle accident Mean PTA of 32.7 days Mean of 71 days spent in inpatient rehabilitation | Intervention was a coping skills group that ran for 90 minutes twice a week for 5 weeks, this group was based on a CBT model. Outcome measures were completed at four | <u>Anxiety and depression</u> HADS <u>Coping</u> Coping Scale for Adults <u>Self-Esteem</u> | Adaptive coping increased significantly after the intervention for both groups A and B, although this was not stable over time Participation in the group ²² | Insufficient data reported to calculate effect size. |

| | | | | | | |
|------------------------|-------|---|--|---|--|------|
| | | (range 1–210 days) Mean age of 38.9 years in group A (n=15) and 37.8 years in group B (n=16). A = 5 week baseline, B = 10 week baseline | timepoints, baseline (5 weeks before intervention), 1 week before intervention, 1 week after intervention, and follow-up (5 weeks after intervention) The emotional adjustment measures were completed at long-term follow-up (6–24 months after completing the intervention) | Rosenberg Self-Esteem Scale <u>Psychosocial dysfunction</u> Sickness Impact Profile <u>Anger</u> State-Trait Anger Expression Inventory, 2nd edn. <u>Cognitive functioning</u> NART–premorbid IQ RAVLT–learning and memory BADS <u>Self-Awareness</u> Patient Competency Rating Scale Self Awareness of Deficits Interview | did not have a significant effect on measures of anxiety, self-esteem, depression or psychosocial dysfunction | |
| Backhaus et al. (2010) | 89.8% | N=40 (20 participants and 20 respective caregivers) Participants and their caregivers were randomised equally to two groups: brain injury coping skills group, and control group (no treatment) Participants brain injury, either acquired via stroke, hypoxia, ruptured aneurysm or metabolic encephalopathy, or traumatic Mean age of 43 years | The intervention was given in 12 sessions, each of 2 hours in length, and included both survivors and caregivers Sessions were a combination of psychoeducation, psychotherapy, teaching of stress management and problem solving strategies Outcome measures | <u>Psychological distress</u> Brief Symptom Inventory-18 <u>Perceived self-efficacy</u> Brain Injury Coping Skills questionnaire | No significant difference in psychological distress between groups Brain injury coping skills group showed significantly improved perceived self-efficacy | 1.21 |

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|------------------------|-------|---|---|--|---|--|
| | | | completed at baseline, immediately after completion of intervention and at 3-month follow-up | | | |
| Bedard et al. (2003) | 79.6% | <p>Convenience sample N=10 (completed the programme)</p> <p>Community based rehabilitation programme, with referrals from a local neuropsychologist, the local brain injury association and through advertising</p> <p>Mean age of 43 years</p> <p>TBI sample, mild to moderate TBI at 1 year after injury, sample about 3–10 years after injury</p> | <p>Pre–post design with control group (three dropouts from study)</p> <p>Intervention consisted of 12-week group intervention based on Kabat-Zimm’s mindfulness based stress reduction programme; a manual was developed</p> <p>The intervention used insight meditation, breathing exercises, guided visualisation and group discussion</p> | <p><u>Quality of life</u></p> <p>SF-36</p> <p><u>Psychological processes</u></p> <p>BDI-II (depression)</p> <p>SCL-90R</p> <p>Perceived Stress Scale</p> <p>Multidimensional Health Locus of Control Scale</p> <p><u>Function</u></p> <p>Community Integration Questionnaire</p> | <p>Depression symptoms almost halved in intervention group, Significant change in cognitive-affective domain of BDI-II no significant change noted in somatic domain</p> <p>SF-36 mental health score showed improvement, physical health score was unchanged</p> | <p>1.86</p> <p>1.71</p> |
| Bradbury et al. (2008) | 86.4% | <p>N=20, split equally into two groups: CBT group (five group, five telephone, and education control group (five group, five telephone)</p> <p>Patients with traumatic or non-traumatic TBI had initial GCS scores in the moderate or severe range</p> <p>Patients with non-traumatic injuries were in the moderate to severe range of cognitive impairment in at least one cognitive domain or had remained in</p> | <p>Ten treatment or education sessions were conducted either over the telephone or in the face-to-face group format</p> <p>Sessions took place on weekly basis, each of Ranged from 45–75 minutes in length</p> <p>CBT tailored to meet the unique needs of ABI population, while adhering to proven treatment protocols. In the education group, sessions were</p> | <p>Primary</p> <p><u>Psychological symptoms</u></p> <p>SCL-90-R</p> <p><u>Depression and anxiety</u></p> <p>DASS-21</p> <p>Secondary</p> <p><u>Coping strategies</u></p> <p>Ways of Coping Scale, Revised</p> <p><u>Community integration</u></p> <p>Community Integration</p> | <p>CBT group showed significant reduction in distress</p> <p>CBT group showed decrease in symptoms on DASS-21</p> <p>SCL-90-R CBT group showed improvement in symptoms</p> <p>Group Telephone</p> | <p>1.30</p> <p>1.79</p> <p>1.45 and 1.06</p> |

| | | | | | | |
|-------------------------------|-------|---|---|--|---|---|
| | | inpatient treatment for more than double the provincial average length of stay (27 days) Mean age of 39.8 | entirely educational and were used to control for general aspects of therapeutic contact | Questionnaire | DASS-21 improvements were seen for both group and telephone | 1.91 and 1.46 |
| Hofer et al. (2010) | 72.8% | N=11 All participants were outpatients and had completed intensive neuropsychological rehabilitation as inpatients, outpatients or both Seven TBI stroke (NIHSS used) patients, four TBI patients (GCS used, three moderate and one severe) Mean age of 51 years | Main treatment focus was on the emotional aspects of coping with the consequences of ABI; treatment followed principles of general psychotherapy, central coping mechanisms were similar to those used following grief, acceptance of loss, adjustment to a changed life situation, and redefinition of daily routines Individualised goals and therapy for each participant, therapy sessions not limited | <u>Psychological disorders</u> SCID-I <u>Depressive symptoms</u> BDI <u>Coping strategies</u> Trier Coping Scales <u>Treatment outcome</u> Patient-defined individual goals for therapy | At the end of therapy, no patients fulfilled the diagnostic criteria of an adjustment disorder any longer Significant change in depressive symptoms | 1.3 |
| Lincoln and Flannaghan (2003) | 88.1% | N=123 split into three groups: 41 received no intervention (mean age of 65 years), 43 received attention placebo (mean age of 66.1 years) and 39 received CBT (mean age of 67.1 years) All participants had experienced a stroke and were experiencing | Patients were offered ten 1-hour sessions of CBT by the same research community psychiatric nurse over 3 months Treatment consisted of cognitive and behavioural techniques, as used in the treatment of depression, and were based on a manual produced from the pilot study; techniques | Primary <u>Depression symptoms</u> BDI Wakefield Self Assessment of Depression Inventory Secondary Extended Activities of Daily Living | No significant difference between the groups found at baseline, 3 months or 6 months in those recruited early (1–3 months) or late (>6 months) Significant improvement in mood over time but this was independent of | Could not calculate cohen's d' from information given |

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|--------------------------------|-------|--|--|---|--|--------------------|
| | | symptoms of depression | included education, graded task assignment, activity scheduling, and identification and modification of unhelpful thoughts and beliefs Interventions were tailored to meet the individual's needs | Scale London Handicap Scale Rating of Satisfaction of Care measure | intervention received | |
| McMillan et al. (2002) | 86.4% | N=145 patients with problems of attention, split into three groups: 44 in attentional control training group (Mean age 34.6 years), 38 in physical exercise group (age of 31.4 years), and 48 in control group (no therapist contact; age = of 36.2 years) | Attentional control training in five 45 minutes sessions of supervised practice over a 4-week period and use of an ACT audiotape | <u>Cognitive measures</u> Test of Everyday Attention Adult Memory and Information Processing Battery Sunderland Memory Questionnaire Cognitive Failures Questionnaire <u>Psychological measures</u> HADS GHQ | No significant differences between three groups on measures before and after intervention Do not recommend the use of attentional control training of this duration and intensity for routine treatment of patients with attentional problems | 0.22 |
| Topolovec-Vranic et al. (2010) | 72.8% | N=21 TBI sample of mild to moderate severity (GCS ≥9) Mean age of 42.5 years Mean of 2.1 years since injury Score ≥12 on PHQ-9 | MoodGYM is a free, interactive internet-based program designed to prevent and decrease symptoms of depression | <u>Depression symptoms</u> CES-D PHQ-9 | Significant decrease in depressive symptoms | -3.19 -2.59 |
| Watkins et al. (2007) | 91.5% | Single centre open randomised controlled trial N=207 in control group | Intervention group received four sessions of motivational interviewing, | Primary <u>Mood</u> | Detected a significant benefit of motivational interviewing over usual | 1.60 |

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|--|--|--|--|--|---|------|
| | | (median age of 70 years), and N=204 in intervention group (median age of 70 years) Patients identified from stroke register, and randomised at 5–28 days after stroke | one per week, lasting 30–60 minutes Control group received treatment as usual | GHQ-28 Secondary <u>Depression screen</u> Yale <u>Function</u> Barthel Index <u>Beliefs and expectations of recovery</u> SEQ | care on GHQ at 3 months Motivational interviewing had a protective effect against depression screen Motivational interviewing had no significant effect on function | 1.65 |
|--|--|--|--|--|---|------|

Abbreviations - Behavioural Assessment of the Dysexecutive Syndrome (BADs), Beck Depression Inventory (BDI), Centre for Epidemiological Studies – Depression (CES-D), Depression Anxiety Stress Scales – short form (DASS-21), General Health Questionnaire (GHQ), Glasgow Coma Scale (GCS), Hospital Anxiety and Depression Scale (HADS), National Adult Reading Test (NART), National Institutes of Health Stroke Scale, Post Traumatic Amnesia (PTA), Rey Auditory Visual Learning Test (RAVLT), Short Form Health Survey – 36 (SF-36), Stroke Expectations Questionnaire (SEQ), Structured Clinical Interview for Diagnostic Statistical Manual – IV Axis Disorders (SCID-I), Symptoms Checklist – 90 – Revised (SCL-90-R)

Discussion

Previous reviews tend to focus on stroke or TBI and include a mixture of, for example, pharmacological and psychological interventions (Fann, Hart & Schomer, 2009; Soo & Tate, 2009; Hackett, Yapa, Paraf & Anderson, (2008). This review adds to current knowledge by critically reviewing psychological interventions that target anxiety or depressive symptoms after ABI sample. Studies used a variety of designs and interventions although the majority employed control groups and used variants of CBT.

Depression

The results of the studies reviewed indicate that the outcome of CBT for depression after ABI is variable. Successful results are associated with a smaller sample size and non RCTs and the only CBT-RCT found no group difference. Group CBT would be cost effective as it could target a larger number of people with fewer resources than one-to-one therapy, however the evidence for group CBT for people with ABI are inconclusive therefore replication of studies that found an effect with poorer methodological quality are required. Telephone CBT is more time intensive than group work and may be less effective than group CBT. However, it would target patients who may not otherwise receive treatment, resulting in equality in accessibility of healthcare resources though it may also increase the number of patients accessing treatment, therefore the best way to use resources would need to be considered. Replication of the study using telephone CBT with a (larger) sample based on a power calculation from the study would be appropriate. Online CBT is effective with an adult mental health population (Proudfoot, 2004) and there was some evidence that it can be effective with an ABI population. This approach could be cost effective and could be accessed for a number of patients with ABI. However, modifications would be required to tailor the on-line information to an ABI population, given the high drop out rate and participant feedback about ease of use. Motivational Interviewing was a time limited approach that produced effective changes in depressive symptoms and appears feasible when working with clients with a stroke. More research is required to investigate if this approach would also be successful with a client group with TBI. Mindfulness may require additional training of clinicians whereas CBT approaches may not. In order for it to be recommended

as a standard treatment for emotional difficulties after ABI further research incorporating an appropriate matched control group with a sample size based on a power calculation would be helpful. To offer general psychotherapy as standard to ABI patients with adjustment difficulties would require significant clinical resources, and further research is required utilising a control group and a larger sample size.

Anxiety

Bradbury et al. (2008) provide evidence for a reduction in anxiety symptoms after group or telephone CBT. Anson and Ponsford (2006b) found no reduction in anxiety symptoms after a group CBT approach aimed at improving coping skills. These varying results indicate that a CBT approach for anxiety may improve symptoms if the focus is not on coping skills per se. However further research with a more robust design and a larger number of participants is required.

Adjustment/coping

Backhaus et al. (2010) found that the treatment group scored higher on a Brain Injury Coping Skills questionnaire after attending a coping skills group based on a CBT model, however improvements on measures of depressive symptoms were not found. Bradbury et al. 2008 note a decline in emotion focused (maladaptive) coping in the CBT groups and an improvement in their (adaptive) problem focused coping, however they also found that the education control group improved their (adaptive) problem focused coping. This study also found an improvement in levels of anxiety and depressive symptoms. Anson and Ponsford (2006b) reported improvements in adaptive coping immediately after completion of a coping skills group based on a CBT model, however this was not sustained over time and again, no improvement on measures of anxiety or depression were noted. This review would suggest that further research is required to understand what coping strategies are useful in alleviating anxiety and depression symptoms and an understanding of how they help.

Psychological Distress

Backahus et al. (2010) measured psychological distress and found that psychological distress did not decrease after attendance at a Brain Injury Coping Skills group based on a CBT model. A limitation of this study was that none of the participants were necessarily suffering from pathological levels of psychological distress before taking part in the study. Therefore it is difficult to determine from this study alone if participants with pathological levels of psychological distress would benefit from a coping skills group based on a CBT model. As there is some evidence that a CBT group format may reduce symptoms of depression and anxiety it may be worth repeating this study with a sample that is experiencing psychological difficulties.

Attentional Control

McMillan et al. (2002) investigated the effect of improving attentional control on levels of anxiety and depression. They used attentional control training for 45 minutes per session over a period of 4 weeks. No improvement was seen on attentional control or levels of anxiety and depression. The mindfulness study (Bedard et al. 2003) used a similar technique for a one hour session over a period of 12 weeks and did report some improvements on measures of depression and provides some support for the replication of the attentional control study using a more intensive intervention in a group setting.

Conclusions

The small number of studies and variation in design and participant groups makes it difficult to draw definite conclusions or make clear recommendations about the effectiveness and use of psychological treatments for anxiety and depression after ABI. The results suggest that CBT can be effective with an ABI sample. Individuals with an ABI can also utilise mindfulness techniques to reduce symptoms of anxiety and depression if they are provided with enough therapist contact, however, this may be difficult to resource and deliver clinically. Motivational Interviewing appears to be protective against developing symptoms of depression and given that it can be used in conjunction with other therapies

to help increase motivation before undertaken therapy to change the behaviour in a normal population, further research investigating this within a TBI sample would be useful. Furthermore the results from this review highlight other important considerations for future research. Firstly, more research in this area is required as there are very few studies that consider solely a psychological intervention for psychosocial problems in ABI population. This review considered psychological interventions for psychosocial difficulties after ABI as there were few studies that investigated TBI samples (5 papers in this review) or non traumatic populations (2 papers in this review) independently. In addition there was no study comparing treatment for a TBI group with a non traumatic ABI, this design with the addition of a control group would provide evidence for whether or not similar treatments should be used for both populations. Secondly, research in this area requires studies that are adequately powered and using appropriate designs to allow general conclusions to be drawn with regard to the population. Further research considering a group CBT approach is recommended given the mixed results and the potential for this to be a cost effective treatment. An integrated approach is recommended by 'A Guide to Delivering Evidence-based psychological Therapies in Scotland-The Matrix' (Scottish Government & NHS Education Scotland, 2008), for individuals with severe depression they recommend mindfulness based cognitive therapy. Hence future research might investigate the effects of a combined MI (individual)/CBT group approach with possibly four groups(TBI, ABI, TBI-control, ABI-control) of participants who reported difficulties with depression, using an RCT design to randomly assign TBI and ABI participants into treatment group or control group.

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Chapter 2: Major Research Project

A Preliminary Investigation into Empathic Responding after Traumatic Brain Injury

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Rehabilitation (Appendix A.1)

Lay summary

An inability to empathise after a Traumatic Brain Injury (TBI) (i.e. an injury to the brain caused by an external force) has been reported in the literature. Recent studies have investigated emotional empathy (the ability to feel the same as another is feeling) and cognitive empathy (the ability to know what another person is feeling). This preliminary study aims to investigate empathy after a TBI using a model which outlines the relationships between affective empathy, cognitive empathy, sympathy and personal distress. This study investigated this model using two groups, a TBI group and a healthy control group matched for age, gender and years of education. A task was devised based on the model and involved viewing pictures and answering questions about the different types of empathy. Standardised measures of empathy were also used. This study found that the TBI group scored lower on the standardised measures of cognitive empathy and in particular the sadness emotion for cognitive empathy. In addition the results indicate that cognitive empathy may be associated with distress but not sympathy. The results support the view that empathy is impaired after TBI assessed by self report questionnaires, however, affective empathy and sympathy as assessed by the task were not affected by TBI. A replication of this study with a larger sample size is required.

Abstract

Introduction: Traumatic Brain Injury (TBI) can cause difficulties in the ability to empathise; however, research that investigates specific models of empathy in a TBI sample has not been forthcoming. This study investigates difficulties with empathy after TBI using Eisenberg's Empathy Related Responding Model.

Design: A between-subject design was used with two groups of 19 participants. The groups were matched for age, gender and years of education.

Methods: There were three primary outcomes measures. These were an empathy task devised for this study, the Basic Empathy Scale and the Balanced Emotional Empathy Scale.

Results: Groups did not differ in affective empathy, sympathy and personal distress on the empathy task. The groups did differ on the sadness emotion for the cognitive empathy task. These results were consistent with the results for the BES and BEES.

Discussion: The TBI group have difficulties with empathic responding. In addition, cognitive empathy appears to mediate distress but not sympathy. The need for further research to investigate the results of this preliminary study is discussed.

Introduction

Recent research suggests that a reduction in the ability to empathise occurs after traumatic brain injury (TBI) (de Sousa, McDonald, Rushby, Li, Dimoska et al., 2010, Wood & Williams 2008, Obonsawin, Jefferis, Lowe, Crawford, Fernandes et al., 2007). Wood and Williams found that a TBI cohort scored significantly lower on the scale of emotional empathy when compared to the general population, as did de Sousa et al. (2010). Obonsawin et al. (2008), in developing a model of personality change after brain injury, identified a number of descriptors that differentiate individuals with TBI from those without TBI and distinguish the personality of the TBI survivor before and after the injury, on a range of factors including lack of empathy. There are a number of models of empathy in the literature; however, research investigating empathy in a sample of individual's with TBI based on these models is not forthcoming.

Current models of empathy agree that empathy is a multidimensional construct. Empathy encapsulates a hierarchy of concepts related to the understanding of others from 'response contagion' to 'cognitive empathy' (Preston & de Waal, 2002). This multidimensional approach to empathy has been argued by a number of authors including Davis (1983) who states that, "our understanding of empathy can only improve with the explicit recognition that there are both affective and cognitive components to the empathic response" (pg113). Using the Interpersonal Reactivity Index (IRI) measure of empathy, Davis (1983) identified three key components of empathy including: Perspective-Taking, which he defined as "assesses the tendency to spontaneously adopt the psychological point of view of others" (pg113-114); empathic concern, which "assesses "other-oriented" feelings of personal anxiety and concern for unfortunate others" (pg114); and, personal distress, which considers "self-oriented" feelings of personal anxiety and unease in tense interpersonal settings" pg 114. Wood and Williams (2008) distinguish between emotional empathy – feeling what another person is feeling; and, cognitive empathy – knowing what another person is feeling. Others also provided data to support two different forms of empathy and postulate that different brain areas are responsible for mediating these different forms of empathy, hence, suggesting that they are dissociable (Shamay-Tsoory, Aharon-Peretz & Perry, 2008).

The model that this project investigates is Eisenberg's (2009) Empathy Related Responding model. Eisenberg (2009) highlighted the importance of differentiating between different empathy-related reactions and distinguishes between empathy, sympathy and personal distress. Eisenberg defines **empathy** as "an affective response that stems from the apprehension or comprehension of another's emotional state or condition, which is identical or very similar to what the other person is feeling or would be expected to feel" (pg1). This seems similar to the concept of "emotional empathy" (Wood & Williams 2008). **Sympathy** is defined as "concern with an affective response that frequently stems from empathy, but can derive solely (or partly) from perspective taking or other cognitive processing" (pg1-2). The model defines **personal distress** as "frequently stemming from exposure to another's state or condition; it is conceptualised as a self-focused, aversive emotional reaction to the vicarious experience of another's emotion that is associated with the egotistic motivation of making oneself feel better"(pg2).

Eisenberg's definition of sympathy and personal distress appears to require Wood and Williams (2008) construct, cognitive empathy. Eisenberg (2009) argues that self-regulation can explain the difference in empathic response. The model suggests that personal distress involves high empathic arousal that is experienced as aversive, it hypothesises that the consequence is that the individual focuses on their own distress rather than the distress of the other person. Eisenberg (2009) postulates that sympathy involves vicariously induced emotion; however, this model assumes that this vicarious affect is modulated and does not result in aversive personal distress. Further evidence for this model comes from physiological research. Physiological changes have also been associated with different empathic reactions to other's distress, with personal distress linked with higher levels of physiological arousal than sympathy (Eisenberg, Fabes & Spinrad, 2006). Chauhan, Mathias & Critchley (2008) also demonstrated that autonomic failure generally impairs participants on measures of emotional empathy.

To date this model has not been tested on a sample of individuals with TBI. Research suggests that individuals who have experienced TBI have difficulty with cognitive (Milders, Ietswaart, Crawford &

Currie 2008) and emotional empathy (Wood & Williams 2008) though the relationship between these different forms of empathy has not been fully investigated. Clinically, lack of empathy has an adverse impact on ratings of life satisfaction made by those caring for survivors of TBI (Wells, Dywan & Dumas, 2005). It has also been suggested that weaknesses of cognitive and/or emotional empathy may underpin many of the neurobehavioural disorders associated with TBI (Wood, 2001). However, it is not always easy to distinguish different types of empathy deficit at a clinical level. Wood and Williams (2008) tried to conceptualise the difficulties that would be observed clinically with deficits in the different forms of empathy. They suggest that diminished cognitive empathy seems to be reflected in a lack of tact and social discretion, as well as poor awareness of the emotional needs and sensitivities of others. Diminished emotional empathy may be reflected by an egocentric, self-centred attitude which is insensitive to, or neglectful of, the needs of others.

DeSousa, McDonald, Rushby, Li, Dimoska et al. (2011) recently compared the relationships between emotional empathy and emotional responsivity in a TBI and a control group. They measured facial electromyography and skin conductance. They found that TBI participants showed reduced facial mimicry of emotional responses in particular with respect to angry faces. They also found a difference in skin conductance between the two groups during the task. The research suggests that some individuals with a TBI have difficulty with empathy; that a clinical measure that distinguishes between deficits in different forms of empathy-related response is lacking; and the development of such a measure would enhance clinical work and research in this area.

This project investigates empathic responding in individuals who have experienced TBI. It pilots a measure derived from Eisenberg's model of empathic related responses and compares it to standardised, validated measures of cognitive and emotional empathy.

Hypotheses and Research Questions

Hypotheses

1. The mean score for all three types of empathy will be lower in people with TBI than people without TBI.
2. People with TBI will show greater variability in empathy scores than people without TBI, and will show empathy profiles that are different from the profiles of people without TBI.
3. The different types of empathy proposed by Eisenberg are dissociable.
4. A laboratory task can simulate situations that evoke the different types of empathy and will reflect the scores on self-report measures of empathy.

Research Questions

1. Does the TBI group have lower scores on the standardised measures of empathy, the Balanced Emotional Empathy Scale (BEES) and the Basic Empathy Scale (BES)?
2. Are differences on the BEES reflected on the empathy task by the TBI group scoring lower on the affective empathy questions?
3. Are differences on the BES reflected on the empathy task by the TBI group scoring lower on the cognitive empathy questions?
4. Are the TBI group less sympathetic as measured by the empathy task?
5. Are the TBI group less distressed as measured by the empathy task?
6. Do low scores in cognitive empathy result in lower scores of sympathy and higher scores for personal distress?
7. Are cognitive and affective empathy dissociable?

Methods

Design

This study used a between group design comparing participants with a TBI to healthy controls, matched for gender, age and years of education.

Sample size estimation

G*Power 3, software program (Faul, Erdfelder, Lang & Buchner, 2007) was used to estimate the sample size required based on a large effect size¹, (Cohen's $d = 0.82$; $f=0.41$), and $p=0.05$. A minimum of 49 participants were required (25 in one group, 24 in the other)

Eligibility Criteria

Individuals were included in the TBI group if they met the following criteria: aged between 18-65 years old, severe TBI (post traumatic amnesia (PTA) of more than 1 hr) and injury at least 3 months prior to date of testing. Participants in the healthy control group were also aged 18-65, but with no history of brain injury. Participants were excluded from the study if they met any of the following criteria: impaired ability to consent; diagnosis of deteriorating neurological condition; psychiatric or alcohol/drugs problems requiring current treatment; learning disability; and, visual or hearing impairment that made it difficult to participate.

Participant characteristics

Participants in the TBI group were recruited from: an inpatient unit; a social work service; and, a voluntary service, all specific to people with brain injury. A member of staff who knew them well contacted them to ask if they would be interested in taking part; if yes, they were provided with an information sheet and asked to contact the researcher. Healthy controls were recruited through advertising in the local council service and word of mouth. A total of 38 participants were recruited, 19 in each group, see Table 1.

¹ calculated from de Sousa et al. (2010) from means and standard deviations given describing the results of a TBI group and control group on the BEES

Table 1 Participant Characteristics.

| | <u>Traumatic Brain Injury Group</u> (n=19) | <u>Control Group</u> (n=19) |
|----------------------------|---|---|
| Gender | 15 males, 4 females | 15 males, 4 females |
| Age | Mean = 45.0 years, SD = 12.0 (range 19–61 years) | Mean = 42.7 years, SD = 12.3 (range 24–61) |
| Years of Education | Mean = 11.6 years, SD = 2.1 (9-17) | Mean = 12.8, SD = 2.5 (10-17) |
| WTAR | Mean = 95.06, SD = 9.49 (82-115) | Mean = 108.00 SD = 4.679 (101-119) |
| Type of injury | 47% RTAs (9), 37% Falls (7), 16% Assaults (3) | Not applicable |
| Time since injury (months) | Mean = 129.1, SD = 132.56 (Range 7 - 448) | Not applicable |
| Hayling ³ | N= 19, Mean = 10.42 SD = 3.78 (range 3-19) | N = 19 Mean 16.91 SD = 3.45 (range 9-21) |
| SDMT | N = 16 ¹ , Mean = 28.06, SD = 8.62 (range 17 – 41) | N = 19, Mean = 57.26, SD = 8.80 (range 42-74) |
| HADS-A ⁴ | N=18 ² , Mean = 7.11, SD = 4.21 | N = 19 mean = 6.05, SD = 2.48 |
| HADS-D | N = 18 ² mean = 6.22, SD = 3.62 | N = 19 mean = 6.22, SD = 1.35 |
| MCS | N=19, mean = 18.47, SD = 4.47 | N=19, mean = 15.42, SD = 5.27 |
| GOS-E | Severe = 11 Moderate = 7 Good = 1 | Not applicable |

1. One participant was unable to complete SDMT written form, two participants did not complete SDMT.

2. One participant refused to complete the HADS.

3. Lower scores indicate poorer performance

4. Higher scores indicate more symptomatic

Ethics

Ethics approval was obtained from the West of Scotland Research Ethics Committee. Management approval for the protocol was granted by NHS Greater Glasgow and Clyde Research & Development Directorate (see Appendix B.1 for copies of approval). Written consent was obtained from the

participant before testing (see appendix B.2 for information sheet and consent form). Ethics approval to test university students for the pilot study was obtained from the Department of Psychology at University of Strathclyde, as was ethics approval to test control participants at the University of Strathclyde.

Procedures

Participants attended for one test session lasting approximately 2.5 hours for the TBI group and 1.5 hours for the control group. After written informed consent was obtained, the demographic information was taken and the measures and scales were administered in the order given below. A number of measures were administered in order to describe the groups, these were: Hospital Anxiety and Depression Scale (HADS); Marlowe Crowne Scale (MCS); Symbol Digit Modalities (SDMT); Hayling Test, Wechsler Test of Adult Reading (WTAR); and, Glasgow Outcome Scale Extended (GOS-E) (TBI group). In addition to describing the groups, differences in the HADS and MCS may explain possible differences in the empathy scores and is investigated. The laptop was set 30cm from the participant. Due to executive functioning difficulties some participants in the TBI group required extra support from the researcher to aid their understanding of the questionnaires; for example, requiring the researcher to read questions aloud or requiring clarification of the scale for the empathy task. This was not required by the control group.

Measures (in order of administration)

Wechsler Test of Adult Reading (WTAR)

This tool was used to estimate the premorbid intellectual functioning of participants, in the form of the Verbal Intelligence Quotient (VIQ). Studies have demonstrated that the internal consistency coefficients for the UK sample range from 0.87 to 0.95 and the test-retest stability coefficients range from .90 to .94. The WTAR displays high positive correlations with the VIQ ranging from 0.66 to 0.80. It is hypothesised that WTAR scores obtained by adults with TBI would be similar to scores obtained by matched nonclinical samples, except in cases of rather severe injury (Wechsler, 2001). This measure will be used to describe the two groups.

Empathy Task

A new task was devised for use in this study. Pilot work was undertaken with 10 undergraduate students at Strathclyde University. The students were presented with a photograph taken from the International Affective Picture System (Lang, Bradley & Cuthbert, 1999) on a laptop screen using Superlab 4.5 software (Cedrus Cooperation 2011). Participants were asked about their emotional feelings about the photograph see Appendix B.3, this procedure was repeated for 16 photographs see Appendix B.4. Responses to questions were recorded using a 5 point Likert scale, where 1 = not at all and 5 = a lot. Questions asked about: affective empathy ('how do you feel looking at the picture?'); cognitive empathy ('how do you think the person feels?'); sympathy ('do you feel sorry for the person?'); and, distress ('is viewing this picture an upsetting experience?'). Photographs were picked as they represented one of the four basic emotions in the Basic Empathy Scale (Jolliffe & Farrington 2006): fear, anger, happiness and sadness. These emotions were provided as responses for the affective and cognitive empathy question. Two other responses, "excited" and "interested" were included in the affective empathy questions to measure the participant's engagement with the photograph.

The affective empathy question was included twice, once at the beginning and again at the end of the question booklet for each picture, to try and obtain a spontaneous measure of the participant's affective empathy. The first affective empathy question was answered and the participant was asked

not to return to that page. The participant's focus was then directed to a specific person in the picture and they were asked the cognitive empathy, sympathy and personal distress questions. The affective empathy question was then asked for a second time to investigate if this response changed. Participants were also asked what they thought was happening in the picture see Appendix B.3

From this pilot work, 8 photographs which elicited the greatest emotional response within the cognitive empathy section were chosen to be included in the main study. These included 2 photographs of happiness, sadness, fear and anger, see Appendix B.5. The pictures were randomised using the Superlab 4.5 programme (Cedrus Corporation, 2011). Sadness was represented by pictures 1 and picture 6; fear by pictures 2 and picture 3; happiness by pictures 4 and picture 5; and, anger by pictures 7 and picture 8. This was the main measure, and differences between the two group's responses were used to help answer Research Questions 2, 3, 4, 5, 6 and 7.

Balanced Emotional Empathy Scale (BEES)

This is a measure of emotional empathy. Mehrabian (2000) states that the trait of Emotional Empathy can be used to help distinguish persons who typically experience more of others' feelings from those who are generally less responsive to the emotional expressions and experiences of others. Respondents use a 9-point scale to report their degree of agreement or disagreement with each item. There are 30 items, 15 positively worded and 15 negatively worded. The coefficient alpha internal consistency for the Balanced Emotional Empathy Scale (BEES) is .87 (Mehrabian, 2000). Due to gender differences in the raw scores (women are expected to score higher than men (Mehrabian, 2000)), z scores were calculated, (using different norms for men and women), in order to directly compare male and female scores. Copyright restrictions do not permit a copy of this questionnaire to be included in the Portfolio. This measure was used to investigate the difference between the two groups' emotional empathy and the results were compared with the results from the affective empathy question from the empathy task. It was used to answer Research Questions 1, 2 and 7.

Basic Empathy Scale (BES)

The Basic Empathy Scale (BES) (Jolliffe & Farrington, 2006) was used as a measure of empathy that assesses both affective empathy and cognitive empathy. This scale is based on the definition of empathy by Cohen and Strayer (1996) as, “the understanding and sharing in another’s emotional state or context” (pg 523). Items for the BES are based on four of the five ‘basic emotions’ (fear, sadness, anger, happiness). The BES has 20 items; 11 measure affective empathy and 9 measure cognitive empathy. Eight of the items are scored negatively. Each item asks the participant to respond on a Likert scale from 1 representing ‘strongly disagree’ to 5 representing ‘strongly agree’. Due to copyright restrictions a copy of this questionnaire cannot be included in the portfolio. This measure was used to compare the two group’s cognitive empathy and the results will also be compared with the results from the cognitive empathy question from the empathy task. It was used to answer Research Questions 1, 3, 6 and 7.

Hospital Anxiety and Depression Scale

This is a self assessment questionnaire used for assessing anxiety and depression. It was developed for use in a hospital outpatient setting (Zigmond & Snaith, 1983) and has an internal consistency of Cronbach’s alpha 0.93 for A-scale and 0.90 for D-scale (Moorey, Greer, Watson, Gormen, Rowden et al., 1991). Retest data taken from within a healthy sample indicated significant correlations of 0.92 for the D-scale and 0.89 for the A-scale (Snaith & Zigmond unpublished data). Research within the TBI population found that, compared with Structured Clinical Interview for DSM-IV Diagnoses (Axis 1), the depression subscale of the HADS had a sensitivity of 62% and a specificity of 92% and the anxiety subscale had a sensitivity of 75% and a specificity of 69% (Whelan-Goodinson, Ponsford & Schönberger, 2009). A total score of 0 to 7 indicates that you do not have anxiety or depression. Borderline cases score between 8 and 10, and definite cases have a score of 11 and above. This measure was used to describe the two groups.

The Marlowe Crowne Scale

This scale measures social desirability and conceptualises social desirability as a need for approval. It is a self-administered scale with instructions printed on the form. Crowne and Marlowe (1960) report internal consistency using Kuder-Richardson's formula 20, as .88. This measure was used for descriptive purposes.

Hayling Test

This is a measure of executive functioning, and, more specifically, of response initiation and response suppression. It consists of two sets of 15 sentences each having the last word missing. In the first section the examiner reads each sentence aloud and the participant has to simply complete the sentences, yielding a simple measure of response initiation speed (Time 1). In the second section the subject is asked to complete the sentences with a word that does not make sense, giving measures of response suppression ability (errors) and thinking time (Time 2, (Burgess & Shallice, 1997). Test-retest reliability for 31 healthy volunteers were as follows: Hayling 1 time 0.62 ($p < 0.001$); Hayling 2 time: 0.78 ($p < 0.001$); Hayling errors: 0.52 ($p < 0.01$); Hayling overall score: 0.76 ($p < 0.001$) (Burgess & Shallice, 1997). This measure was used to describe the two groups.

Symbol Digit Modalities Test

This test was also used as a measure of executive functioning, specifically of processing speed. It involves the conversion of meaningless geometric designs into written and/or oral number responses and can be used for screening for cerebral dysfunction (Smith, 2010). Evidence for test-retest reliability of the SDMT written and oral form was provided in a study of normal adults. The test-retest correlation was found to be .80 for the written SDMT and .76 for the oral SDMT. The SDMT has been shown to be effective as a test of "general" brain impairment (Smith, 2010). This measure was for descriptive purposes.

The Awareness of Social Inference Test (TASIT)

(Part 1 – Emotion Evaluation Test)

This measure tests the ability of the viewer to recognise basic emotions shown by other people (McDonald, Flanagan & Rollins, 2002). Emotions measured are: Happiness, Sadness, Anger, Fear, Revulsion (Disgust), and Surprise. The TASIT was designed as a criterion referenced test, with speakers expected to perform near ceiling on all subtests. McDonald et al. (2002) demonstrated that on Part 1 the TBI subjects were generally poor at judging emotion but had specific difficulty in interpreting neutral and anxious expressions. This measure was for descriptive purposes.

Glasgow Outcome Scale Extended (used with TBI group only)

The Extended Glasgow Outcome Scale (GOS-E) (Wilson, Pettigrew & Teasdale, 1997) attempts to generalize and categorize disability outcome of patients in the community with traumatic brain injury. The GOS-E has 8 categories: Dead, Vegetative State, Lower Severe Disability, Upper Severe Disability, Lower Moderate Disability, Upper Moderate Disability, Lower Good Recovery, and Upper Good Recovery. Good inter-rater reliability and content validity have been demonstrated (Wilson et al. 1997). This measure was used to describe disability outcome in the TBI group.

Statistical analysis was undertaken using PASW Statistics 18. All data were tested for normality by visually inspected histograms and the Shapiro Wilk test of normality. For data that were not normally distributed, transformations were utilised. If a normal distribution was not obtained by transformation, or the properties of the measure did not allow the use of parametric tests, then the data were analysed using the non-parametric tests. Planned analysis of the data from the empathy task using mixed model ANOVA and ANCOVA was not used because the data violated the assumptions of parametric statistics; distributions were not normally distributed and there were unequal variances that could not be corrected by transformation. . Due to the properties of the data they were re-coded into categorical data where $<3 = 0$ and $\geq 4 = 1$, to allow statistical analysis. On the basis of the pilot, this study assumes that there is a 'correct' answer to the question of emotional valency and hence the

control group would correctly rate the 'pre-assigned' emotion and hence the rate of their correct answers would represent an expected frequency with which to compare that observed by the TBI group. Both groups' answers to the other empathy questions, personal distress and sympathy, were predicted to be associated with their cognitive empathy answer. Therefore the Fisher's Exact test was used to measure the goodness of fit of these expected results with the observed results. Fisher's Exact Test was chosen as Pearson's Chi-squared statistic assumes that the data has expected frequencies above 5 and the data in this study violated that assumption. As a number of comparisons were made using Fisher's Exact Test to investigate the effects of the different pictures for affective and cognitive empathy the Bonferroni correction was utilised, the significance level adjusted for multiple (8) comparisons is 0.00625. Correlations for the data collected by the empathy task were undertaken using Kendall's Tau, one sided, due to the properties of the data requiring a non parametric analysis and the small sample size and used the original responses from the ordinal scale. Correlations using the information gathered from the empathy questionnaires were undertaken using Pearson's r , one sided, as this data satisfied the assumptions of parametric analysis. The data was analysed for individual pictures as research suggests that a TBI sample respond in a similar way to healthy controls for positive emotions but differently to a healthy control group for negative emotions (deSousa et al. 2010).

Results

Participants

The groups did not differ significantly in age ($t(36)=.574$, $p>=0.570$) or years of education ($U=123.5$, $p=0.088$). The TBI group had a significantly lower predicted VIQ ($t(24.5)^2 = -5.218$, $p=0.000$). Sample sizes, means and standard deviations for these measures are provided in table 1. As expected the TBI group scored more poorly on the SDMT ($t(34) = -10.03$, $p=0.000$) and the Hayling test ($U =38.5$, $p=0.000$, $r =-0.68$). The TBI group had higher scores on the HADS-D³ ($t(21.40)^4 = 4.10$, $p=0.001$). The groups did not differ significantly on the HADS-A ($t(35)=0.937$, $p = 0.355$) and neither group met criteria for a moderate or severe depressive disorder (mean score > 11) or an anxiety disorder (mean score > 11). In the TBI group three individuals scored 11 or above on the HADS-A and the same three individuals scored 11 or above on the HADS-D, indicating for both sub-scales moderate-severe abnormality. In the control group one individual scored above 11 on the HADS-A and there were no scores above 11 for the HADS-D. There was a trend toward significance on the Marlowe Crowne Scale of Social Desirability ($t(36)=1.924$, $p=0.062$), with the TBI group scoring higher indicating more social desirable responses. Both groups reported being equally interested in the pictures ($t(36) = 0.65$, $p=0.950$), as measured by the Empathy Task, see Appendix B.3. The TBI group scored significantly lower than the control group on the emotion evaluation test, ($t(34) = -5.48$, $p=0.000$), (see table 2), indicating that the TBI group had difficulty identifying an emotion from a set choice of 7 during a video clip.

1. Does the TBI group have lower scores on the standardised measures of empathy, the Balanced Emotional Empathy Scale (BEES) and the Basic Empathy Scale (BES)?

The TBI group had lower total empathy scores on the BES total score ($t(36) = -3.29$, $p=0.002$) and the BES Cognitive subscale ($t(36)=-3.92$, $p=0.000$). The two groups did not differ on the BES Affective Sub-scale ($t(36) = -1.94$, $p=0.060$) or the BEES ($t(36) = 0.072$), though there was a trend towards significance on these two measures (see table 2).

² Levene's test for equality significant therefore equal variances not assumed.

³ This data underwent a log transformation as it was not normally distributed

⁴ Levene's test for equality significant therefore equal variances not assumed

Table 2 Independent t-Test Results for Empathy Measures, BES & BEES and Emotion Evaluation Test , TASIT

| Measure | TBI Mean (SD) | Control Mean (SD) | T | df | P | Effect Size d' ¹ |
|-----------------|------------------|----------------------|-------|--------------------|------------------|-----------------------------|
| BES total | 67.47 (7.88) | 75.37 (6.89) | -3.29 | 36 | 0.002 | -1.07 |
| BES cog | 31.95 (3.49) | 36.05 (2.95) | -3.92 | 36 | <0.001 | -1.27 |
| BES affect | 35.53 (6.46) | 39.32 (5.61) | -1.94 | 36 | 0.060 | -0.62 |
| BEES z-score | -0.48 (1.31) | 0.16 (0.78) | -2.37 | 36 | 0.072 | -0.59 |
| TASIT | 16.65 (4.23) | 22.68 (2.19) | -5.48 | 23.39 ² | <0.001 | -1.79 |

Lower scores indicate less empathy.

1. Cohen (1988) defines effect sizes of 0.2 as small, 0.5 as medium and 0.8 as large.
2. Levene's test for equality was significant, therefore equal variances not were assumed.

2. Are differences on the BEES reflected on the empathy task by the TBI group scoring lower on the affective empathy questions?

For affective empathy 1 the expected and observed frequencies were similar for all of the photographs (see Table 3).

Table 3 Results of Empathy Task - Affective empathy 1, Fisher's exact test, p = exact significance (two-sided)

| Picture | TBI group n=19 (scored 4 or 5) | Control group n=19 (scored 4 or 5) | P |
|---------------|--------------------------------------|--|-------|
| 1 – Sadness | 5 | 11 | 0.099 |
| 2 – Fear | 4 | 3 | 1.000 |
| 3 – Fear | 7 | 6 | 1.000 |
| 4 – Happiness | 14 | 12 | 0.728 |
| 5 – Happiness | 11 | 9 | 0.746 |
| 6 – Sadness | 12* | 10 | 0.508 |
| 7 – Anger | 3 | 3 | 1.000 |
| 8 – Anger | 4 | 6 | 0.714 |

*n=18

Analysis of affective empathy 2 indicates that expected and observed frequencies were similar (see Table 4).

Table 4 Results of Empathy Task - Affective empathy 2, Fisher's exact test, $p = \text{exact significance (two-sided)}$

| Picture | TBI group n=19 (scored 4 or 5) | Control group n=19 (scored 4 or 5) | P |
|---------------|--------------------------------------|--|-------|
| 1 – Sadness | 5 | 9 | 0.313 |
| 2 – Fear | 4 | 5 | 1.000 |
| 3 – Fear | 4 | 6 | 0.714 |
| 4 – Happiness | 14 | 13 | 1.000 |
| 5 – Happiness | 12 | 11 | 1.000 |
| 6 – Sadness | 11* | 7 | 0.194 |
| 7 – Anger | 2 | 6 | 0.232 |
| 8 – Anger | 6 | 6 | 1.000 |

*n=18

3. Are differences on the BES reflected on the empathy task by the TBI group scoring lower on the cognitive empathy questions?

For cognitive empathy expected and observed frequencies were similar for 6 out of 8 photographs, the exception was the sadness photographs which was scored lower by TBI group for picture 1, and a trend for lower scores was seen for picture 6 (see Table 5). Using the Bonferroni correction the significance level adjusted for multiple (8) comparisons is 0.00625.

Table 5 Results of Empathy Task - Cognitive empathy, Fisher's exact test, $p = \text{exact significance (two-sided)}$

| Picture | TBI group n=19 (scored 4 or 5) | Control group n=19 (scored 4 or 5) | P |
|---------------|--------------------------------------|--|-------|
| 1 – Sadness | 10 | 19 | 0.001 |
| 2 – Fear | 14 | 18 | 0.180 |
| 3 – Fear | 18 | 18 | 1.000 |
| 4 – Happiness | 19 | 19 | * |
| 5 – Happiness | 17 | 19 | 0.486 |
| 6 – Sadness | 12** | 19 | 0.08 |
| 7 – Anger | 13 | 17 | 0.232 |
| 8 – Anger | 4 | 6 | 0.714 |

*All 19 participants in both groups scored either a 4 or 5 therefore could not perform Fisher's Exact Test as did not have a 2x2 table.

**n=18

4. Are the TBI group less sympathetic as measured by the empathy task?

The groups did not differ significantly in their responses for sympathy, (see Table 6).

Table 5 Results of Empathy Task - Sympathy, Fisher's exact test, $p = \text{exact significance (two-sided)}$

| Picture | TBI group n=19 (scored 4 or 5) | Control group n=19 (scored 4 or 5) | P |
|---------------|--------------------------------------|--|-------|
| 1 – Sadness | 10 | 12 | 0.743 |
| 2 – Fear | 12* | 12 | 1.000 |
| 3 – Fear | 9* | 9 | 1.000 |
| 4 – Happiness | 15 | 13 | 0.714 |
| 5 – Happiness | 11 | 10 | 1.000 |
| 6 – Sadness | 11 | 10 | 1.000 |
| 7 – Anger | 3 | 2 | 1.000 |
| 8 – Anger | 3 | 6 | 0.447 |

*n=18

5. Are the TBI group less distressed as measured by the empathy task?

The prediction for Personal Distress from Eisenberg's model was that the TBI group would be more distressed and therefore would score higher. Overall there were no group differences. It should be noted that in order to keep the responses congruent with the emotion two questions were asked for the distress measure, "is looking at this picture a pleasant experience?" and "is looking at this picture an upsetting experience?". For the fear, sadness and anger pictures, upsetting was the focus of analysis and for the happiness pictures, pleasant was used.

Table 5 Results of Empathy Task – Personal Distress, Fisher's exact test, $p = \text{exact significance (two-sided)}$

| Picture | TBI group n=19 (scored 4 or 5) | Control group n=19 (scored 4 or 5) | P |
|---------------|--------------------------------------|--|-------|
| 1 – Sadness | 9 | 4 | 0.170 |
| 2 – Fear | 8 | 5 | 0.502 |
| 3 – Fear | 7 | 8 | 1.000 |
| 4 – Happiness | 14 | 16 | 0.693 |
| 5 – Happiness | 11 | 10 | 1.000 |
| 6 – Sadness | 11* | 10 | 0.743 |
| 7 – Anger | 10 | 6 | 0.325 |
| 8 – Anger | 9 | 7 | 0.743 |

*n=18

6. Do low scores in cognitive empathy result in lower scores of sympathy and higher scores for personal distress?

The two groups differed in their response to the sadness pictures for cognitive empathy and did not differ in their response to the sympathy or personal distress questions associated with sadness. For

picture 1 (sadness), cognitive empathy responses did not correlate with sympathy responses (TBI group, Kendall's $\tau=0.124$, $p=0.262$, Control group, Kendall's $\tau= -2.09$, $p=0.166$). The cognitive empathy score for the TBI group correlated with their distress score (Kendall's $\tau=0.374$, $p=0.026$) and not the control group ($\tau=-0.284$, $p=0.093$)

7. Are cognitive and affective empathy dissociable?

The groups differed significantly on the BES total score and cognitive subscale score and there was a trend towards significance for differences in the BEES and affective subscale of the BES. Further analysis revealed a trend towards significance for a positive correlation between the BES cognitive subscale and the BEES total score for the total sample (Pearson's $r = 0.250$, $p=0.065$) and no relationship for these measures in the TBI sample (Pearson's $r = 0.147$, $p=0.245$). The results of the empathy task indicated that the TBI group scored lower on the sadness pictures for cognitive empathy but did not differ on any emotions for any other forms of empathy (affective2, sympathy and personal distress). Correlation analysis of the cognitive and affective empathy scores for Picture 1, sadness, indicated that there was no relationship between cognitive and affective empathy as measured by the task for the TBI sample (Kendall's $\tau=0.327$, $p=0.093$) and the total sample (Kendall's $\tau=-0.48$, $p=0.741$).

Discussion

An impaired ability to empathise after TBI is reported in recent literature (Wood & Williams 2008, deSousa et al. 2010). While a number of studies concur with this finding, few attempt to describe their results in terms of a specific model of empathy and most measure empathy using self report scales. Therefore, the current study employed Eisenberg's model of empathy to design a task to measure empathy (affective/cognitive), sympathy and personal distress to investigate if this model of empathy accounted for the changes in empathy in individuals who had suffered a brain injury.

Main Findings

The TBI group were less empathic overall and specifically so for cognitive empathy with borderline trend for emotional empathy as measured by questionnaires. Results of the laboratory task suggest that the TBI group had difficulty identifying and rating other people's emotions (cognitive empathy), particularly for sadness but did not have any difficulty rating their own (affective empathy, sympathy) emotions. The TBI group also had difficulty in identifying the correct emotion of an individual in a video clip. This process would appear to require the ability of cognitive empathy. This pattern of findings from the laboratory task provides some evidence for the dissociation between cognitive and affective empathy as the TBI groups' ability to answer questions regarding their own emotions was not impaired even when they did not correctly identify the emotion of the person in the picture. In addition distress appears to be associated with cognitive empathy, with an increase in cognitive empathy resulting in an increase in personal distress, but there was no association between cognitive empathy and sympathy.

The relationship between the different types of empathy proposed by Eisenberg (empathy, sympathy and personal distress) appears to be complex. Results suggest that affective empathy, sympathy and personal distress are not affected by TBI, but cognitive empathy is reduced. In addition the relationship between cognitive empathy and sympathy appears to be different to the relationship between cognitive empathy and personal distress, the groups do not differ in cognitive empathy for all emotions, only the sadness pictures; however, the results from the BES do support a difference between the two groups in cognitive empathy. Overall the results from the empathy task provides

some support that cognitive and affective empathy may be dissociable, in that a TBI reduces cognitive empathy but outcome is more variable for affective empathy. In addition, the correlation results from the BES (cognitive subscale) and the BEES total score (affective empathy) are consistent with the hypothesis that cognitive and affective empathy are dissociable in a TBI sample.

Given the results, the cognitive measure of the task seems to measure a similar concept to the BES, however, the relationship between affective empathy and the BEES is less clear. A major difference between the questionnaires and the laboratory task is that the questionnaires require a subjective response which rates their perception whereas the laboratory task is a more objective rating of their own and others emotions. These two different methods of administration may require different cognitive processes when answering the questions.

The results of this study should be interpreted with caution as a post hoc power calculation indicated that this study is underpowered for the BEES. Based on the BEES data a sample size of 74, 37 participants in each group for this study to reach power of 0.8, which indicates that the initial power calculation sample size of 49 was an underestimate. Therefore the non-significant result on the BEES could be due to the study being underpowered. Previous research by Wood and Williams (2008) found a significant difference between a TBI group and a matched control group on the BEES using an $n = 173$. Also given the properties of the data and the limitations of analysis it is difficult to determine if the TBI group responded to the sympathy questions for a cognitive empathy emotion other than the one they were expected to give. For example, for the fear picture the TBI participants may have scored fear low but sadness high and answered the sympathy question based on a high sadness score. Future studies with a larger n may utilise multivariate statistics to further understand these relationships.

Previous research

Eisenberg's (2009) Empathy Related Responding Model proposed that personal distress involves an empathic response that is experienced as aversive, with the individual focusing on their distress. It states that sympathy involves emotion induced by the situation that is sufficiently modulated by the individual so it is not distressing for them and they can respond appropriately to the other person's emotion. Eisenberg postulates that these responses can frequently stem from empathy but can also derive solely (or partly) from perspective taking. Eisenberg (2009) states that factors likely to contribute to individual differences in empathy related responding in a normal population include innate differences in how an individual responds to vicarious negative emotion and differences in self regulation. Individuals who are prone to negative emotions are likely to experience personal distress when presented with stimuli of negative emotion. The current study indicates that the TBI group experience similar personal distress and sympathy as the controls but have difficulty identifying the correct emotion that the person in the picture is feeling. The lack of association between sympathy and cognitive empathy suggest that sympathy is not mediated by cognitive empathy. If sympathy is mediated by an empathic response then the results of this study indicate that it is more likely to be affective empathy. Thus the relationship between affective empathy, cognitive empathy, sympathy and personal distress appear to be complex.

DeSousa et al. (2010) used a similar design to this one but measured facial muscle responses, skin conductance and valence and arousal measures. The TBI group were poorer on all three self report measures of empathy, which is consistent with other literature suggesting that TBI results in difficulties with the ability to empathise both emotionally and cognitively. They also found that the TBI group demonstrated poorer facial mimicking to pictures of emotional expressions. It is possible that mimicking facial expressions may be required to help identify the emotion of the other person as the TBI group have difficulty with both of these processes. This study is also consistent with the hypothesis that subjective questionnaire measures and objective measures of emotion may be tapping different processes.

In contrast to previous research investigating alexithymia, (reduction in the tendency to think about emotions, and to engage in fantasising), as well as a deficit in the ability to consciously experience, describe and identify emotions (Henry, Phillips, Crawford, Theodorou & Summers, 2006) this study did not find a difference between groups on their ability to identify their own emotions. Henry et al. (2006) found a difference between groups on the subscale “Difficulty Identifying Emotions” (DIE) from the Toronto Alexithymia Scale (Taylor, Bagby & Parker, 2003) which include statements such as, “I sometimes find it difficult to explain sensations in my body”. Henry et al., (2006) found that a TBI group had difficulty in identifying emotions and that these were negatively correlated with performance on verbal fluency. They postulated the following mechanisms could be underlying the relationship: the same processes controlling executive function also controlling affect regulation or reliance of verbal intelligence for both. The current study differed to Henry et al. (2006) by using a more objective measure of the participant’s ability to identify their own emotions by asking them to rate photographs as opposed to asking them their subjective opinion on their ability to identify emotions. Also, the current study found that the two groups differed on measures of executive function with the TBI group being impaired, however, this did not result in the TBI group being impaired in identifying their own emotions. Therefore, this study would support the view that the groups in Henry et al. (2006) study differed on the Difficulty Identifying Emotions subscale and verbal fluency tests due to differences in verbal intelligence.

Strengths/Limitations

A key strength of the current study is that the control group were matched for age, gender and years of education. This study also considered the view of a significant other/someone who knew the person well where possible. A number of ancillary measures were administered in order to describe the two groups with respect anxiety, depression, executive function abilities and recovery (for the TBI group).

Limitations of the study include a modest sample size. Also, the method of administration for some of the questionnaires were different between the two groups due to the TBI group having difficulty understanding the questions and forgetting what the scale 1-5 represented on the empathy task. A

number of participants in both groups commented that looking at a photograph did not elicit the same level of emotion as being involved in the situation or viewing a family member in the situation. In addition, the sample in this study were self – selecting volunteers willing to take part in a 2.5 hour study with no monetary incentive. A number of participants approached for the TBI group refused to take part and also a number of controls were unwilling to take part after learning there was no monetary incentive, this could possibly have resulted in more empathic participants taking part. In contrast, the TBI group in the Wood and Williams (2008) study were administered cognitive tests as part of a routine neuropsychological battery and then administered the BEES, which may have resulted in more people with empathy difficulties taking part. In addition this study did not obtain information about the brain area affected by the TBI.

Future research

Future research should replicate this study using a larger sample size to further investigate the relationships between affective empathy, cognitive empathy, sympathy and personal distress. In addition research involving the task and physiological measures may prove helpful in understanding the different processes that are involved in the different types of empathy as Eisenberg (2006) reported that personal distress is linked with higher levels of physiological arousal than sympathy and the current study has demonstrated an association between cognitive empathy and distress but not sympathy. The relationship between subjective measures of empathy and objective measures would be interesting to explore further, as due to the nature of questionnaires being self-report they may require a greater input from cognitive empathy than a task which asks directly how they are feeling in a specific situation. The questions proposed by this study could perhaps be further explored by the using a similar task but with more realistic materials, such as video clips or role play, in order to ensure the task is clinically relevant.

Conclusions

Eisenberg's (2009) model of Empathy Related Responding provides a useful framework in which to investigate empathy in a TBI sample. This study provides further support for impaired empathy in a TBI sample. However it raises questions about whether or not questionnaires and a laboratory task

are measuring the same concepts, particularly with affective empathy; as impairment as indicated by the questionnaire did not prevent the TBI group for identifying their emotion as congruent with the person in the picture. This was not dependent on the cognitive empathy task and the non significant correlation results for the TBI sample from the empathy task and the empathy questionnaires provide some support for the hypothesis that affective and cognitive empathy are dissociable, however, this should be interpreted with caution given the sample size.

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Chapter 3: Advanced Clinical Practice I

Reflective Account

Intervention or cure? A reflective account of the dilemma of a Clinical Psychology Trainee in a medical setting

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Submitted in partial fulfilment of the requirements for the degree of Doctorate in Clinical

Psychology (D. Clin Psy)

Abstract

In this reflective account I have chosen to reflect on one particular session during my placement in a paediatric psychology service within a children's hospital. I have drawn upon Boud, Keogh and Walker's model (1985) and Gibbs' (1988) model to help provide a framework to my reflection. This reflection was the result of an overwhelming feeling that resonated with me. During this account I consider one session and my feelings after that session in detail. Specifically, this is an account about reflecting and the importance it has for my own professional development and the role of a clinical psychologist. I consider the influence of different systems on the choices and decisions I made including supervision and the context in which I was working. I then reflect on the process of writing the account and the impact that it has had on how I think about the case and my clinical work.

Chapter 4: Advanced Clinical Practice II

Reflective Account

*Year 3 competences make an impact: Consolidating the cognitive with the affective – a
reflective account*

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Submitted in partial fulfilment of the requirements for the degree of Doctorate in Clinical

Psychology (D. Clin Psy)

Abstract

In this reflective account I have chosen to reflect on how the experience of my final placement, based in a Cardiac Rehabilitation Team, has prepared me for life post qualification. I have drawn on Boud, Keogh and Walker's Model (1985), as this model seemed to fit best with the process I engaged in when reflecting. During this reflection I considered the process of choosing a suitable focus for the account, the difficulty I had with this and why I think it was difficult. The main focus of this account was the impact that waiting list times had on how I felt and how this affected my clinical practice. By using Boud et al's model (1985) I was able to reflect on my personal reading, teaching and discussions with peers and University teachers, this allowed me to shape my opinion of waiting lists. I then considered the other roles of a Clinical Psychologist and how these contribute to managing waiting lists. Finally, I thought about the wider professional issues including service organisation and management and how this reflection has allowed me to grow personally and professionally.

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Adlington, R. L., Laws, K. R., & Gale, T. M. (2009). The Hatfield Image Test (HIT): A new picture test and norms for experimental and clinical use. *Journal of Clinical and Experimental Neuropsychology*, *31*, 731-753. doi:10.1080/13803390802488103

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Figures should only be used when essential and the same data should not be presented both as a figure and in a table. Where possible, related diagrams should be grouped together to form a single figure. Each figure should be on a separate page, not integrated with the text. The figure captions should be typed in a separate section, headed, e.g., "Figure 2", in Arabic numerals. Instructions for placing the figure should be given in parentheses in the text, e.g., "(Figure 2 about here)".

For more detailed guidelines see [Preparation of Figure Artwork](#) .

Statistics. Results of statistical tests should be given in the following form:

"... results showed an effect of group, $F(2, 21) = 13.74$, $MSE = 451.98$, $p < .001$, but there was no effect of repeated trials, $F(5, 105) = 1.44$, $MSE = 17.70$, and no interaction, $F(10, 105) = 1.34$, $MSE = 17.70$."

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Appendix A.2 – Methodological Quality Rating Checklist

Methodological criteria.

| Introduction | | Anson & Ponsford 2006(a) | Anson & Ponsford 2006(b) | Backhaus et al. 2010 | Bedard et al. 2003 | Bradbury et al. 2008 | Hofer et al. 2010 | Lincoln et al. 2003 | McMillan et al. 2002 | Topolovec-Vranic et al. 2010 | Watkins et al. 2007 |
|--------------|--|--------------------------|--------------------------|----------------------|--------------------|----------------------|-------------------|---------------------|----------------------|------------------------------|---------------------|
| Max. score | | | | | | | | | | | |
| 1 | 1. Were key concepts and theory and reviews of existing literature introduced? | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 2. Were the aims outlined? | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 3. Were research questions and hypotheses apparent? | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Methods | | | | | | | | | | | |
| 1 | 4. Was the design described? | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| 2 | 5. Were the eligibility of participant's specified, inclusion (1) and exclusion criteria(1)? | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 1.5 | 6. Demographic information given? (age (0.5), gender (0.5), years of ed /IQ(0.5)? | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1 | 1.5 | 1.5 | 1 |
| 1 | 7. Setting and location where data was collected/sample recruited | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 8. Method used to recruit | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 8. Description of brain injury sample | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | | | | | | | | | |
| 1 | 10. Description of intervention / reference to manual | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 11. Allocation to intervention groups random? (1)Randomisation explained? (1) | 1 | 1 | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 2 |
| 1 | 12. Sample size informed by power calculation/appropriate sample size used | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| 2 | 13. Appropriate control group? Matched? | 0 | 0 | 2 | 0 | 2 | 0 | 1 | 2 | 0 | 2 |
| 1 | 14. Primary measures stated | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 16. Were the validity and reliability of the measures used described (1), | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 2 | 0 |

| | | | | | | | | | | | |
|------------|---|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|--------------------|----------------------|-----------------------|--------------------|
| | and/or appropriate measures are referenced for the brain injury population (1)? | | | | | | | | | | |
| 1 | 17. Therapists trained? | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| Results | | | | | | | | | | | |
| 1 | 18. Analysis focus on aims/ hypotheses | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 19. Stats described? Appropriate stats? Significant result and no effect size reported (-1) | 0 | 0 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 2 |
| 1 | 20. For each group, number of participants included in each analysis and whether the analysis was by original assigned groups | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 21. For each outcome, results for each group reported | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Discussion | | | | | | | | | | | |
| 1 | 22. Were the data interpreted in reference to the aims/hypotheses | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 23. Are interpretations of the data accurate? | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 24. Are attempts made to interpret results in reference to theory and previous findings? | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 25. Are the strengths and limitations of the study outlined? | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Total = 29.5 | 21.5 72.8% | 20.5 69.4% | 26.5 89.8% | 23.5 79.6% | 25.5 86.4% | 21.5 72.8 % | 26 88.1% | 25.5 86.4% | 21.5 72.9 % | 27 91.5% |

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Liz.Jamieson@ggc.scot.nhs.uk

Dear Miss Paterson

Study Title: Empathic Responding after Traumatic Brain Injury
REC reference number: 10/51001/65

The Research Ethics Committee reviewed the above application at the meeting held on 17 November 2010. Thank you for attending to discuss the study.

Ethical opinion

The members of the Committee present gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, subject to the conditions specified below.

The Committee had a number of questions which were answered satisfactorily by you as follows:

- 1) The Committee commented that some of the pictures the participants would be asked to look at may cause distress. You assured the Committee that should a participant become distressed when going through the pictures then they would be offered support or asked if they wished to terminate the interview.
- 2) The Committee commented that due to the nature of their illness participants could become aggressive during the interview thus compromising your safety. Again you assured the Committee that colleagues would be on hand to help should such a situation arise. You also agreed to consider having a panic button.
- 3) The Committee asked how the participants, due to their illness, would be able to know whether any of the exclusion criteria as detailed in the Participant Information Sheet would apply to them. You advised that participants would have someone with them who would know them and be able to assist with reading and understanding the PIS.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

For NHS research sites only, management permission for research ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

Sponsors are not required to notify the Committee of approvals from host organisations.

It is responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The documents reviewed and approved at the meeting were:

| <i>Document</i> | <i>Version</i> | <i>Date</i> |
|---|----------------|-----------------|
| Questionnaire: Brain Injury Personality Scale - Interview with client | - | 31 January 2008 |
| Questionnaire: Perceived Stress Scale | - | |
| Participant Information Sheet Control | 2-C | 21 October 2010 |
| Letter from Sponsor | - | 21 October 2010 |
| Participant Consent Form: Patient | 2-P | 21 October 2010 |
| Questionnaire: Brain Injury Personality Scale - Interview with significant other | - | 31 January 2008 |
| Questionnaire: Brain Injury Personality Scale - Interview with significant other (Desc of individual items) | - | 31 January 2008 |
| Questionnaire: Glasgow Outcome Scale Questionnaire | - | |
| Questionnaire: HADS | - | |
| Questionnaire: Marlowe-Crowne Scale | - | |
| Poster | 1 | 15 October 2010 |
| Professor T McMillan's CV | - | 31 August 2010 |
| Participant Information Sheet Patient | 2-P | 21 October 2010 |
| Participant Consent Form: Control | 2-C | 21 October 2010 |
| Investigator CV | - | 22 October 2010 |
| Protocol | 2 | 21 October 2010 |
| REC application | - | 22 October 2010 |

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document "After ethical review - guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email reference!!roup@nres.npsa.nhs.uk.

With the Committee's best wishes for the success of this project

Yours sincerely

A stylized handwritten signature in black ink, appearing to read 't.S~'.

Liz Jamieson Committee
Co-ordinator
On behalf of Or Gregory Ofili, Chair

Enclosures: List of names and professions of members who were present at the meeting and those who submitted written comments
"After ethical review - guidance for researchers"

Copy to: Professor Tom McMillan, University of Glasgow R&D

Coordinator/Administrator: Or Erica Packard/Ms Elaine O'Connell
Telephone Number: 01412116208
E-Mail: erica.packard@ggc.scot.nhs.uk
Website: www.nhsggc.org.uk/r&d

12 January 2011

Miss Nicole Paterson
Trainee Clinical Psychologist
Section of Psychological Medicine
Gartnavel Royal Hospital
1055 Great Western Road
Glasgow
G120XH

NHS GG&C Board Review

Dear Miss Paterson,

Study Title: Empathic Responding after Traumatic Brain Injury Miss
Principal Investigator: Nicole Paterson
Sponsor: NHS Greater Glasgow and Clyde
R&D reference: GN10CP306
REC reference: 10/S1001/65
Protocol no: Version 2; 21/10/10
(including version and date)

I am pleased to confirm that Greater Glasgow & Clyde Health Board can confirm receipt of the above study and have completed a governance check.

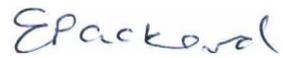
For all studies the following information is required during their lifespan.

- a. Recruitment Numbers on a quarterly basis
- b. Any change of staff named on the original SSI form
- c. Any amendments - Substantial or Non Substantial
- d. Notification of Trial/study end including final recruitment figures
- e. Final Report & Copies of Publications/Abstracts

Please add this approval to your study file as this letter may be subject to audit and monitoring. Your personal information will be held on a secure national web-based NHS database.

I wish you every success with this research study

Yours sincerely,



Or Erica Packard.
Research Co-ordinator

Miss Nicole Paterson
NHS Greater Glasgow & Clyde Section
of Psychological Medicine Gartnavel
Royal Hospital
1055 Great Western Road
Glasgow
G120XH

tel: (01563) 825856
Fax: (01563)825806

Date: 11 January 2011
Your Ref:
Our Ref: CAW/KLB/NM R&D 2010AA082

Enquiries to: Karen Bell
Extension: 25850
Direct Line: 01563 825850
Email: Karen.bell@aaaht.scot.nhs.uk

Dear Miss Paterson

Empathic Responding after Traumatic Brain Injury

I confirm that NHS Ayrshire and Arran have reviewed the undernoted documents and grant R&D Management approval for the above study.

ADDroved documents:

| Document | Version | Date |
|-----------------------------|---------------|-----------------|
| R&D Form | Version 3.0 | 19/11/10 siQned |
| SSI Form | Version 3.0 | 30/11/10 signed |
| Questionnaire - BES | No version | No date |
| Questionnaire - PSS | No version | No date |
| Questionnaire - MCS | No version | No date |
| Questionnaire - HADS | No version | No date |
| Questionnaire - GOS | No version | No date |
| Poster | Version 1.0 | 15/10/10 |
| Information Sheet - TBI | Version 2.0 P | 21/10/10 |
| Information Sheet - Control | Version 2.0 C | 21/10/10 |
| Consent Form - TBI | Version 2.0 P | 21/10/10 |
| Consent Form - Control | Version 2.0 C | 21/10/10 |

The terms of approval state that the investigator authorised to undertake this study is: -

Miss Nicole Paterson, NHS Greater Glasgow and Clyde

We await the requested disclosure check before issuing you with a Letter of Access to conduct the study within NHS Ayrshire and Arran.

With no additional investigators.

The sponsors for this study are NHS Greater Glasgow and Clyde.

This approval letter is valid until 11 March 2012.

PLEASE NOTE: During our local review process it was highlighted that subjects may be involved in more than one research project within a short timescale, as similar studies have recently been given R&D approval. We therefore request that the same subjects should not be approached for more than one of these proposals.

WoSRES

West of Scotland Research Ethics Service

NHS

Greater
Glasgow and
Clyde

West of Scotland REC 5
Ground Floor - The Tennent Institute
Western Infirmary
38 Church Street
Glasgow G11 6NT
www.nhsqgc.org.uk

Miss Nicole Paterson
Trainee Clinical Psychologist
Section of Psychological Medicine
Gartnavel Royal Hospital
1055 Great Western Road
Glasgow G12 0XH

Date Your 04 May. 11
Ref Our
Ref Direct
line Fax 0141 211 2123
E-mail 01412111847
Liz.Jamieson@ggc.scot.nhs.uk

Dear Miss Paterson

Study title: Empathic Responding after Traumatic Brain Injury
REC reference: 10/51001/65
Amendment number: AM01
Amendment date: 27 April 2011

The above amendment was reviewed at the meeting of the Sub-Committee held in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

| Document | Version | Date |
|--|---------|---------------|
| Participant Consent Form | 3 | 26 April 2011 |
| Participant Information Sheet | 3 | 26 April 2011 |
| Protocol | 3 | 26 April 2011 |
| Notice of Substantial Amendment (non-CTIMPs) | AM01 | 27 April 2011 |

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

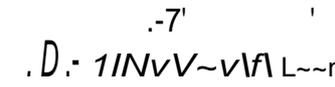
R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

Yours sincerely


Committee Co-ordinator
On behalf of Or Gregory Ofili, Chair

Copy to: Professor Tom McMillan, University of Glasgow R&D - NHS Greater Glasgow & Clyde

Appendix B.2 Information Sheets and Consent Forms



University
of Glasgow



People's feelings when viewing pictures of human situations Information Sheet

You are being invited to take part in a research study. Before you decide whether or not you wish to take part in this study, it is important for you to understand why the research is being done and what it will involve. Please take time to read this information carefully and discuss it with others if you wish. Please ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. You do not have to make an immediate decision.

Who is conducting the research?

This study is being carried out by Nicole Paterson and is being supervised by Dr Marc Obonsawin from the University of Strathclyde and Professor Tom McMillan from the University of Glasgow.

What is the purpose of the study?

The purpose of this study is to examine whether Traumatic Brain Injury influences how people feel when viewing pictures of human situations. This study will also be submitted as part of the main researcher's (Nicole Paterson) portfolio for examination by the University of Glasgow as part of the Doctorate in Clinical Psychology award.

Why have I been invited?

You have been invited to take part in this study as you have experienced a Traumatic Brain Injury more than 6 months ago and experienced post traumatic amnesia of one hour or more.

We are inviting participants between the ages of 18 and 65. You cannot take part in this study if any of the following criteria apply to you:

- i) you have neuropsychological disability that impairs the ability to consent,
- ii) you have a current diagnosis of a deteriorating condition,
- iii) you are currently undergoing psychiatric difficulties,
- iv) you have a learning disability,
- v) you are currently being treated for an alcohol and/or drugs problem,
- vi) you have vision or hearing impairment

Do I have to take part?

It is up to you to decide. We will describe the study and go through this information sheet, which we will then give to you. You will be asked to sign a consent form to show you have agreed to take part. You are free to withdraw at any time, without giving reason. This would not affect the standard of care you receive or your future treatment.

What does taking part involve?

Taking part involves attending for one session for up to 2 hours to complete a computerised task and a number of questionnaires. The computerised task involves looking at a number of pictures of people in situations and then answering questions about how these pictures make you feel. Taking part also requires that someone who knows you well answer questionnaires on your behalf, for example, a family member or a friend. Testing will take place at a centre that you are familiar with and can access.

What happens to the information?

Your identity and personal information will be completely confidential and known only to the researcher. The information obtained will remain confidential and stored within a locked filing cabinet. The data are held in accordance with the Data Protection Act, which means that we keep it safely and cannot reveal it to other people, without your permission.

What are the possible benefits of taking part?

It is hoped that by taking part in this research, you will be providing valuable information regarding the development and validation of a new task that can be used clinically to investigate the nature of empathic responding in people who have experienced a Traumatic Brain Injury.

Who has reviewed the study?

This study has been reviewed by the West of Scotland Research Ethics Committee.

If you have any further questions?

We will give you a copy of the information sheet and signed consent form to keep. If you would like more information about the study and wish to speak to someone **not** closely linked to the study, please contact **Dr Sue Turnbull, Research Tutor, University of Glasgow, Section of Psychological Medicine, email: s.turnbull@clinmed.gla.ac.uk, tel no: 0141 211 3927**

If you have a complaint about any aspect of the study?

If you are unhappy about any aspect of the study and wish to make a complaint, please contact the researcher in the first instance but the normal NHS complaint mechanisms is also available to you.

Researcher and Chief Investigator Contact Details:

Nicole Paterson
Trainee Clinical Psychologist
University of Glasgow
Section of Psychological Medicine
1055 Great Western Road
Glasgow, G12 0XH
Email: n.paterson.2@research.gla.ac.uk
Tel No: 07816158806

Other Investigators:

Dr Marc Obonsawin
School of Psychological Sciences and Health
University of Strathclyde
Email: m.c.obonsawin@strath.ac.uk
Tel: 0141 548 2573

Professor Tom McMillan
University of Glasgow
Section of Psychological Medicine
1055 Great Western Road
Glasgow, G12 0XH
Email: Thomas.McMillan@glasgow.ac.uk
Tel: 0141 211 3938

Thank you for taking the time to read this information sheet.



People's feelings when viewing pictures of human situations
Consent Form

Name of researcher: Nicole Paterson

Please initial the BOX

- I confirm that I have read and understand the information sheet dated 21/10/2010 (version 2) for the above study
I confirm that the researcher has answered any queries to my satisfaction.
I confirm that I give my permission for someone who knows me well to answer questionnaires on my behalf.
I understand that my participation is voluntary and that I am free to withdraw from the project at any time, without having to give a reason and without any consequences.
I understand that I can withdraw my data from the study at any time.
I understand that any information recorded in the investigation will remain confidential and no information that identifies me will be made publicly available.
I consent to being a participant in the project

Name of Participant Date Signature

Name of Witness Date Signature

1 copy to the patient, 1 copy to the researcher, 1 Original for the patients' notes

People's feelings when viewing pictures of human situations Information Sheet

You are being invited to take part in a research study. Before you decide whether or not you wish to take part in this study, it is important for you to understand why the research is being done and what it will involve. Please take time to read this information carefully and discuss it with others if you wish. Please ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. You do not have to make an immediate decision.

Who is conducting the research?

This study is being carried out by Nicole Paterson and is being supervised by Dr Marc Obonsawin from the University of Strathclyde and Professor Tom McMillan from the University of Glasgow.

What is the purpose of the study?

The purpose of this study is to examine whether Traumatic Brain Injury influences how people feel when viewing pictures of human situations. This study will also be submitted as part of the main researcher's (Nicole Paterson) portfolio for examination by the University of Glasgow as part of the Doctorate in Clinical Psychology award.

Why have I been invited?

You have been invited to take part in this study as you have experienced a Traumatic Brain Injury more than 6 months ago and experienced post traumatic amnesia of one hour or more.

We are inviting participants between the ages of 18 and 65. You cannot take part in this study if any of the following criteria apply to you:

- i) you have neuropsychological disability that impairs the ability to consent,
- ii) you have a current diagnosis of a deteriorating condition,
- iii) you are currently undergoing psychiatric difficulties,
- iv) you have a learning disability,
- v) you are currently being treated for an alcohol and/or drugs problem,
- vi) you have vision or hearing impairment

Do I have to take part?

It is up to you to decide. We will describe the study and go through this information sheet, which we will then give to you. You will be asked to sign a consent form to show you have agreed to take part. You are free to withdraw at any time, without giving reason. This would not affect the standard of care you receive or your future treatment.

What does taking part involve?

Taking part involves attending for one session for up to 2 hours to complete a computerised task and a number of questionnaires. The computerised task involves looking at a number of pictures of people in situations and then answering questions about how these pictures make you feel. Taking part also requires that someone who knows you well answer questionnaires on your behalf, for example, a family member or a friend. Testing will take place at a centre that you are familiar with and can access.

What happens to the information?

Your identity and personal information will be completely confidential and known only to the researcher. The information obtained will remain confidential and stored within a locked filing cabinet. The data are held in accordance with the Data Protection Act, which means that we keep it safely and cannot reveal it to other people, without your permission. If you choose to take part in another

research study, conducted by Mari O'Neill, then some of the information you have provided during this research may be shared with Mari if you provide consent. This will prevent you having to undertake the same tasks twice.

What are the possible benefits of taking part?

It is hoped that by taking part in this research, you will be providing valuable information regarding the development and validation of a new task that can be used clinically to investigate the nature of empathic responding in people who have experienced a Traumatic Brain Injury.

Who has reviewed the study?

This study has been reviewed by the West of Scotland Research Ethics Committee.

If you have any further questions?

We will give you a copy of the information sheet and signed consent form to keep. If you would like more information about the study and wish to speak to someone **not** closely linked to the study, please contact **Dr Sue Turnbull, Research Tutor, University of Glasgow, Section of Psychological Medicine, email: s.turnbull@clinmed.gla.ac.uk, tel no: 0141 211 3927**

If you have a complaint about any aspect of the study?

If you are unhappy about any aspect of the study and wish to make a complaint, please contact the researcher in the first instance but the normal NHS complaint mechanisms is also available to you.

Researcher and Chief Investigator Contact Details:

Nicole Paterson
Trainee Clinical Psychologist
University of Glasgow
Section of Psychological Medicine
1055 Great Western Road
Glasgow, G12 0XH
Email: n.paterson.2@research.gla.ac.uk
Tel No: 07816158806

Other Investigators:

Dr Marc Obonsawin
School of Psychological Sciences and Health
University of Strathclyde
Email: m.c.obonsawin@strath.ac.uk
Tel: 0141 548 2573

Professor Tom McMillan
University of Glasgow
Section of Psychological Medicine
1055 Great Western Road
Glasgow, G12 0XH
Email: Thomas.McMillan@glasgow.ac.uk
Tel: 0141 211 3938

Thank you for taking the time to read this information sheet.



People's feelings when viewing pictures of human situations

Consent Form

Name of researcher: Nicole Paterson

Please initial the BOX

- I confirm that I have read and understand the information sheet dated 26/04/2011 (version 3) for the above study
- I confirm that the researcher has answered any queries to my satisfaction.
- I confirm that I give my permission for someone who knows me well to answer questionnaires on my behalf.
- I understand that my participation is voluntary and that I am free to withdraw from the project at any time, without having to give a reason and without any consequences.
- I understand that I can withdraw my data from the study at any time.
- I understand that any information recorded in the investigation will remain confidential and no information that identifies me will be made publicly available.
- I consent to being a participant in the project
- ***If I take part in Mari O'Neill's research I consent to my information from this study being shared with her.***

| | | |
|------------------------------|---------------|--------------------|
| ----- Name of Participant | ----- Date | ----- Signature |
| ----- Name of Witness | ----- Date | ----- Signature |

1 copy to the patient, 1 copy to the researcher, 1 Original for the patients' notes

People's feelings when viewing pictures of human situations Information Sheet

You are being invited to take part in a research study. Before you decide whether or not you wish to take part in this study, it is important for you to understand why the research is being done and what it will involve. Please take time to read this information carefully and discuss it with others if you wish. Please ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. You do not have to make an immediate decision.

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What is the purpose of the study?

The purpose of this study is to examine whether Traumatic Brain Injury influences how people feel when viewing pictures of human situations. This study will also be submitted as part of the main researcher's (Nicole Paterson) portfolio for examination by the University of Glasgow as part of the Doctorate in Clinical Psychology award.

Why have I been invited?

You have been invited to take part in this study as you have never experienced a Traumatic Brain Injury. We are inviting participants between the ages of 18 and 65. You cannot take part in this study if any of the following criteria apply to you:

- i) you have neuropsychological disability that impairs the ability to consent,
- ii) you have a current diagnosis of a deteriorating condition,
- iii) you are currently undergoing psychiatric difficulties,
- iv) you have a learning disability,
- v) you are currently being treated for an alcohol and/or drugs problem,
- vi) you have vision or hearing impairment

Do I have to take part?

It is up to you to decide. We will describe the study and go through this information sheet, which we will then give to you. You will be asked to sign a consent form to show you have agreed to take part. You are free to withdraw at any time, without giving reason. This would not affect the standard of care you receive or your future treatment.

What does taking part involve?

Taking part involves attending for one session for up to 2 hours to complete a computerised task and a number of questionnaires. The computerised task involves looking at a number of pictures of people in situations and then answering questions about how these pictures make you feel. Taking part also requires that someone who knows you well answer questionnaires on your behalf, for example, a family member or a friend. Testing will take place at a centre that you are familiar with and can access.

What happens to the information?

Your identity and personal information will be completely confidential and known only to the researcher. The information obtained will remain confidential and stored within a locked filing cabinet. The data are held in accordance with the Data Protection Act, which means that we keep it safely and cannot reveal it to other people, without your permission.

What are the possible benefits of taking part?

It is hoped that by taking part in this research, you will be providing valuable information regarding the development and validation of a new task that can be used clinically to investigate the nature of empathic responding in people who have experienced a Traumatic Brain Injury.

Who has reviewed the study?

This study has been reviewed by the West of Scotland Research Ethics Committee.

If you have any further questions?

We will give you a copy of the information sheet and signed consent form to keep. If you would like more information about the study and wish to speak to someone **not** closely linked to the study, please contact **Dr Sue Turnbull, Research Tutor, University of Glasgow, Section of Psychological Medicine, email: s.turnbull@clinmed.gla.ac.uk, tel no: 0141 211 3927**

If you have a complaint about any aspect of the study?

If you are unhappy about any aspect of the study and wish to make a complaint, please contact the researcher in the first instance but the normal NHS complaint mechanisms is also available to you.

Researcher and Chief Investigator Contact Details:

Nicole Paterson
Trainee Clinical Psychologist
University of Glasgow
Section of Psychological Medicine
1055 Great Western Road
Glasgow, G12 0XH
Email: n.paterson.2@research.gla.ac.uk
Tel No:

Other Investigators:

Dr Marc Obonsawin
School of Psychological Sciences and Health
University of Strathclyde
Email: m.c.obonsawin@strath.ac.uk
Tel: 0141 548 2573

Professor Tom McMillan
University of Glasgow
Section of Psychological Medicine
1055 Great Western Road
Glasgow, G12 0XH
Email: Thomas.McMillan@glasgow.ac.uk
Tel: 0141 211 3938

Thank you for taking the time to read this information sheet.

Appendix B.3 - Empathy Task - Questions

first question for all pictures

Sample of questions to accompany “empathic” pictures

Instructions: Please look at the picture on the computer screen and then answer the following question. (where 1 = not at all and 5 = a lot)

Affective Empathy

How do you feel looking at this picture?

| | | | | | |
|------------|---|---|---|---|---|
| Fear | 1 | 2 | 3 | 4 | 5 |
| Anger | 1 | 2 | 3 | 4 | 5 |
| Sadness | 1 | 2 | 3 | 4 | 5 |
| Happiness | 1 | 2 | 3 | 4 | 5 |
| Interested | 1 | 2 | 3 | 4 | 5 |
| Excited | 1 | 2 | 3 | 4 | 5 |

Beliefs

What do you think is happening in this picture?

Please turn over and do not return to this page

Questions that will accompany the “fear” “anger” and “sad” pictures

Instructions: Please now answer these questions for the same picture.

Cognitive Empathy

How much do you think the person (which person will be specified for each photograph) feels (where 1 = not at all and 5 = a lot):

| | | | | | |
|-----------|---|---|---|---|---|
| Fear | 1 | 2 | 3 | 4 | 5 |
| Anger | 1 | 2 | 3 | 4 | 5 |
| Sadness | 1 | 2 | 3 | 4 | 5 |
| Happiness | 1 | 2 | 3 | 4 | 5 |

Sympathy

How much do you feel (where 1 = not at all and 5 = a lot):

| | | | | | |
|------------------------------------|---|---|---|---|---|
| Sorry for the person | 1 | 2 | 3 | 4 | 5 |
| They deserve what happened to them | 1 | 2 | 3 | 4 | 5 |
| I don't feel anything for them | 1 | 2 | 3 | 4 | 5 |

Distress

Is looking at this picture (where 1 = not at all and 5 = a lot):

| | | | | | |
|-------------------------|---|---|---|---|---|
| A pleasant experience | 1 | 2 | 3 | 4 | 5 |
| An upsetting experience | 1 | 2 | 3 | 4 | 5 |

Affective Empathy

When you look at ...(depends on picture) how much do you feel? (where 1 = not at all and 5 = a lot):

| | | | | | |
|------------|---|---|---|---|---|
| Fear | 1 | 2 | 3 | 4 | 5 |
| Anger | 1 | 2 | 3 | 4 | 5 |
| Sadness | 1 | 2 | 3 | 4 | 5 |
| Happiness | 1 | 2 | 3 | 4 | 5 |
| Interested | 1 | 2 | 3 | 4 | 5 |
| Excited | 1 | 2 | 3 | 4 | 5 |

Beliefs

What do you think is happening in this picture?

Questions that will accompany the “happy” pictures

Instructions: Please now answer these questions for the same picture.

Cognitive Empathy

How much do you think the person (which person will be specified for each photograph) feels (where 1 = not at all and 5 = a lot):

| | | | | | |
|-----------|---|---|---|---|---|
| Fear | 1 | 2 | 3 | 4 | 5 |
| Anger | 1 | 2 | 3 | 4 | 5 |
| Sadness | 1 | 2 | 3 | 4 | 5 |
| Happiness | 1 | 2 | 3 | 4 | 5 |

Sympathy

How much do you feel (where 1 = not at all and 5 = a lot):

| | | | | | |
|------------------------------------|---|---|---|---|---|
| Happy for the person | 1 | 2 | 3 | 4 | 5 |
| They deserve what happened to them | 1 | 2 | 3 | 4 | 5 |
| I don't feel anything for them | 1 | 2 | 3 | 4 | 5 |

Distress

Is looking at this picture (where 1 = not at all and 5 = a lot):

| | | | | | |
|-------------------------|---|---|---|---|---|
| A pleasant experience | 1 | 2 | 3 | 4 | 5 |
| An upsetting experience | 1 | 2 | 3 | 4 | 5 |

Affective Empathy

When you look at ...(depends on picture) how much do you feel? (where 1 = not at all and 5 = a lot):

| | | | | | |
|------------|---|---|---|---|---|
| Fear | 1 | 2 | 3 | 4 | 5 |
| Anger | 1 | 2 | 3 | 4 | 5 |
| Sadness | 1 | 2 | 3 | 4 | 5 |
| Happiness | 1 | 2 | 3 | 4 | 5 |
| Interested | 1 | 2 | 3 | 4 | 5 |
| Excited | 1 | 2 | 3 | 4 | 5 |

Beliefs

What do you think is happening in this picture?

Appendix B.4 – Empathy Task - Pictures included in pilot study

Reference numbers for the pictures included in the study, taken from The International Affective Picture System, created by Lang et al. (1999). In order of administration.

2141

2205

2216

2312

2340

2352

2590

2691

3500

3530

6212

6571

6838

6840

9220

9250

Appendix B.5 – Empathy Task - Pictures included in main study

Reference numbers for the pictures included in the study, taken from The International Affective Picture System, created by Lang et al. (1999). In order of administration.

2141

6571

3500

2340

2216

9220

6840

3530

Appendix B.6 – Major Research proposal

Title

Empathic Responding after Traumatic Brain Injury

Background

Recent research suggests that a reduction in the ability to empathise occurs after traumatic brain injury (TBI) (de Sousa et al 2010, Woods and William 2008, Obonsawin et al 2007). Woods and Williams found that a TBI cohort scored significantly lower on a scale of emotional empathy when compared to the general population, as did de Sousa et al (2010). Obonsawin et al (2008) in developing a model of personality change after brain injury identified a number of descriptors that differentiated individuals with TBI from those without brain injury and distinguished between the personality of the TBI survivor before and after the injury. These yielded a number of factors and lack of empathy was a factor that a number of individuals with brain injury demonstrated. There are a number of models of empathy in the literature however research investigating empathy in a sample of individual's with TBI based on these models is not forthcoming.

Current models of empathy appear to agree that empathy is a multidimensional construct. The term empathy encapsulates a hierarchy of concepts related to the understanding of others from 'response contagion' to 'cognitive empathy' (Preston and de Waal, 2002) This multidimensional approach to empathy has been argued for by a number of authors including Davis (1983) who states that "our understanding of empathy can improve only with the explicit recognition that there are both affective and cognitive components to the empathic response". Davis (1983), using an individual difference measure of empathy (the Interpersonal Reactivity Index, IRI) identified three key components of empathy including: Perspective-Taking which assesses the tendency to spontaneously adopt the psychological point of view of others; Empathic Concern assesses "other-oriented" feelings of personal anxiety and concern for unfortunate others; and Personal Distress "self-oriented" feelings of

personal anxiety and unease in tense interpersonal settings. Wood & William (2008) also made a distinction between two different types of empathy and defined them as: emotional empathy – feeling what another person is feeling; and cognitive empathy – knowing what another person is feeling.

The model that this project will use to investigate changes in empathy in a TBI sample is Eisenberg's (2009) Empathy Related Responding model. Eisenberg (2009) has highlighted that it is important to differentiate between different empathy-related reactions. The distinction made is between empathy, sympathy and personal distress. Eisenberg defines empathy as an affective response that stems from the apprehension or comprehension of another's emotional state or condition, which is identical or very similar to what the other person is feeling or would be expected to feel. This appears to be similar to the concept of "emotional empathy" (Woods & William 2008). Sympathy is defined as concerned with an affective response that frequently stems from empathy, but can derive solely (or partly) from perspective taking or other cognitive processing. The model defines personal distress as also frequently stemming from exposure to another's state or condition; however it is conceptualised as a self-focused, aversive emotional reaction to the vicarious experiencing of another's emotion that is associated with the egoistic motivation of making oneself feel better. Eisenberg's definition of sympathy and personal distress appears to require the ability of Woods & Williams (2008) construct, cognitive empathy. Eisenberg (2009) argues that self-regulation can explain the difference in empathic response. The model suggests that personal distress involves empathic arousal that is over high and experienced as aversive, with the consequence that the individual tends to focus on their own distress rather than the distress of the other person. Sympathy involves vicariously induced emotion however this model assumes that this vicarious affect is sufficiently modulated that it is not experienced as aversive personal distress. Further evidence for this model comes from physiological research. Physiological changes have also been associated with different empathic reactions to other's distress, with personal distress appearing to be linked with higher levels of physiological arousal than

sympathy (Eisenberg 2006). Chauhan et al (2008) also demonstrated that autonomic failure generally impairs participants on measures of emotional empathy.

To date this model has not been tested on a sample of individuals who have experienced TBI. Research suggests that individuals who have experienced TBI have difficulty with both cognitive (Milders et al 2008) and emotional empathy (Woods and Williams 2008) though the relationship between these different forms of empathy has not been fully investigated. Clinically, lack of empathy has an adverse impact on ratings of life satisfaction made by those caring for survivors of TBI (Wells et al 2005). It has also been suggested that weaknesses of cognitive and/or emotional empathy may underpin many of the neurobehavioural disorders associated with TBI (Wood 2001). However it is not always easy to distinguish different types of empathy deficit at a clinical level. Woods and Williams (2008) tried to conceptualise the difficulties that would be observed clinically with deficits in the different forms of empathy. They suggested that diminished cognitive empathy seems to be reflected in a lack of tact and social discretion, as well as poor awareness of the emotional needs and sensitivities of others. Diminished emotional empathy may be reflected by an egocentric, self-centred attitude which is insensitive to, or neglectful of the needs of others.

deSousa et al (2010) recently investigated the relationship between emotional empathy and emotional responsivity in a TBI group compared to controls, by measuring facial electromyography and skin conductance. They found that TBI participants differed in their facial mimicry of emotional responses in particular with respect to angry faces. They also found a difference in skin conductance between the two groups during the task. It is apparent from the research that some individuals who have experienced a TBI have difficulty with empathy and a clinical measure that distinguishes between deficits in different forms of empathy-related response appears to be lacking. It would seem that the development of such a measure would enhance clinical work and research in this area.

This project aims to investigate empathic responding in a sample of individuals who have experienced TBI. It will pilot a measure devised using Eisenberg's model of empathic related responses. This measure will be compared to a number of standardised, validated cognitive and emotional empathy measures. As current literature suggests that self-awareness of such deficits in empathy appears to be variable (Shearer et al, 1998, Bogod et al 2003), information will be obtained from both the individual and the significant other regarding changes in personality.

Question

Following traumatic brain injury, what is the nature of an individual's emotional response to other people emotions as conveyed by a photograph?

Aims Hypotheses and Predictions

Aims

The aim of this project is to investigate the following questions:

1. Is Eisenberg's model of empathy helpful in understanding the changes in empathy that can accompany TBI?
2. Can a laboratory task simulate situations that evoke the different types of empathy proposed by Eisenberg?
3. Are cognitive and emotional empathy dissociable?
4. Do individuals with TBI show empathy profiles that are different from the profiles of people without TBI?

Hypotheses

1. The mean score for all three types of empathy will be lower in people with TBI than people without TBI.
2. People with TBI will show greater variability in empathy scores than people without TBI, and will show empathy profiles that are different from the profiles of people without TBI.
3. The different types of empathy proposed by Eisenberg are dissociable.
4. A laboratory task can simulate situations that evoke the different types of empathy and will reflect the scores on self-report measures of empathy

Predictions

1. TBI group will score lower on the standardised measures of empathy, the Balanced Emotional Empathy Scale (BEES) and the Basic Empathy Scale (BES).
2. Deficits with affective empathy as measured by the BEES will also be apparent by responses to the affective empathy questions of the task.
3. Deficits with cognitive empathy as measured by the BES will also be apparent by responses to the cognitive empathy questions of the task.
4. TBI group will be less sympathetic.
5. TBI group will be less distressed.
6. Deficits in cognitive empathy will result in difficulty with sympathising and the experience of personal distress
7. Cognitive and affective empathy will not be dissociable (if impaired in one will be impaired in the other?)

Plan of Investigation

Participants

Two groups of participants will be recruited:

1. Traumatic brain injury group
2. Healthy gender, education and age-matched control group

Inclusion and exclusion criteria

Inclusion

Brain injury group

- aged between 18-65 years old
- male or female
- severe brain injury as measured by post traumatic amnesia (PTA) of more than 1 hr, at least 3 months prior to date of testing

Control Group

- aged between 18-65 years old
- male or female
- no history of brain injury

Exclusion (all participants)

- neuropsychological disability that impairs the ability to consent
- current diagnosis of deteriorating condition
- current psychiatric difficulties
- learning disability
- currently being treated for alcohol and/or drugs problem

- vision or hearing impairment

Recruitment Procedure

Brain injury participants will be recruited from various different services. These include: Headway in Glasgow, Ayrshire, North Lanarkshire and South Lanarkshire; Community Treatment Centre for Brain Injury, a NHS service in Glasgow and a Social Services Brain Injury service in West Dunbartonshire. Potential participants may also be recruited from the inpatient units in Glasgow including Graham Anderson House. Contact will be made with these clinics to gauge interest. For all interested potential participants the service will provide an information sheet and consent form to the participant from the researcher. Potential participants will be invited to contact the researcher with any questions they may have. Once participants have completed the consent form and returned it to the researcher they will be contacted about attending for testing.

Healthy controls will be recruited via the participant if their significant other meets the inclusion and exclusion criteria. Also other possible sources of healthy controls include further education night classes and through companies such as the local council. The same procedure for obtaining consent will be followed.

Measures

- For use with all participants
 - a measure of different forms of empathic response devised for this project see **Appendix A and Appendix B**
 - Basic Empathy Scale (Jolliffe and Farrington 2006) **Appendix C**
 - Balanced Emotional Empathy Scale (Mehrabian, 2000) see **Appendix D**
 - Hospital Anxiety and Depression Scale (Zigmond et al 1983)
 - The Marlowe Crowne Social Desirability Test (Crowne & Marlowe 1960)

- Wechsler Test of Adult Reading
 - Hayling Test (Burgess & Shallice) – measure of response inhibition and response suppression
 - Information processing test – Symbol Digit Modalities Test
 - The Awareness of Social Inference Test (TASIT) (McDonald, Flanagan & Rollins 2002) – Part 1 The Emotion Evaluation Test.
- For use with TBI group only
 - Brain Injury Personality Scale (Obonsawin et al 2007)
 - Glasgow Outcome Scale – Extended (Wilson 1998)
 - Perceived stress scale (Cohen 1983)

Design of experiment

Participants will be shown approximately 8-12 photographs from The International Affective Picture System created by Lang et al (1999) (please see **Appendix B**) depicting emotive scenes using Superlab on a laptop computer. After being presented with the photograph participants will be required to complete a set of questions asking about their emotional response to the picture (please see **Appendix A**). For the question regarding beliefs the tester will ask the participant this question and record their response. This will be repeated for all photographs. Before this, the researcher will complete an example with the participant to ensure all instructions are clear and the participant is confident about what to expect and do.

Once the above stated component is completed the participant will be asked to complete a number of questionnaires. These questionnaires will measure a number of factors including a subjective measure of the participant's emotional empathy, cognitive empathy, level of depression and anxiety and social

desirability. Participants will also be asked to complete a number of psychometric measures that measure pre-morbid IQ, response inhibition and processing speed. The brain injury group will be asked to complete an additional questionnaire regarding the severity of their brain injury. Also a significant other of the participants in the TBI group will be asked to complete the Brain Injury Personality Scale and the Perceived Stress Scale.

Design of task

The questions that accompany the photograph are answered using a Likert scale. The responses for the empathy questions are based on four of the five basic emotions as used in the Basic Empathy Scale (Jolliffe and Farrington 2006). Two other measures, “excited” and “interested” have been included to measure the participant’s engagement with the photograph. The responses to the sympathy and personal distress questions were devised by the researchers. The affective empathy question is included twice, once at the beginning and again at the end this is to try and get a spontaneous measure of the participant’s affective empathy. The first affective empathy question is answered and the participant is asked to turn over that page and not to go back to it. After this question the participant’s focus is directed to a specific person in the picture and it is about this person that the cognitive empathy, sympathy and personal distress questions are aimed, the affective empathy question is then asked for a second time to investigate if this response has changed. The question is asked a second time as the participant may have answered it the first time “empathising” with a different person in the picture than from the one identified for the remaining questions. The first question is to get a spontaneous measure of who the participant empathises with, as this may differ in the different groups. The aim is to obtain a score for each measure so that a ratio of empathy, sympathy and distress can be obtained that can be compared between groups. The order of the responses, e.g. fear, anger etc will be counterbalanced. After the participant has answered question regarding empathy, sympathy and personal distress they will be asked by the researcher a question regarding what they believe is happening in the scenario.

A pilot study will be completed before commencing the main project. The aim of the pilot study is to pilot the photographs and also the measure of emotional responses. Information from the pilot study will help identify which pictures evoke emotional responses of fear, anger, happiness and sadness and also will determine if participants find the answers to the sympathy and personal distress questions adequate for how they are feeling at the time, an “other” option may be added to these responses to investigate if pilot participants think there is a better way to describe how they are feeling. Two photographs will then be selected for each emotion for inclusion in the main study. 10 participants will be recruited to pilot the task and measure. These participants will be undergraduates and postgraduates recruited from the University of Strathclyde via email and posters.

Research Procedures

- Participant will be asked to sit at a desk on which there will be a laptop at set distance from edge of table.
- The participant will be presented with a photograph depicting an emotive scene on the laptop via the computer programme Superlab.
- After 10 seconds of viewing this photograph the participant will be asked to complete some questions pertaining to the photograph, the photograph will still be visible during the completion of the questions.
- Participants are asked to complete question 1 which asks about affective empathy then turn this page over and put it to the side before completing another four questions.
- The researcher will ask the question regarding beliefs.
- The above procedure is repeated for the next 11 pictures.
- Once completed the participant is provided with a copy of a number of questionnaires and asked to complete them

- Participants will also be asked to complete the WTAR, Hayling test and Symbol Digit Modalities Test.
- For participants in the brain injury group the BIPS and the PSS will be completed with a significant other. The Glasgow Outcome Scale – Extended will also be administered with this group.

Justification of Sample Size

Based on a large effect size of Cohen's $d = 0.82$ ($f = 0.41$), calculated from de Sousa et al (2010) from means and standard deviations given describing the results of a TBI group and control group on the BEES. This study was used as it shares similar aims to the current study. It measured empathy using the BEES and then compared the two groups' results on a task designed to measure emotional responsivity using physiological measures.

The number of participants required in each group

- For a t-test = 19
- For an ANOVA Fixed effects, omnibus, one-way = 25
- For an ANCOVA Fixed effects, main effects and interactions **total sample** = 49

Please see Appendix E for further description

This study will aim to recruit a total sample of 50 participants with two groups of $N=25$. As it is expected that the analysis will be undertaken using a mixed design ANOVA. It is also predicted that there may be a number of covariates within this study and therefore an ANCOVA would need to be undertaken to analyse the data. Variables that may affect participants' measure of empathy include their ability to distinguish emotional expressions,

their responses being biased by social desirability, their ability to process information and their level of impulsivity as measured by a response suppression and inhibition task.

Data Analysis

The task devised for this study will result in a number of variables that will require to be analysed. The pictures depict one of four emotions, fear, happiness, sadness and anger and all four emotions are provided as possible responses. Therefore the two groups could differ on whether or not they identify the correct emotion depicted in the picture and can also differ on the extent to which they identify with the emotion. The statistical analysis that will be undertaken with this data is a mixed design ANOVA 4x2 (fear, anger, happiness, sadness x TBI, control). The sympathy and distress questions are similar in design to the affective and cognitive empathy question though with different responses therefore a mixed design ANOVA will also be used for them though with differing levels depending on the number of responses.

Questionnaire Data – all provide total and/or sub-category scores. An ANCOVA will be undertaken to analyse variables that may be affecting participant's scores on the measures of empathy.

Settings and Equipment

Settings

As all materials are portable then testing can take place in a testing room within the clinic from which the participant has been recruited, for example, Glasgow Headway clinic room during working hours. For the pilot study testing will take place within a testing room at the University of Strathclyde.

Equipment

Laptop with Superlab; The International Affective Picture System CD

Health and Safety Issues

Researcher Safety Issues

Participants will be recruited from the afore-mentioned services during working hours with staff present. The research procedures should not present any safety issues for the researcher.

Participant Safety Issues

The research procedures of this project should not present any safety issues for the participant. However due to the nature of the task some participants may experience some distress whilst viewing the pictures. Before commencing the task participants will be provided with information sheets detailing the nature of the study and also will be informed that they can withdraw from the project at any time. If a participant is feeling distress after the taking part in testing they will have the opportunity to discuss it with the researcher and also will be provided with telephone details of organisations they can contact if they are still feeling distress after leaving the session.

Ethics

Ethics approval will be required for this project and will be sought via the local NHS ethics committee. An information sheet will be provided to all participants and written consent will be obtained. Possible ethical considerations include the TBI group's ability to consent, however those whose ability to consent is impaired will be excluded from the study. Other considerations include the nature of the study is such that emotive responses are expected and this may be distressing for some participants, to address this participants will receive an information sheet which details the requirements of the task and will also have the opportunity to discuss with the researcher any concerns before or after testing.

With regard to the pilot study the researcher will seek to become an honorary member of the University of Strathclyde for research purposes and therefore separate ethics approval will be

required. Apply to the university of Strathclyde ethics board. Again an information sheet will be provided to participants and written consent will be obtained.

Financial Issues

Laptop and Superlab programme provided by University of Glasgow, do not envisage costs.

Travel costs for researcher visiting different sites to test participants.

Possible costs for questionnaire use.

Timetable

Mid July – August apply for ethics for main project; apply for honorary status at University of Strathclyde

September - October – pilot study; once ethics has been approved contact different clinics to recruit participants.

November 2010: March 2011- Data Collection

April : May 2011 – Data Analyses

June : July 2011 – drafts to supervisor

End July 2011 Submit

Practical Applications

- The development and validation of a new task that can be used clinically to investigate the nature of empathic responding in people who have experienced TBI.

- The investigation into the nature of empathic responding after brain injury will help inform future research. Further areas of study that could utilise the task include neuroimaging studies and physiological studies investigating empathic responding.
- Eisenberg's model of empathy, as measured by the different types of empathy in the laboratory task, can lead to well-defined targets for intervention with this client group

Amendment to the original ethics application

A minor amendment was made to ethics so that a fellow trainee clinical psychologist could access information that I collected and vice versa. This resulted in a change to the consent form and information sheet.

