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A changed reality: Experience of an acceptance and commitment therapy (ACT) group after stroke

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Title: The relationship between stroke survivors' perceived identity and mood, self-esteem and quality of life.

Running Head: Identity and outcome after stroke

Key words: stroke, identity, self-esteem, mood, quality of life

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ABSTRACT

Objectives. To examine change in identity after stroke and to elucidate its relationship with mood and quality of life. To test Higgins' theory of the impact of identity (self-discrepancy) on anxiety and depression. To examine the role of self-esteem in mediating the relationship between identity and outcomes.

Method. Sixty-five community-living first-time stroke survivors, mean age 61.58 and time since stroke 5.60 years, were recruited from stroke charities. A cross-sectional study used the Head Injury Semantic Differential Scale, the Hospital Anxiety and Depression Scale, the Rosenberg Self-Esteem Scale, the Stroke-Specific Quality of Life Questionnaire (adapted) and the Barthel Index.

Results: Identity was rated more negatively after stroke than before ($t(64)=6.46, p<.00$). Greater discrepancy in identity was associated with anxiety ($r=.38, p<.00$), depression ($r=.59, p<.00$), self-esteem ($r=-.48, p<.00$) and quality of life ($r=-.54, p<.00$). Overall positivity of identity after stroke predicted outcomes even better than discrepancy. The association between discrepancy and mood and quality of life was mediated by self-esteem ($\beta=.30, p<.01$; $\beta=-.24, p<.01$, respectively). Specific types of discrepancy defined by Higgins did not show differential relationships with anxiety and depression as predicted.

Conclusions: Identity changes after stroke and identity and self-esteem are associated with important outcomes for stroke survivors.

INTRODUCTION

Stroke is a form of brain injury posing sudden life changes as a consequence of a range of physical and psychological impairments. These in turn decrease participation in meaningful activities (Roth & Lovell, 2007) and quality of life (Clarke & Black, 2005). Anxiety and depression are common after stroke and hinder adjustment and rehabilitation (Mukherjee, Levin & Heller, 2006); around 55% of stroke survivors experience depression at some stage (Ayerbe, Ayis, Crichton, Wolfe & Rudd, 2013). Depression prevalence is about 33% (Hackett, Yapa, Parag & Anderson, 2005) and anxiety about 20% (Campbell Burton et al., 2013). The aetiology of emotional problems after stroke is complex, encompassing neurological facets, physical and cognitive impairment, and restriction or loss of activities (Mukherjee et al., 2006). Many of these characteristics are shared by other sudden-onset conditions such as traumatic brain injury. It is unsurprising that such profound changes impinge upon survivors' perceived 'identity' and 'self-esteem'.

Change or 'loss' of identity/sense of self following brain injury or stroke is common (Carroll & Coetzer, 2011; Levack et al., 2014; Ellis-Hill & Horn, 2000; Tyerman & Humphrey, 1984; Wright & Telford, 1996). Identity change is the "subjective discontinuity in their felt, embodied or social experience of who they are" (Yeates, Gracey & McGrath, 2008, p. 567). Survivors experience a disconnect with their pre-injury self and see the reconstruction of the disrupted identity as an important step in their recovery (Levack, Kayes & Fadyl, 2010). Identity change has been described as 'loss of me' and feeling distanced from the new self, which is perceived as strange and unfamiliar (Murray & Harrison, 2004) and can persist for five years (Pallesen, 2014). The self is often viewed more negatively after stroke to a degree unrelated to physical impairment (Ellis-Hill & Horn, 2000) and negative views of self are associated with higher levels of depression and anxiety after stroke (Vickery, 2006). Depression has been shown to correlate with negative views of self even more strongly than

with somatic factors (Jorge et al., 1993). The related construct of self-esteem (sense of self-worth) also changes (Cooper-Evans, Alderman, Knight & Oddy, 2008; Keppel & Crowe, 2000). Impaired self-esteem after brain injury is associated with greater psychological distress (Cooper-Evans et al., 2008; Vickery, Sepehri, Evans & Lee, 2008).

Identity change impacts both upon people with brain injury (Ben-Yishay, 2008) and their families (Landau & Hissett, 2008). It engenders a sense of threat (Gracey, Longworth & Psaila 2015) and provokes attempts to restore identity-related functions. When this goal cannot be attained, an adjustment to loss process is triggered (Brands, Wade, Stapert & Heugten, 2012). Consequently, there may be grieving for the lost identity and a striving to construct a new identity (Moldover, Goldberg & Prout, 2004; Levack et al., 2010). These processes can be experienced as a struggle (Morris, 2004) that distracts from rehabilitation (Cloute, Mitchell & Yates, 2008). Any negative change in identity, like negative identity itself, is associated with: emotional problems (Cantor et al., 2005; Carroll & Coetzer, 2011; Wright & Telford, 1996); social isolation (Engberg & Teasdale, 2004); pessimism about the future; and poorer quality of life (Cloute et al., 2008). Conversely, maintenance of social identity predicts well-being (Haslam et al., 2008) and higher quality of life following brain injury (Vickery, Gontkovsky & Caroselli, 2005).

Self-Discrepancy Theory

Cantor et al. (2005) explained the centrality of identity in traumatic brain injury using Higgins' (1987) self-discrepancy theory. This model describes how discordant beliefs about the self ("self-discrepancies") are associated with depression and anxiety. Higgins described three basic domains: the 'actual' self (self-concept), representing the current self-perceptions; the 'ideal' self (the self a person aspires to become); and 'ought' self (the facet of self related to duty, obligations and responsibilities). Attainment of congruence between self-concept and

ideal and ought selves is a basic psychological drive; lack of concordance leads to particular types of emotional vulnerability (see Figure 1).

[Figure 1 about here]

The relationships shown in Figure 1 have been demonstrated in general population samples (Higgins, 1987; Higgins, Bond, Klein & Strauman, 1986; Higgins, Klein & Strauman, 1985); depressed people show greater actual/ideal self-discrepancies than controls, and anxious people showed larger actual/ought self-discrepancies (Fairbrother & Moretti, 1998; Scott & O'Hara, 1993). Self-discrepancies and emotional distress were shown to be related in individuals with chronic lower back pain (Kinderman, Hujinen, Goossens, Roelofs & Verbunt, 2011) and cancer (Heidrich, Forsthoff & Ward, 1994). However, whilst larger, better controlled studies supported the general association between discrepancy and distress, they failed to find distinct relationships between actual/ideal and actual/ought self-discrepancies and depression and anxiety respectively (Phillips & Silvia, 2010; Tangney, Niedenthal, Covert & Barlow, 1998).

Cantor et al. (2005) applied Higgins' (1987) taxonomy to brain injury hypothesising that discrepancies between pre-injury self and post-injury self are akin to the discrepancies described by Higgins; i.e. that actual/ideal discrepancy precipitates vulnerability to depression and actual/ought discrepancy to anxiety. Cantor et al. (2005) found that emotional distress was indeed related to discrepancy between pre-injury and post-injury selves in traumatic brain injury survivors; however, the specific predictions for the relationship of actual (post-injury)/ideal discrepancy and depression, and actual/ought discrepancy and anxiety were not supported.

The current study extended Cantor et al.'s (2005) work using Higgins' (1987) taxonomy by examining self-discrepancies in a sample of stroke survivors. The hypotheses were:

1. identify would be more negative post-stroke than pre-stroke;
2. discrepancy between pre-stroke and post-stroke self identity would be associated with greater psychological distress and lower quality of life;
3. actual-ideal discrepancy would be associated with depression and actual-ought discrepancy with anxiety, as predicted by Higgins' model;
4. the associations between pre-post discrepancy and outcomes would be mediated by self-esteem.

Finally we compared our pre- and post-stroke identity scores for stroke survivors with those of healthy samples obtained by previous studies to assess whether the pre-post discrepancy was likely to be due to an elevation (idealisation) of pre-stroke identity, or a diminution of post-stroke identity.

METHOD

Sample

A power analysis was carried out using G Power. To detect a small correlation of .3 with $\alpha = .05$ and power = 0.8, a total sample size of 67 would be required. Therefore, the target sample size was 67 first-time adult stroke survivors. However, two datasets had to be excluded due to breaches of the exclusion criteria, and therefore the final sample consisted of 65 stroke survivors.

Participants and Recruitment

Following ethical approval by the Cardiff University ethics committee, participants were recruited from stroke charities in south Wales and south west England. Five of the sixty-five participants were recruited by charity internet announcements and sixty directly from the

charities' services. Once nominated by charity staff those interested in participation were contacted by the researcher to obtain consent. Included participants must have experienced one stroke six months to fifteen years previously and after the age of 18 years (if more than one stroke, these occurred within one month). Exclusion criteria were: severe communication, cognitive or perceptual difficulties that would hamper questionnaire completion or giving consent; severe physical disabilities; learning disability; diagnosis of dementia; co-morbid Parkinson's disease.

Measures

Perceived identity before and after stroke was rated using The Head Injury Semantic Differential Scale – III (HISD-III; Tyerman & Humphrey, 1984). Versions of this scale have previously been used in brain injury studies including stroke (Carroll & Coetzer, 2011; Ellis-Hill & Horn, 2000; Tyerman & Humphrey, 1984; Wright & Telford, 1996). It has 18 questions, each requiring a seven point rating on a bipolar dimension (e.g. of value-worthless, unhappy-happy, despondent-hopeful, capable-incapable). The original scale was shown to have internal reliability (Cronbach's *alpha* 0.88, split half Guttman's .87), based on the ratings of present self by 60 persons with very severe head injury on admission to rehabilitation. Present-self ratings of the updated HISD III had a Cronbach *alpha* of .93, and a split half Guttman of .93 in a sample of 42 adults with severe head injury (Tyerman, personal communication, 19 December 2012). Participants used this scale to rate their pre-stroke self (six months before the stroke) and post-stroke self (over the two weeks prior to interview) and also their view of their ideal self (how they would ideally like to be, in terms of their hopes, wishes, aspirations) and their ought self (how they think they ought to be or should be, in relation to their duties, responsibilities, obligations).

The Barthel Index (BI; Mahoney & Barthel, 1965) was used to assess functional abilities using self-report. It is suitable for stroke patients (Gompertz, Pound, & Ebrahim, 1994) with a test-retest Bland-Altman reliability of 2.0 (Green, Forster, & Young, 2001). The Barthel Index correlates with the Schwab and England measure of functioning ($r = .64, p < .00$; Morley, Selai, & Thompson, 2012).

Quality of life was assessed using The Stroke Specific Quality of Life Scale (SSQLS; Williams, Weinberger, Harris, Clark & Biller, 1999) which measures 12 domains. For this study only energy, work/productivity, mood, social roles, family roles, thinking, and personality were used in order to minimise overlap with the Barthel. Total scores for SSQLS refer to totals for these seven sub-scales. In 34 individuals with stroke Cronbach's *alpha* ranged from adequate (*alpha* = .75 for work/productivity subscale) to excellent (*alpha* = 0.89 for self-care). Excellent test-retest reliability ($r = .92$) was also shown and most domains of the SS-QOL correlated significantly with the Barthel Index (Williams, Weinberger, Harris, Clark *et al.*, 1999).

The Rosenberg Self Esteem Scale (RSES; Rosenberg, 1965) was used to measure global sense of self-worth; it has previously been used with stroke (Keppel & Crowe, 2000). In general (non-stroke) samples the RSES demonstrated Guttman coefficient of reproducibility of .92 (Rosenberg, 1979), Cronbach's *alpha* of .88 and test re-test reliability of .82 (Fleming & Courtney, 1984). But higher test-retest reliability of .85 to .88 over two weeks has been reported (Rosenberg, 1979). The RSES correlated significantly with other measures of self-esteem, including the Coopersmith Self-Esteem Inventory (Rosenber, 1979) and exhibited a correlation of .78 with self-regard (Fleming & Courtney, 1984).

Mood was assessed with The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) which yields a total mood score alongside separate scores for anxiety (HADS-

A) and depression (HADS-D). The HADS scales have been validated in stroke and agreement of the total score with a clinical interview ranged from 0.84 to 0.89 at different cut-offs (Sagen et al., 2009). Cronbach's *alpha* in a stroke population was 0.88 (Turner et al., 2012).

Procedure

All the measures were completed sequentially face-to-face in the stroke clubs ($N=52$) or via the telephone at home ($N=13$) in a single 45-60 minute session with one of three researchers. The questionnaires were administered in a fixed order: HISD-III for past self, BI, RSES, SSQSL, HADS, HISD-III for current, ideal and ought self.

Data Analysis

The data were analysed using SPSS Version 20. Means of measures for each participant were compared with correlated *t*-tests or non-parametric equivalent. The normality of the distributions of the interval variables was explored by Kolmogorov-Smirnov tests. The following variables showed deviation from normality; pre-stroke HISD-III, discrepancy scores between post-stroke self and ought self, anxiety (HAD-A), HISD ideal and ought self scores and the Barthel. The assumptions of linearity and homoscedasticity were met for all pairs of variables analysed by bivariate Pearson correlation, and since the Pearson correlation is robust when there is violation of the normality assumption (Havlicek and Peterson 1977) it was used. As an additional check Kendall's Tau correlations were also conducted and in all cases there was agreement about the significance of the correlation. Regression-based mediation analyses with assumption-free bootstrapping and bias correction (Hayes, 2013) were employed to test mediational hypotheses. Boxplots of each variable were inspected for outliers: there were only seven outliers across four of the variables. These were adjusted to be one unit above/below the next highest/lowest non-extreme score (Dancey and Reidy, 2004).

Results

Twenty-nine of the sample were male and 36 female, 55 were white British and one was Afro-Caribbean (nine did not state ethnicity). Thirty-nine were married, the remainder were widowed, separated/divorced or never married. Forty-nine were retired, seven in employment and eight unemployed (one did not respond). Fourteen reported haemorrhagic stroke, 18 ischaemic and 33 did not answer this question. Twenty-four had right weakness and 32 had left weakness, six reported no lateralised weakness and three did not respond to this question. The results for the interval and test variables are presented in Table 1.

[Tables 1 & 2 about here]

Hypothesis 1: Identity change after stroke.

HISD-III post-stroke scores were lower than pre-stroke scores ($t(64)=6.46, p<.00$). Survivors rated themselves significantly less positively after stroke on all dimensions except calm, patient, relaxed, satisfied and aggressive (Wilcoxon test with Bonferroni correction for 18 comparisons -- Table 2). Ratings for ideal and ought selves were markedly more positive than those for pre-stroke or for post-stroke selves (related t -tests, all comparisons, $p<0.00$, one-tailed). Discrepancy in identity before and after stroke may arise in two ways; through decline in post-stroke identity or idealisation of pre-stroke identity. This question was addressed by comparison with population norms for the HISD-III. Wright and Telford (1996) collected data for a control group using the original HISD. This group was comprised of individuals with no history of head injury, matched for age, sex, socioeconomic and marital status and history of mental health problems. Rescaling pre-stroke scores to account for differences in the HISD-III, the current sample showed a prominent idealisation effect compared with healthy controls ($M=105.7, SD=15.1$ versus $M=87.9, SD=23.0$; $t(99)=4.76$,

$p < .00$), and a less marked, but significant, reduction in ratings of post-stroke self ($M=86.0$, $SD=23.5$ versus $M=94.9$, $SD=13.1$; $t(99)=2.10$, $p=.04$), both comparisons two-tailed.

Hypothesis 2: Association between identity change and outcome variables.

Correlations between identity, identity discrepancies and the outcome variables relevant to the study's hypotheses are shown in Figure 2. In addition to the predicted negative correlation between pre- and post-stroke identity discrepancy and ratings of post-stroke self ($r(65)=-.81$, $p < .00$), discrepancy also correlated significantly and negatively with self-esteem and quality of life and positively with anxiety and depression. These correlations are concordant with hypothesis 2, that discrepancy will be associated greater levels of distress and lower quality of life.

Additionally, quality of life correlated negatively with anxiety ($r(65)=-.64$, $p < .00$), depression ($r(65)=-.68$, $p < .00$) and total HADS score ($r(65)=-.74$, $p < .00$).

The demographic variables were investigated as possible confounders in the associations between discrepancy and mood. Only age and level of functioning correlated significantly with key variables. But partial correlations, controlling for age and functioning, remained highly significant suggesting that there was no confounding. Correlations between the Barthel and outcome variables (quality of life $r(65)=.45$, $p < .00$; anxiety $r(65)=-.18$, $p=.16$; depression $r(65)=-.33$, $p=.01$; total HADS score $r(65)=-.28$, $p=.03$), although generally significant, were lower than between post-stroke identity and these outcomes.

[Figure 2 about here]

Hypothesis 3: Specific associations between actual-ideal and actual-ought self discrepancies and depression and anxiety.

The discrepancy between post-stroke self and ought-self was correlated with anxiety as predicted, but also with depression. Although the self-discrepancy theory predicts correlations with both depression and anxiety, the association with anxiety should be strongest (Higgins, Klein & Strauman, 1985). However, the correlation with anxiety was the weaker ($z=-1.68, p=.046$). Similarly, the discrepancy between post-stroke self and ideal self correlated with depression as predicted, but also with anxiety. However, the correlation with depression was significantly larger than with anxiety ($z=1.66, p<.05$), supporting the self-discrepancy theory (Higgins, Klein & Strauman, 1985).

Hypothesis 4: Mediation of the association between discrepancy and outcomes by self-esteem

The regression for HADS total score on pre-post self-discrepancy with self-esteem as the mediator produced a significant model (adjusted $R^2=.59, F(2,62)=44.60, p<.00$) and a significant mediation effect demonstrating that self-discrepancy acted indirectly on mood through its effect on self-esteem. . When self-esteem was the mediator for the regression of quality of life on discrepancy, there was again a significant model (adjusted $R^2=.47, F(2,62)=28.1, p<.00$) and a significant mediation effect demonstrating that discrepancy affected quality of life indirectly through its effect on self-esteem. The direct and indirect effects for each outcome variable are shown in Figure 3.

[Figure 3 about here]

Although the hypotheses focussed on self-discrepancy after stroke, ratings of post-stroke identity correlated more highly with outcome variables than discrepancy. To investigate their predictive power, discrepancy and post-stroke self were entered into separate stepwise regressions with HADS total score and quality of life as outcomes using SPSS 20 defaults for variable entry and removal. The assumptions of multiple regression, including collinearity, were met. For both mood and quality of life as outcomes there was a significant model (adjusted $R^2=.55$ and $.45$; $F(1,64) = 78.56$ and 53.09 respectively, $p<0.00$). In both regression models discrepancy was excluded and only post-stroke self produced a significant regression coefficient ($beta=-.75$, $t=-8.86$, $p<.00$; $beta=.68$, $t=7.29$, $p<0.00$, respectively).

DISCUSSION

Participants evaluated themselves more negatively following stroke than before stroke. Those with a greater discrepancy in evaluation after stroke compared with before had lower mood, self-esteem and quality of life, supporting results from traumatic brain injury samples. Part of this influence of discrepancy on mood and quality of life was mediated (transmitted) via variations in self-esteem which was an important intermediate variable in determining the outcomes.

These results for identity discrepancy echoed those in brain injury populations (Carroll & Coetzer, 2011; Tyerman & Humphrey, 1984; Wright & Telford, 1996) as well as those in stroke, in particular (Ellis-Hill & Horn, 2000). This discrepancy could be a consequence of idealisation of pre-injury self (Iverson, Lange, Brooks & Ashton Rennison, 2010) or detrusion of post-injury self. Comparisons with survivors' perceptions of uninjured people (Tyerman & Humphrey, 1984), and with ratings by control groups (Iverson et al., 2010; Wright & Telford, 1996) suggest that idealisation of pre-injury self does indeed occur. On the other hand, evidence for decline in post-injury identity is mixed; post-injury self did not

differ from controls using the original Head Injury Semantic Differential Scale (Wright & Telford, 1996), but was lower than in controls using the Tennessee Self Concept Scale (Ponsford, Kelly & Couchman, 2014). Comparison of our data with norms (Wright & Telford, 1996) suggested that idealisation was the principal reason for the discrepancy, but that there was also some detrusion of post-stroke identity. These identity discrepancies may be akin to the discrepancies described by Brands et al. (2012) between a person's goals for restoring functions in order to re-establish pre-injury identity (i.e. ideal state,) and the person's current level of function/performance (i.e. the actual, post-injury identity).

Those with greater identity discrepancy were more depressed and anxious which is consistent with the notion that self-discrepancy depresses mood. However, the converse influence could also be the case. Cognitive accounts of depression do predict a negative view of current self (Clark & Beck, 1999), but they also predict a negative view of the past and future self. This dual influence provides no basis for predicting a pre- post- identity discrepancy occasioned by depression. However, prospective studies are necessary to confirm the direction of the relationship.

Greater identity discrepancy was also associated with lower perceived quality of life. This resonates with the finding that stroke survivors with higher quality of life focus on activities most salient to their identity, even if in a modified form, and maintain a sense of continuity in their life (Clarke & Black, 2005).

Discrepancies between post-stroke (actual) self and the ideal and ought selves were also found, as predicted by Cantor et al. (2005). Those exhibiting greater discrepancy of both these types were more anxious and more depressed, broadly supporting the self-discrepancy theory. However, the predicted distinct relationships between these two forms of identity discrepancy and depression and anxiety respectively (greater actual-ideal discrepancy

increases depression and greater ought-actual discrepancy increases anxiety) were not found. These findings accord with Cantor et al. (2005) and other studies that failed to find distinct associations with anxiety and depression (Phillips & Silvia, 2010; Tangney et al., 1998).

Rosenberg Self Esteem Scale scores below 25 are considered to be clinically significant (Anson & Ponsford, 2006) and in this study 42% of participants met this criterion. This highlights the potency of stroke in affecting a key aspect of personhood that is normally stable during adult life (Trezesniewski, Donnellan & Robins, 2003). Greater identity discrepancy was associated with decreased self-esteem. This association suggests a functional relationship: stroke may impact on abilities and characteristics crucial in shaping a person's view of themselves, and this in turn could produce a less positive perception of self-worth and hence impaired self-esteem.

Self-esteem functioned as an intermediate (mediating) variable in determining how greater identity discrepancy was associated with lower mood and quality of life. Discrepancy could impact on self-esteem through reduced self-efficacy resulting from failure to attain goals related to pre-injury identity (Brands et al., 2012). Self-esteem in turn may influence outcomes through mitigating the negative effects of stressful life events (Schroevers, Ranchora & Sanderman, 2003) and thereby facilitating adjustment to illness, psychosocial functioning and quality of life (Anson & Ponsford, 2006; Li & Moore, 1998). Low self-esteem is associated with impaired self-efficacy (Judge & Bono, 2001), which would then reduce motivation for tasks (Brown & Dutton, 1995) and compromise perseverance, especially in the face of challenging, anxiety-provoking, demands; individuals may avoid challenges altogether (Waschull & Kernis, 1996) or quit early (Sandelands, Brockner & Glynn, 1988). This may limit social participation and quality of life and opportunities for rewarding engagement which in turn could lead to depression (Lewinsohn, 1975).

Despite the strong associations of identify discrepancy with outcomes, ratings of post-stroke identity itself were very highly correlated with discrepancy and showed even stronger associations with outcome variables than discrepancy. For practical purposes it may be sufficient, and simpler, to measure post-stroke identity rather than the discrepancy before and after stroke. However, self-discrepancy before and after stroke and perceived lack of continuity and coherence in the self might well contribute to the processes which determine identity after stroke. It is striking that identity correlated more strongly with all the main outcome variables than did the Barthel Index; it appears that how people see themselves is a more potent determinant of adjustment than disability per se.

The study had some limitations. Retrospective appraisal of pre-stroke self could engender memory bias. Indeed, the occurrence of idealisation of pre-stroke self suggests memory distortion was a key psychological process engendering discrepancy. The causality underlying correlation cannot be directly established with this design and can only be inferred. There was no comparison group to measure changing perceptions of identity over time in the absence of stroke. However, it has been demonstrated that self-concept is relatively stable except at times of acute crisis (Trezesniewski, Donnellan & Robins, 2003); so the observed discrepancy effects are likely to be due to stroke. The sample may not have been representative: It was limited to volunteers and the recruitment method did not permit enumeration of those who declined to participate. Moreover, participants were drawn principally from stroke clubs and were without severe language and cognitive impairment. Numbers were low, although power analyses demonstrated adequate power. In addition, mean anxiety and depression scores were high, close to standard Hospital Anxiety and Depression Scale caseness cut-offs (Zigmond & Snaith, 1983), recruitment from those attending community stroke groups might account for this. The results demonstrated a large number of significant correlations, generally, but not universally, positive. While the

measures used purport to assess distinct characteristics, there is a degree of item similarity between the HISD-III, quality of life and self-esteem scales, and all the scales utilised self-report and were administered at the same time. These test-related factors could account for some of the shared variance in addition to underlying psychological processes. But not all the significant correlations were positive, suggesting that test administration factors were not wholly responsible for the observed associations.

This study adds to our understanding of identity change following stroke and the relationship of perceived identity to important outcomes. Identity discrepancy was associated with outcomes, but post-stroke identity was even more strongly associated. As noted above, this is not to say discrepancy is unimportant and it could play a role in determining post-stroke identity. This requires further investigation. In any event the impact of identity on outcome is strongly mediated by self-esteem.

The findings have implications at the third level of neuropsychological rehabilitation (Prigatano, 2008); the survivors' subjective experience of the brain damage as central to effective rehabilitation. The importance of considering identity and self-esteem in neuropsychological rehabilitation is becoming recognised (Ownsworth & Haslam, 2016) and the current results support this position by demonstrating the association between discrepancy and key outcomes. In addition, the results suggest that rehabilitation might focus on enhancing self-esteem which has a key role in determining outcome. The limited and mixed evidence for the efficacy of current brain injury rehabilitation approaches in improving self-identity (Ownsworth & Haslam, 2016) suggests the need for new approaches integrating models with innovative practice (Gracey et al. 2015).

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	Mean(<i>SD</i>)	<i>SE</i> of Mean	Max. Range
Age	61.58(11.36)	1.41	37 - 82
Years since stroke	5.60(4.25)	.53	1 - 15
Current Functioning (BI)	77.28(20.34)	2.52	0 - 100
Current Self-esteem (RSES)	25.33(5.56)	.69	10 - 40
Current Quality of Life (SSQLS)	67.82(20.66)	2.56	25 - 125
Current Anxiety (HADS-A)	8.31(4.85)	.61	0 - 21
Current Depression (HADS-D)	7.28(3.74)	.46	0 - 21
Current HADS Total (HADS)	15.58(7.62)	.94	0 - 42
Pre-Stroke Self (HISD-III)	105.69(15.06)	1.87	18 - 126
Post-Stroke Self (HISD-III)	85.97(23.50)	2.91	18 - 126
Current Ideal Self (HISD-III)	118.63(7.46)	.93	18 - 126
Current Ought Self (HISD-III)	115.14(8.93)	1.11	18 - 126

Table 1. Interval variables and test scores (*N*=65)

HISD item	Median (interquartile range) Pre-stroke	Median (interquartile range) Post- stroke	$p = <$ (2-tailed)
Interested	7 (1)	6 (4)	.00
Happy	7 (1)	6 (3)	.00
In Control	7 (1)	5 (4)	.00
Relaxed	6 (4)	5 (4)	.04*
Satisfied	6 (2)	5 (3)	.00*
Hopeful	6 (1)	6 (4)	.00
Self Confident	7 (1)	5 (3)	.00
Stable (emotionally)	7 (1)	6 (3)	.00
Attractive (as a person)	6 (2)	5 (3)	.00
Of Value	6 (1)	6 (1)	.00
Unaggressive	6 (4)	6 (4)	.99*
Calm	6 (2.5)	6 (4)	.05*
Capable	7 (1)	5 (3)	.00
Independent	7 (1)	5 (4)	.00
Active	7 (1)	5 (4)	.00
Talkative	7 (2)	6 (3)	.00
Friendly	7 (1)	6 (1)	.00
Patient	6 (3)	6 (4)	.07*

* Non-significant

Table 2. Pre-post stroke comparisons for all HISD-III dimensions with Bonferroni correction ($\alpha=.0027$)

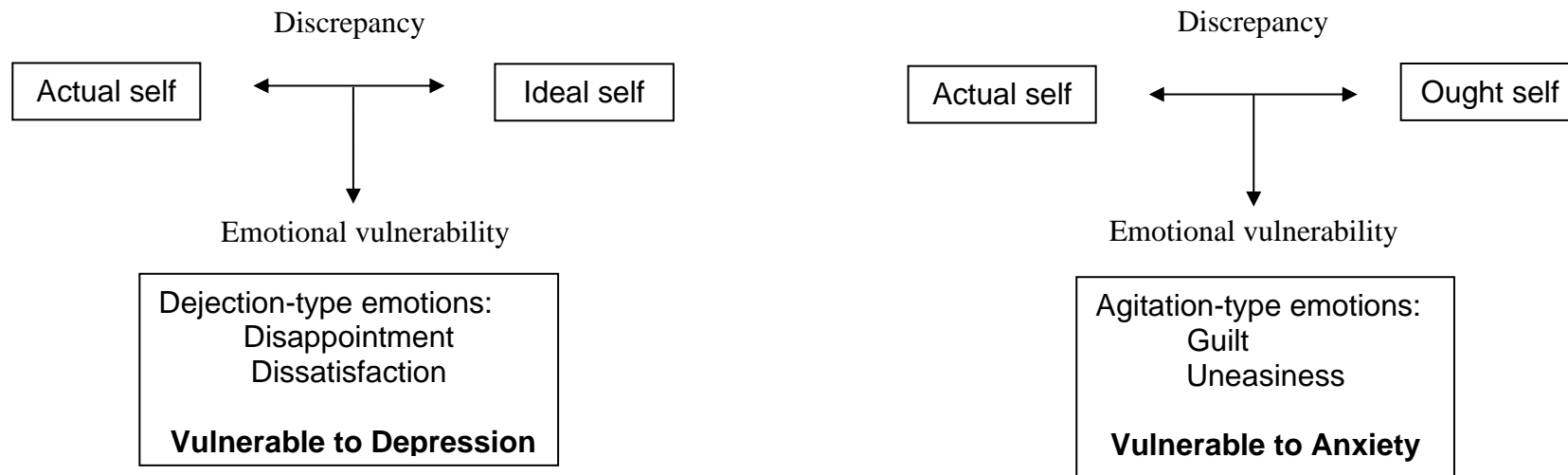


Figure 1. Higgins' (1987) Self-Discrepancy Theory: Consequences of 'actual' and 'ideal' / 'ought' self-discrepancy.

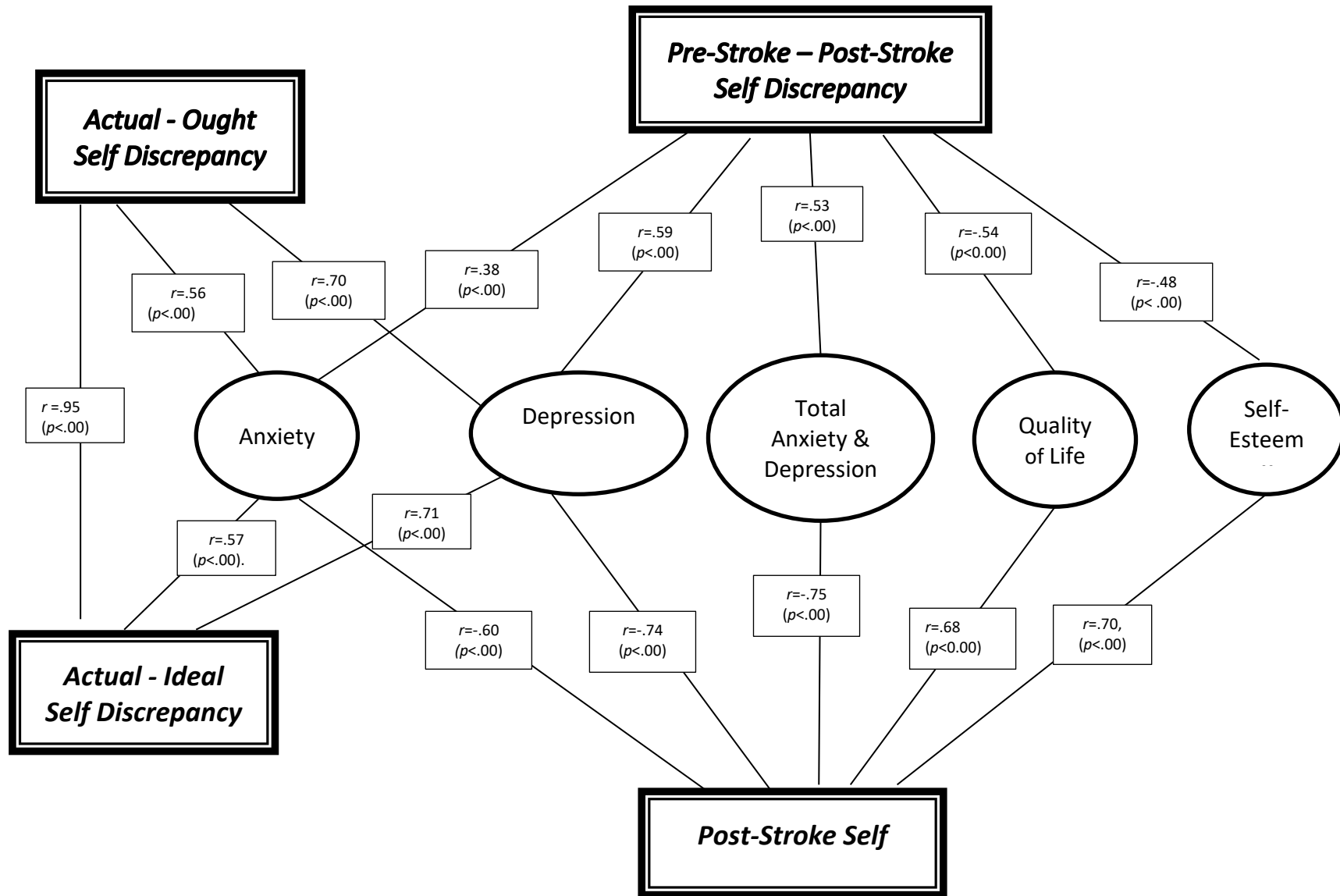
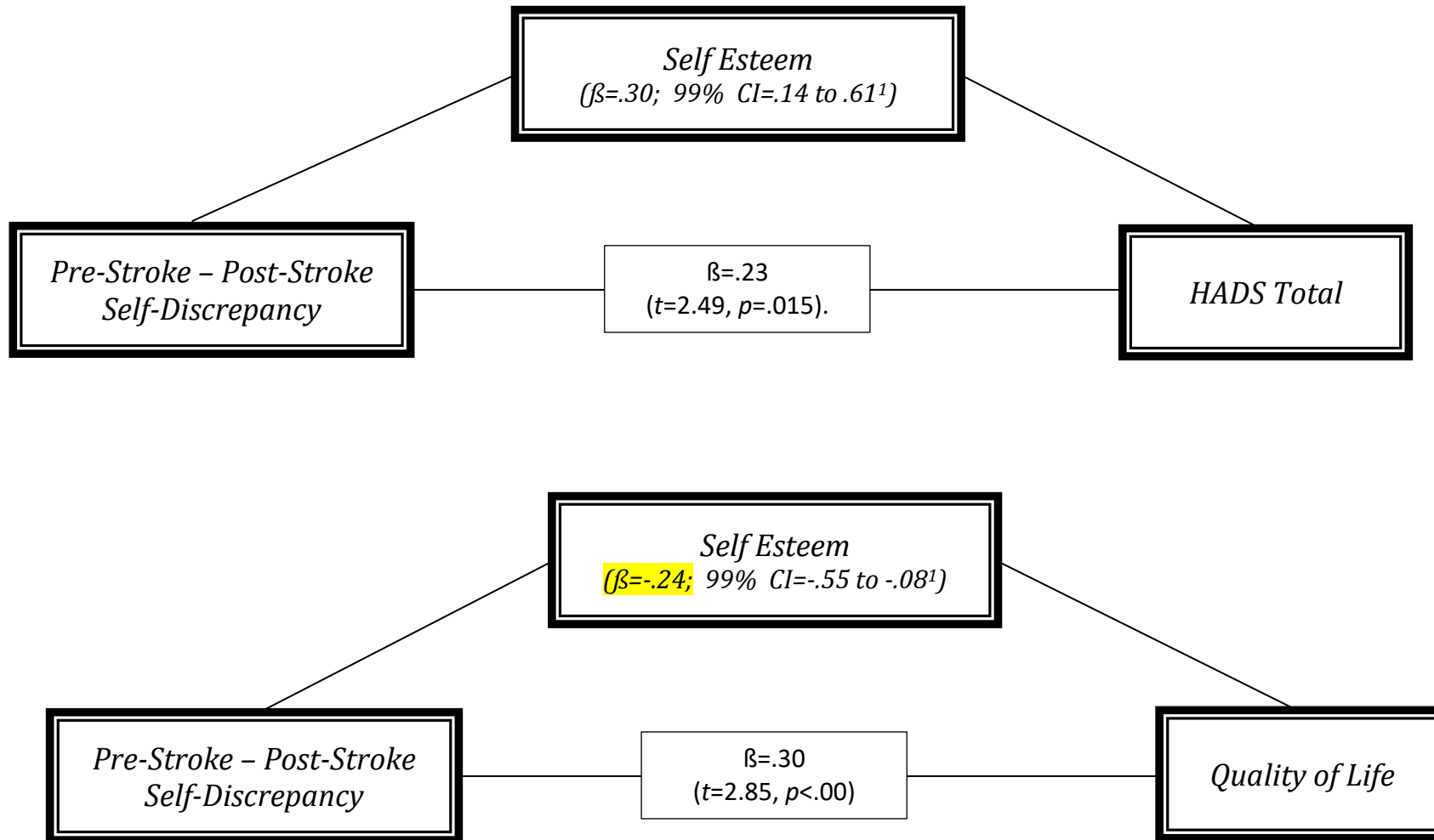


Figure 2: Correlations between variables ($N=65$, two-tailed)



¹ $p<0.01$ since CI does not pass through zero.

Figure 3: Direct and mediated effects of self-discrepancy on mood and quality of life.