Understanding the influences of self-compassion and psychological flexibility on life satisfaction and depression after stroke.

By:

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Declaration

I declare that this thesis has been submitted only for the Doctorate of Clinical Psychology at the University of Sheffield. It has not been submitted to any other institution, or for the purpose of gaining any other qualification.

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Overall Summary

Self-compassion and psychological flexibility are skills that are known to help people maintain their mental health and psychological wellbeing when faced with challenging situations. Both skills involve the use of mindfulness, the ability to intentionally apply one's awareness to the present moment, without judgement or attempts to change what is happening. Self-compassion also involves having a kind, non-judgemental attitude to oneself, as opposed to being self-critical. Self-compassionate individuals see their suffering and struggles as part of a shared, human experience, rather than something unique faced by them alone. Alongside mindfulness skills, psychological flexibility involves welcoming and accepting one's thoughts and feelings, without trying to avoid those that are painful or uncomfortable. People who are psychologically flexible are also aware of what they value in their lives and take action to pursue these things.

The growing evidence that psychological flexibility, self-compassion and mindfulness play a key role in mental health and psychological wellbeing has led to the development of several psychological therapies based on these skills. Research has shown that these interventions can be effective at treating depression and anxiety. The current research firstly sought to examine the existing literature on the use of such therapies for older adults. A search of this literature revealed 14 such studies, and the results of these studies were synthesised. The synthesis found that these therapies may be effective at reducing depression and anxiety, and increasing wellbeing, in older adults. However, the findings and effect sizes reported in the studies were mixed.

In the second part of the research, the role of psychological flexibility and self-compassion in psychological wellbeing after stroke was investigated. Strokes occur when the blood flow to the brain is disrupted, leading to damage. Three quarters of strokes occur in people who are over 65. Stroke survivors often experience physical and/or cognitive difficulties or disabilities, and commonly report feeling depressed and dissatisfied with their lives. This study examined whether greater stroke severity is associated with more depression and less life satisfaction. It also

investigated whether having more psychological flexibility/self-compassion might strengthen or weaken this association.

174 stroke survivors completed a survey about the effects of their stroke, their psychological flexibility, self-compassion, levels of depression and life satisfaction. More severe post-stroke difficulties were associated with increased levels of depression and decreased life satisfaction. More psychological flexibility or self-compassion was associated with less depression, and more psychological flexibility was associated with being more satisfied with life.

These findings suggest that levels of stroke severity and depression/life satisfaction influence each other; however, this study cannot draw conclusions on the directions of this influence. Similarly, psychological flexibility/self-compassion and depression appear to influence one another, as do psychological flexibility and life satisfaction. Once again, however, the nature and direction of this influence could not be determined. Future research is required to examine in greater detail the directions of influence in these relationships, to determine whether psychological flexibility and/or self-compassion can play a role in improving wellbeing post-stroke.

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I would like to thank each of the participants, for completing multiple online questionnaires to provide their data and make this study possible, and to the stroke charities, organisations and online groups who helped facilitate recruitment.

Finally, I would like to dedicate this thesis to my late sister Rachel; thank you for all the joy you brought to our lives, and for consistently reminding me that I'm a nerd. We miss you every day.

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Objectives

Older adulthood, often defined as being over the age of 65, is associated with several specific challenges which can significantly impact mental wellbeing, and older adults experience high rates of depression and anxiety. Third-wave Cognitive Behavioural Therapy (CBT) refers to a group of psychological interventions which may be particularly suited to this population. This review therefore aimed to synthesise the existing literature on the use of these therapies with older adults.

Method

Online databases **(**SCOPUS, PsycINFO, Medline, Cochrane Library, ProQuest, WhiteRose and OpenGrey) were searched to identify studies examining the efficacy/effectiveness of third-wave CBTs in decreasing depression/anxiety, or increasing wellbeing, in older adults. Risk of Bias (RoB) in eligible studies was examined, followed by a narrative synthesis of the studies and their results.

Results

The database searches and forward/backward citation searching yielded 14 studies from an initial pool of 752. Overall RoB in the studies was moderate. There was variance in effect sizes, which ranged from statistically non-significant and trivial (d = 0.06) to statistically significant and large (d = 1.20), although effect sizes were primarily small (42%). Three of the four large effect sizes were in studies of Mindfulness-Based Stress Reduction (MBSR), as were the only studies at low RoB. Three of five case reports found reliable/clinically significant changes.

Conclusions

Third-wave CBTs have a mostly small effectiveness for older adults. MBSR may facilitate larger changes in mood than other third-wave CBTs. The current literature base is small and at moderate RoB; as such, further research is much needed.

Practitioner Points

- Third-wave CBTs facilitate mostly small changes in mood and wellbeing for older adults.

- MBSR facilitated the largest changes, however only four studies reported effect sizes for this approach.
- Further research is required, as the current literature base examining third-wave CBTs with older adults is small.

Limitations

- The variance in study design (and substantial number of case reports), intervention and outcomes precluded the use of meta-analysis; this lack of a statistical synthesis reduces the robustness of the review's findings.
- The use of a more liberal definition of older adults may have allowed the inclusion of more studies.

Keywords: 'older adults', 'third-wave', 'cognitive behavioural therapy', 'ACT', 'CFT' 'MBSR', 'MBCT', 'DBT'.

Introduction

In 2018, there were 11.9 million people aged over 65 living in the United Kingdom, representing 18% of the total population (Office for National Statistics, 2019), and it is estimated that one fifth of the global population will be over 65 in the year 2050 (Chang et al., 2019). Older adulthood poses unique challenges due to the life events, lifestyle changes and physical health difficulties often present in later life, all of which can negatively impact mental health and wellbeing (Haigh et al., 2018). Given these myriad challenges, and the increasingly large proportion of the global population aged over 65, effective methods of helping older adults to maintain good mental health are of paramount importance (Reangsing et al., 2020).

Psychological therapies are one such method. There is substantial empirical evidence that traditional Cognitive Behavioural Therapy (CBT; Beck, 1991) is an efficacious treatment for older adults (Wuthrich et al., 2021). However, additional therapies have developed from CBT, and have been found effective across various age groups (Dimidjian et al., 2016): the so called 'third-wave' CBTs (Hayes, 2004). At present, there exist no published systematic reviews examining the effectiveness of a broad range of third-wave CBTs in older adults. This review aims to address that gap.

Psychological Challenges

The most commonly reported mental health problems in older adulthood are depression and anxiety (Thapa et al., 2020). Up to 20% of older adults experience depressive symptoms that are clinically significant (Kok & Reynolds, 2017). Rates of depressive symptoms reaching the diagnostic threshold for a depressive disorder are lower in older adults than in younger people; however, subthreshold depressive symptoms are more prevalent (Nair et al., 2020). Clinically significant anxiety is experienced by up to 14% of older adults (Witlox et al., 2018). As with depression, the prevalence of subthreshold anxiety difficulties is found to be higher (Grenier et al., 2011), with estimates reaching 52% (Witlox et al., 2018).

Psychological Therapies for Older Adults

There is substantial evidence to support the use of psychological interventions such as CBT to treat anxiety and depression in older adults (Wuthrich et al., 2021). Cognitive/Behavioural therapies are often conceptualised as having formed in three 'waves' (Hayes, 2004). The first of these, which developed around the start to middle of the 20th century, was based upon behavioural theories (Skinner, 1957). These therapies aimed to effect change through the behavioural principles of conditioning, with the primary target of therapy being the learned associations between, and problematic responses to, certain stimuli (Rachman, 2015).

The second wave was prompted by a dissatisfaction with the neglect of cognitive and language-based factors in first-wave behavioural therapies during the latter half of the 20th century (Hayes, 2004). The most popular of these (Öst, 2008), CBT (Beck, 1991), retained an interest in a person's behavioural responses, but introduced a mediating role of cognition, specifically in the form of dysfunctional/maladaptive thoughts and beliefs (Hayes, 2004). CBT aimed to facilitate therapeutic change via adaptations to both cognitions (replacing incorrect/maladaptive cognitions with more accurate/adaptive alternatives, known as 'cognitive restructuring') and behaviours (Beck, 1991). There is considerable evidence that CBT is effective when used with older adults (Kishita & Laidlaw, 2017). However, it has been suggested that the unhelpful or distressing thoughts of older adults may often be appropriate reflections of reality, and that some techniques of CBT, such as cognitive restructuring, may therefore not be as effective for this population (Wetherell et al., 2011). This has led to interest in the use of third-wave CBTs for older adults (Petkus & Wetherell, 2013).

The History of Third-Wave CBT

The term 'third-wave CBT' was coined by Hayes (2004) to describe those interventions borne out of the first and second waves of behavioural and cognitive therapies, but with the integration of additional and traditionally less empirically recognised elements such as mindfulness and acceptance (Dimidjian et al., 2016). These therapies are suggested to be part of a distinct 'wave' due to their transdiagnostic nature (Schaeuffele et al., 2021) and common processes. These include expanding behavioural repertoires by altering the way a person responds to emotions

(response-focused emotion regulation; Hofmann & Asmundson, 2008), and considering the function of cognition and behaviour in a given context (i.e., a philosophical foundation in functional contextualism; Collard, 2019). Other suggested common processes of third-wave CBTs are a focus on behavioural responses to cognitions (rather than their content; Feliu-Soler et al., 2018), an emphasis on personal values (Hayes & Hofmann, 2017), and the use of experiential (rather than didactic) methods (Hayes, 2004).

Hayes (2004) positioned a number of these 'third-wave' concepts as directly challenging parts of traditional CBT, such as its focus on emotion-causing stimuli (antecedent-focused emotion regulation; Hofmann & Asmundson, 2008) and techniques aiming to adapt the content of cognitions to reflect reality more accurately (based on a philosophical underpinning of logical empiricism/rationalism; Collard, 2019) in this approach (Hofmann & Asmundson, 2008). The suggested transdiagnostic third-wave focus on expanding behavioural/cognitive repertoires was described as a direct improvement on what was seen by some as a narrow, problem-based, symptom-reduction focus in the first and second waves (Hayes, 2004).

Below follows a brief description of the main third-wave CBTs and which components of each are thought to be important for older adults. The history and critiques of the 'third-wave' of CBT are then discussed, followed by a summary of the current evidence for the efficacy and effectiveness of these therapies. Finally, the potential benefits of these therapies for older adults are summarised and the aims of the review are outlined.

Mindfulness-Based Stress Reduction

Mindfulness-Based Stress Reduction (MBSR) has its roots in the Buddhist traditions of meditation and mindfulness but is intended to be more accessible for modern/western cultures (Kabat-Zinn, 2003). MBSR typically follows a standard 8-week group-based program of meditation and yoga, with the aim of cultivating improved mindfulness skills and enabling a person to observe and accept negative experiences (Zhou et al., 2020). It has been suggested that MBSR may be

particularly appropriate for older adults due to its emphasis on the mind-body link and the common need to manage health conditions in later life (Hazlett-Stevens et al., 2019).

Mindfulness-Based Cognitive Therapy

Mindfulness-Based Cognitive Therapy (MBCT) developed from MBSR and combines aspects of CBT with mindfulness meditations (Segal et al., 2002). As in MBSR, MBCT is usually delivered in a group format over 8 weeks (Pei et al., 2021). Those advocating for its use in older adults suggest that it may be relevant to such populations due to the search for personal meaning often reported during this life stage, and the emphasis on acceptance of oneself in MBCT (Foulk et al., 2014).

Acceptance and Commitment Therapy

Acceptance and Commitment Therapy (ACT) is based in relational frame theory (RFT; Hayes, 2004) and functional contextualism (Gifford & Hayes, 1999). It focuses primarily on increasing clients' openness to uncomfortable thoughts and emotions (and their awareness of the role of context), grounding awareness in the present moment, and committing to values-based action, skills referred to collectively as 'psychological flexibility' (Hayes et al., 2006).

Petkus and Wetherell (2013) put forward a rationale for the use of ACT with older adults, citing its transdiagnostic nature as appropriate for this population, where comorbid anxiety and depression are often reported. Gillanders and Laidlaw (2014) similarly suggest that ACT may be useful in later life, arguing that the focus on values and committed action may be particularly relevant for older adulthood, when values may be changing/have changed from earlier in life.

Compassion-Focused Therapy

Compassion-Focused Therapy (CFT) is based in evolutionary theories (Gilbert, 2009), and emphasises the universality of suffering (Craig et al., 2020). CFT conceptualises three emotion-regulation systems; drive, threat, and soothe, and aims to facilitate the balancing of these (Thomason & Moghaddam, 2020), with a focus on the up-regulation of the soothe system and self-compassion (Gilbert, 2009). Birdsey (2020) proposes that CFT may be effective in older adults due

to a focus on shame reduction, and the feelings of shame often reported by older adults when struggling with their mental health (Connor et al., 2010).

Dialectical Behavioural Therapy

Dialectical Behavioural Therapy (DBT) was originally developed for people diagnosed with Borderline Personality Disorder (BPD; Linehan, 1993). However, DBT has diversified since its inception, and is now used with various clinical populations (Ben-Porath et al., 2020). DBT aims to reduce distress and improve mental health through a program of mindfulness, emotion regulation skills, distress tolerance, and interpersonal effectiveness (Valentine et al., 2020). DBT may be appropriate for older adults due to the behavioural patterns already enacted by some of this population being similar to those encouraged in DBT – for example, a behavioural pattern of accepting reality (Lynch, 2000).

Conceptual Critiques of Third-Wave CBTs

The claims made by Hayes (2004) and others about third-wave CBTs drew numerous criticisms and rebuttals, many of which challenged the existence of a distinct new 'wave' of therapies. It should be noted, however, that many of these criticisms focused specifically on ACT, sometimes using this approach as representative of all third-wave CBTs (Carona, 2022). Hofmann and Asmundson (2008) rebutted many of Hayes' (2004) criticisms of CBT; for example, they countered the criticism of a narrow symptom-focus by highlighting that while symptoms are one focus of CBT, they are targeted in therapy by adapting cognitions and behaviour. They further argued that despite some differences in their approaches to cognitions and emotion regulation, ACT and CBT have far more similarities, such as their use of values, goals, and behavioural techniques. These authors claim that rather than being part of a new 'wave', ACT techniques are entirely compatible with, and simply additional tools for use in, traditional CBT (Hofmann & Asmundson, 2008). Similarly, MBCT and DBT have been described as "direct extensions" of CBT (Hofmann et al., 2010, p. 2).

Similarities between the individual techniques of third and second wave CBT have also been highlighted as evidence that there is no distinction between third-wave and traditional therapies. For example, the concept of 'decentering' thoughts in mindfulness has been likened to the 'distancing' concept used in traditional CBT (Hofmann et al., 2010). Arch and Craske (2008) argued that cognitive restructuring in traditional CBT necessitates exposure to (rather than avoidance of) anxiety-related cognitions and separates thinker and thought in a manner analogous to cognitive defusion, a key technique of ACT (Hayes et al., 2006). Hayes (2022) has recently recognised the historical use of acceptance and defusion/distancing in traditional CBT but argues that the goals of such techniques differ in traditional and third-wave CBTs. In the former, defusion and acceptance are used to facilitate cognitive restructuring/reappraisal, whereas in the latter these techniques are used to allow cognitive flexibility and alternative behavioural responses (Hayes, 2022).

Collard (2019) provided a more theoretical contrast of ACT and CBT and argued that the underlying theories of functional contextualism (in ACT) and logical empiricism (in CBT) both aim for a pragmatic, holistic understanding and assessment of functioning, including the role of context, and view avoidance as central to psychopathology. Collard (2019) concludes that similar constructs underpin both therapies, as well as MBCT and DBT, and that classifying them as members of separate waves may be misleading.

Empirical Critiques of Third-Wave CBTs

Criticisms of the empirical evidence for third-wave CBTs began even before Hayes' (2004) coining of the phrase/concept. These critiques initially focused on the volume of empirical evidence: Corrigan (2001) accused proponents of several new therapies of encouraging their use before adequate empirical testing had been completed. However, Kahl et al. (2012) conducted a later review of the literature on third-wave CBTs and, in contradiction to Corrigan (2001), concluded that the evidence base at that time provided empirical support for all such therapies.

As the size of the evidence base increased, the focus of critiques moved from the volume of evidence to its methodological quality. Öst (2008) conducted a systematic review of Randomised

Controlled Trials (RCTs) which examined third-wave CBTs and found that the methodological rigour of such studies was substantially lower than that of the traditional CBT literature. However, the procedure for making such comparisons (using 'twinned' ACT and CBT studies) has been criticised (Gaudiano, 2009). The problems identified by Öst (2008) included the use of waitlist or treatment as usual (TAU) comparison groups (rather than using other therapies as 'active control' groups) and combinations of multiple third-wave CBTs/other therapies combined with third-wave CBTs, among others. Hayes et al. (2013) rebutted the comparison of ACT and CBT studies by Öst (2008), arguing that it overlooked the transdiagnostic nature of ACT. Hayes et al. (2013) suggested that research into ACT and related therapies is more concerned with investigations of therapeutic processes than with the effectiveness of a given therapy for a given disorder.

Öst (2014) conducted a follow up review of ACT studies and found no significant improvements in methodological quality. Later reviews, such as that of Dimidjian et al. (2016), reported that the use of waitlist or TAU comparison groups continued to be a methodological limitation of RCTs examining third-wave CBTs. Dimidjian et al. (2016) also note that many meta-analyses of individual third-wave CBTs report low methodological quality in their included studies. The measurement of proposed mechanisms of change has also been criticised, due to issues of validity in measures of psychological flexibility (Tyndall et al., 2019) and a lack of consensus on a definition of mindfulness (Van Dam et al., 2018).

Despite these methodological concerns, meta-analyses show a moderate to large effectiveness of third-wave CBTs when compared to inactive (waitlist or TAU) control conditions (A-Tjack et al., 2015; Gloster et al., 2020; McCartney et al., 2021; O'Connor et al., 2018; Öst, 2008, 2014; Twohig & Levin, 2017). However, their effectiveness when compared to older therapies, in particular traditional CBT, is mixed. While some early findings supported ACT over CBT (Ruiz, 2012), meta-analyses consistently report that neither approach outperforms the other (Gloster et al., 2020; Churchill et al., 2013; Öst, 2014). Similar findings have been reported for comparisons of CBT with MBCT (Clarke et al., 2015) and MBSR (Khoo et al., 2019). These

findings challenge the initial claims of Hayes (2004) that such therapies were, or would become, superior to traditional CBT, and further undermine the existence of a distinct 'third-wave'.

Key champions (Hayes, 2004) and critics (Hofmann, 2008) of third-wave CBTs have been distancing themselves from the debate for some time and have more recently collaborated on process-based CBT (PB-CBT), a new approach to psychological therapy which abandons any role of waves or individual therapies (Hofmann & Hayes, 2019). PB-CBT retains the focus on context emphasised in third-wave CBTs, but aims for a more idiographic form of therapy, described in detail by Hayes et al. (2020).

Despite its abandonment by prolific researchers in the field, the phrase third-wave CBT, has continued to be popular in both the empirical and clinical arenas (Canvin et al., 2022; Stynes et al., 2022), suggesting that the previously recognised growth in its use (Dimidijian et al., 2016; Feliu-Soler et al., 2018) persists. As such, understandings of the empirical status of third-wave CBTs in various populations continue to be necessary.

Aims of the Current Review

It has been proposed that third-wave CBTs may be particularly effective for older adults due to their focus on acceptance fitting the unavoidable aspects of aging (Petkus & Wetherell, 2013). Furthermore, the experiential methods commonly used in third-wave CBTs (Dimidjian et al., 2016) could be well suited to the learning preferences of this population (Delahaye & Ehrich, 2008). Supporting such arguments, Wetherell et al. (2016) found ACT to be more effective for older adults, and CBT to be more effective for younger adults, in a chronic pain sample. Individual third-wave CBTs may also have specific characteristics which make them well suited to older adults, as described in the individual summaries above.

Despite this, there currently exist no systematic reviews of studies investigating the effectiveness of a broad range of third-wave CBTs in this population. Previous reviews have focused on pairs of third-wave CBTs (Geiger et al., 2016; Hazlett-Stevens et al., 2018; Kishita et al., 2016) and found that such therapies are effective for depression, anxiety and affect in older

adults. To the author's knowledge, the applications of CFT and DBT in this population have not been included in any specific or broad systematic reviews of the older adult literature. As such, this review aims to provide a contemporary examination of Risk of Bias (RoB) in the available literature on third-wave CBTs in older adults, and their effectiveness in decreasing anxiety/depression, and increasing wellbeing, in this population.

Method

Search Strategy

To identify literature relevant to the aims of this review, seven electronic databases (four of published and three of unpublished research) were initially searched between the 9th and 13th October 2020: SCOPUS, PsycINFO, Medline, Cochrane Library, ProQuest, WhiteRose and OpenGrey. Table 1 shows the search terms used in all seven databases. All searches were re-run on the 15th September 2021. No date restriction was applied to the search. The protocol for this systematic review was pre-registered on the PROSPERO database and can be accessed at https://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42020187024.

Table 1

Search terms used in database searches (columns joined by 'AND')

Population	Third-wave Cognitive Behavioural Therapy	Outcomes
"older adult*" OR "elderly" OR "geriatric*" OR "over 65*" OR "over-65*" OR "over sixty-five*" OR "over-sixty five*" OR "over sixty five*"	"third-wave cognit*" OR "third-wave cognit*" OR "Acceptance and commitment therapy" OR "compassion focused therapy" OR "compassion-focused therapy CFT" OR "Mindfulness based cognitive therapy" OR "Mindfulness-based cognitive therapy" OR "MBCT" OR "Dialectical behavio*r* therapy" OR "DBT" OR "Mindfulness-based stress reduction" OR "Mindfulness based stress reduction" OR "MBSR"	"depression" OR "anxiety" OR "psychological wellbeing" OR "psychological-wellbeing" OR "emotional wellbeing" OR "emotional-wellbeing" OR "wellbeing" OR "well-being" OR "distress" OR "mood"

To develop these search terms, the relevant literature on third-wave CBTs and older adult mental health was referred to, with relevant terms selected and relevant synonyms added. The chosen search terms were joined by the appropriate Boolean operators, with individual search terms in each of the three categories (population, intervention, outcome) joined by 'OR', and these categories were then joined by the Boolean operator 'AND'. Finally, a truncation symbol (*) was added to all appropriate search terms. In addition to the searching of electronic databases, forward and backward citation searching was completed.

Inclusion/Exclusion Criteria for Selection

The titles and abstracts of search results were initially screened, followed by subsequent screening of the full texts of those papers deemed eligible at the title and abstract level. To ensure the selected papers were relevant to the review's aims inclusion and exclusion criteria (shown in Table 2) were developed and applied while screening the titles, abstracts and full texts of search results.

Table 2

Inclusion and exclusion criteria

Inclusion	Exclusion
Samples of participants who are exclusively 65 or over	Forms of popular media (newspapers, books, book reviews, editorials, blog posts etc.)
Papers reporting on the application of the following third-wave/mindfulness-based therapies: ACT, CFT, DBT, MBSR, MBCT	Systematic, scoping, critical and literature reviews
Studies using a quantitative methodology	Discussion papers, guidance documents etc.
Studies which evaluate effectiveness	Studies using solely a qualitative methodology
Studies with wellbeing/mood/depression/anxiety as the	

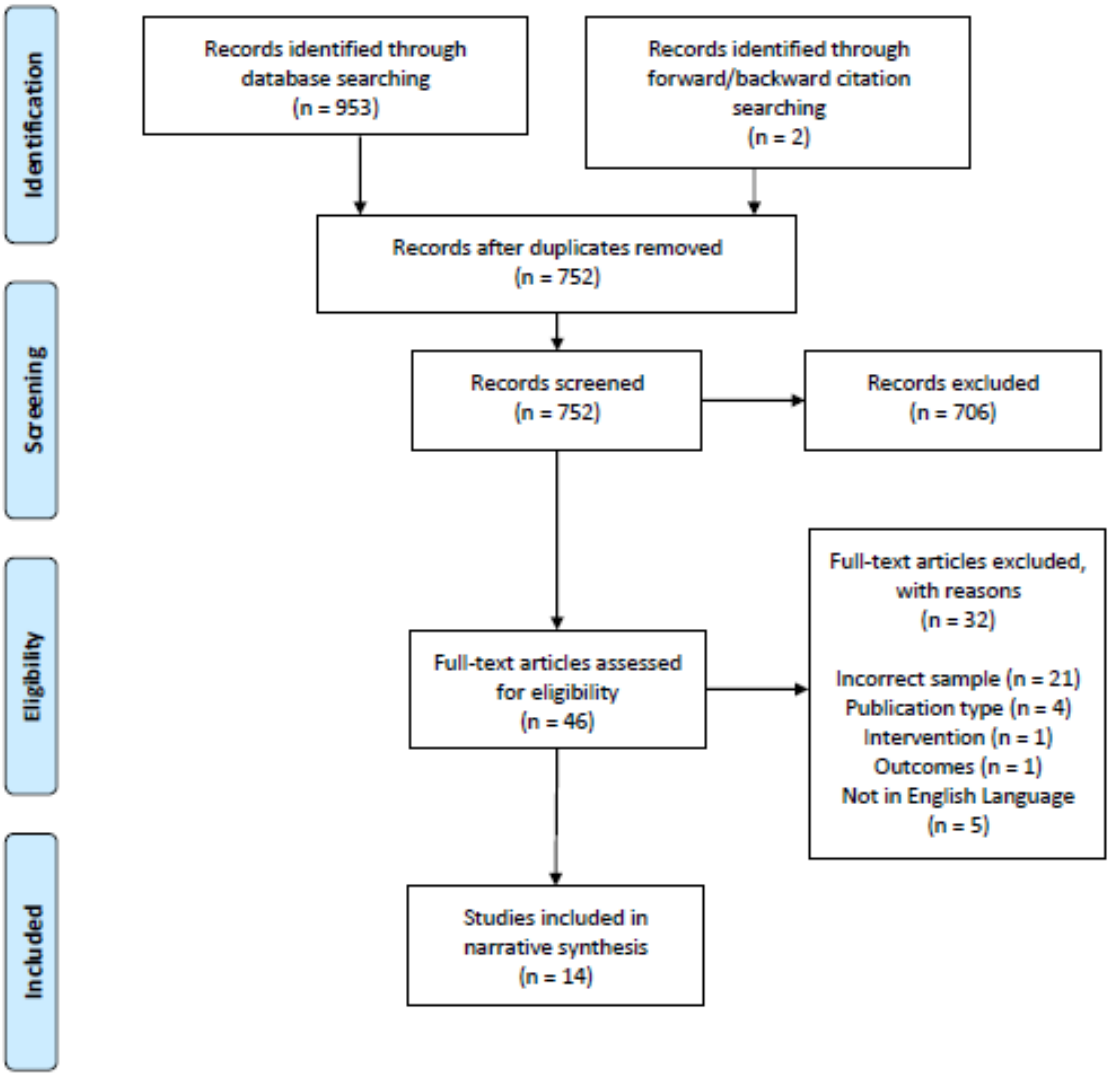
dependent variable/s, assessed with standardised measures Papers published in the English language	Studies with sample inclusion criteria requiring, or studies focused on, populations with neurological conditions (dementias, mild cognitive impairment etc.)

Note. ACT = Acceptance and Commitment Therapy, CFT = Compassion Focused Therapy, DBT = Dialectical Behaviour Therapy, MBSR = Mindfulness-Based Stress Reduction, MBCT = Mindfulness-Based Cognitive Therapy.

A second rater (trainee clinical psychologist) conducted additional full-text screening of a randomly selected subset (k = 7, 50%) of the papers included following title and abstract screening. There was inter-rater agreement on including/excluding 6/7 (86%) of papers – disagreement on the remaining paper was resolved following discussion. Figure 1 presents a PRISMA diagram (Moher et al., 2009) showing the flow of database searches, application of inclusion/exclusion criteria and study selection.

Figure 1

PRISMA diagram showing search strategy and study selection



Risk of Bias Assessment

The Cochrane handbook recommends that systematic reviews now refer to RoB, rather than 'methodological quality', due to concerns regarding the ambiguity of this latter term (Higgins & Green, 2011). As such, the phrase RoB will be used in this review to discuss the findings of such assessments. However, the assessment tools described below report their results in terms of methodological quality; these results will instead be discussed in terms of RoB in the Results and

Discussion sections of this review. A finding of ‘good’ methodological quality, for example, will instead be described as a finding of ‘low RoB’.

RoB in eligible studies was assessed using published RoB assessment tools matched to the study designs used; experimental (i.e., randomised/non-randomised controlled trials; RCT/N-RCT), quasi-experimental (i.e., longitudinal within-subjects studies), and case reports. For experimental studies the Downs and Black (1998) tool was used. This 27-item checklist assesses the quality, external validity, bias, and power of a study, with item scores of “1 (yes)”, “0 (no)”, and/or “0 (unable to determine)” and “1 (partially)” for item 5 only, where “yes” gives a score of 2. As in Hague et al. (2016), a modified version of the final item on statistical power was used, scoring studies for whether they did or did not include a power analysis (1 “yes” or 2 “no”). The maximum attainable score was therefore 28, and scores were classified as excellent (low RoB; 26-28), good (low RoB; 20-25), fair (moderate RoB; 15-19) or poor (high RoB; <14; Williams et al., 2021).

RoB in quasi-experimental designs was assessed using the National Institute of Health (NIH) Quality Assessment Tool for Before-After (Pre-Post) Studies With No Control Group, as recommended by Ma et al. (2020). This is a 12-item checklist of internal validity and bias. This tool does not give studies numerical scores but is intended to assist raters to categorise studies as good (low RoB), fair (moderate RoB) or poor (high RoB) by directing their attention to certain areas of study design and potential bias.

Finally, to assess RoB in case reports the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Case Reports (Moola et al., 2017) was used. Items in this tool are rated as “Yes”, “No”, “Unclear”, or “Not Applicable”. The items in the JBI Critical Appraisal Checklist for Case Reports do not confer numerical scores, and the outcome for each study assessed is rated as either ‘include’ (low RoB), ‘exclude’ (high RoB) or ‘seek further information’, based upon the rater’s overall assessment of the tool’s findings.

To ensure robustness in the RoB assessment process, a random sample of four papers were subject to additional appraisal by a second rater (trainee clinical psychologist). Inter-rater reliability was excellent (Koo & Li, 2016), ICC = .94, 95% CI [.87 - .97], $F(26) = 31.46$, $p < .001$.

Data Synthesis

Due to the variability of study designs, types of therapy, populations and dependent variables/outcome measures in the eligible studies, the review's aim of examining effectiveness was addressed using a narrative synthesis. This decision was pre-registered in the event that a meta-analysis was not possible. Narrative synthesis of experimental/quasi-experimental outcomes (effect sizes) was conducted and grouped by timepoint (post-intervention, follow up), with subgroupings of study design and outcomes measured, followed by a synthesis of case report findings.

Results

After title, abstract and full text screening of the initial search results, 10 eligible studies were identified. Forward citation searching of these eligible studies found one additional study, as did backward citation searching, giving a sample of 12 eligible studies. Two additional eligible studies were found when searches were re-run on the 15th of September 2021 (Birdsey, 2020; Campbell et al., 2021), giving a final sample of 14 studies. One study (Alonso et al., 2013) was the pilot of a later full study (Alonso-Fernández et al., 2016). The corresponding author of these studies was contacted via email, and they confirmed that the two studies used independent data. Table 3 shows information relating to study design, sample, intervention and outcome measures, and a summary of findings for each of the included studies. Statistical details relating to effect sizes and statistical significance are shown in Tables 4, 5 and 6.

Table 3

Summaries of included studies

Study and Location	Sample Size	Publication Type	Design	Population/ Presenting Difficulties	Participant Characteristics	Intervention, Mode of Delivery	Outcome Measures	Results Summary	RoB Assessment
Alonso et al. (2013), Spain	*N* = 10	Peer-reviewed Journal	Pilot study, RCT	Chronic Pain	71-91 80% Female	ACT-SOC, Group	GDS-10 (Spanish version)	Non-significant within-group changes in, or between-group effects for, depression.	High
Alonso-Fernández et al. (2016), Spain	*N* = 53	Peer-reviewed Journal	RCT	Chronic Pain	*M* 83 *SD* 6.8 78.6% Female	ACT-SOC, Group	GDS (Spanish version), Pain Anxiety Symptoms Scale-Short Form	Significant within-group decreases in depression and pain anxiety for the ACT-SOC group. Non-significant within-group changes for the control group. Non-significant between-groups differences in depression, but significant between-groups differences in anxiety, at post-intervention.	Moderate
Birdsey (2020), United Kingdom	*N* = 1	Peer-reviewed Journal	Case Report	Physical Health Difficulties	68, Male	CFT/CBT, Individual	PHQ-9, GAD-7	No reliable or clinically significant change in depression or anxiety scores.	Low
Campbell et al. (2021), United Kingdom	*N* = 1	Peer-reviewed Journal	Case Report	Chronic Pain	72, Male	ACT, Individual	GDS-SF	Reliable and clinically significant decreases in depression scores.	Low
Dewey (2018), United Kingdom	*N* = 9	Thesis	Feasibility study, quasi-experimental	Mental health difficulties	*M* 70.8 *SD* 5 71% Female	ACT, Group	HADS	Significant pre-post intervention decreases in anxiety, but these were not maintained at follow up. Non-significant pre-post or pre-follow up changes in depression.	Moderate
Ernst et al. (2008), Germany	*N* = 16	Peer-reviewed Journal	Feasibility study, N-RCT	Nursing home residents	72-98 Median 83.5 73% Female	MBSR, Group	GDS-12R	Significant pre-post intervention decreases in depression for the MBSR group, non-significant changes in	Moderate

								depression for the control group. Significant between-group effects for depression at post-intervention.	
Gallegos et al. (2013), United Kingdom	*N* = 100	Peer-reviewed Journal	Quasi-experimental	Community dwelling older adults	*M* 72.1 *SD* 6.7 62% Female	MBSR, Group	PANAS Positive Affect Scale	Significant pre-post intervention increases in positive affect.	Low
Jourdain & Dulin (2009), New Zealand	*N* = 1	Peer-reviewed Journal	Case Report	Health Anxiety	68, Male	ACT, Individual	HAQ, PANAS,	Reliable and clinically significant changes in health anxiety, negative affect and psychological flexibility at post-intervention and 6 weeks follow up. No reliable changes in positive affect at either time point.	Low
Lunde & Nordhus (2009), Norway	*N* = 1	Peer-reviewed Journal	Case Report	Chronic Pain (Headaches)	70, Female	ACT-CBT, Individual	BDI	No reliable or clinically significant changes in depression at post-intervention or 6 months follow up.	Low
Martins (2012), Portugal	*N* = 24	Dissertation	RCT	General Population	65-73 *M* 72 63% Female	MBSR, Group	PANAS, PWBS	Significant pre-post intervention changes in positive affect and psychological wellbeing for the treatment group, but not the control group. Significant pre-post intervention changes in negative affect for both groups. Significant between-groups effects for positive affect and psychological wellbeing at post-intervention, non-significant between-groups effects for negative affect.	Moderate
O'Connor et al. (2014), Denmark	*N* = 36	Peer-reviewed Journal	Pilot study, N-RCT	Spousal Bereavement	*M* 77 67% Female	MBCT, Individual	BDI-II	Non-significant decreases in depression at post-intervention and 5-month follow up for those in the MBCT group. Non-significant changes in depression for the control group at either time point	Moderate

Roberts & Sedley (2016), New Zealand	*N* = 1	Peer-reviewed Journal	Case Report	GAD, Depression	89, Female	ACT, Individual	GDS, HADS	Reliable and clinically significant changes in depression. No reliable or clinically significant changes in anxiety.	Low
Scott et al. (2016), United Kingdom	*N* = 60	Peer-reviewed Journal	Quasi-experimental	Chronic Pain	*M* 69.3 *SD* 4.2 62.7% Female	ACT, Group	PHQ-9,	Significant decreases in depression at post-intervention and 9 months follow up.	Moderate
Zhang et al. (2015), China	*N* = 60	Peer-reviewed Journal	RCT	Insomnia	*M* 78.1 58% Female	MBSR, Group	GDS, SAS	Significant pre-post intervention decreases in depression for the MBSR group. Non-significant changes in depression in the control group. Non-significant pre-post intervention changes in anxiety for either group. Significant post-intervention between-groups effect for depression, non-significant post-intervention between-groups effect for anxiety.	Low

Note. RoB = Risk of Bias, RCT = Randomised Controlled Trial, ACT-SOC = Acceptance and Commitment Therapy-Selective Optimisation with Compensation, CFT = Compassion-Focused Therapy, CBT = Cognitive Behavioural Therapy, ACT = Acceptance and Commitment Therapy, GDS-10 = Geriatric Depression Scale-10, GDS = Geriatric Depression Scale, Geriatric Depression Scale – Short Form, HADS = Hospital Anxiety and Depression Scale, N-RCT = Non-Randomised Controlled Trial, GDS-12 = Geriatric Depression Scale-12, MBSR = Mindfulness-Based Stress Reduction, PANAS = Positive and Negative Affect Scale, HAQ = Health Anxiety Questionnaire, DASS = Depression Anxiety Stress Scales, BDI = Beck Depression Inventory, PWBS = Psychological Wellbeing Scale, MBCT = Mindfulness-Based Cognitive Therapy, BDI-II = Beck Depression Inventory-II, GAD = Generalised Anxiety Disorder, PHQ-9 = Patient Health Questionnaire-9, SAS = Self-rating Anxiety Scale.

Study Designs

The included studies used various research methods and designs. Four used RCT designs, two were N-RCTs, three used quasi-experimental designs, and five were case reports. Five of the experimental studies used waitlist or untreated comparison groups, and one (Alonso-Fernández et al., 2016) used a minimal support comparison group, who received a two hour talk on Selective Optimisation with Compensation (SOC) strategies, but no psychological support. There was considerable variability in sample sizes; the largest sample analysed was $N = 100$ (Gallegos et al., 2013), and the smallest were the case reports, with samples of $N = 1$. Overall, the 14 included studies analysed data from $N = 373$ adults aged over 65. All studies used standardised measures of affect (positive affect (PA)/negative affect (NA)/anxiety/depression), and one (Martins, 2012) used a standardised measure of psychological wellbeing (PWB).

Mode of Delivery

The majority of studies ($k = 8$) used group-based therapy, with the remainder ($k = 6$) delivering therapy in a one-to-one format. Of these one-to-one therapies, five were described in case reports ($k = 4$ ACT or ACT/CBT, $k = 1$ of CFT/CBT), leaving only one experimental study examining a one-to-one intervention (O'Connor et al., 2014; MBCT). The mean number of therapy sessions was nine, with an average contact time of 10.5 hours. However, Scott et al. (2016) did not report number of sessions and, along with Jourdain and Dulin (2009) and Campbell et al. (2021), did not report session duration. In 11 studies adaptations such as shortening sessions, reducing the number of sessions, and simplifying content were made in efforts to make third-wave CBTs more appropriate for older adults.

Individual Third-Wave CBTs for Older Adults

Four different third-wave CBTs were assessed in the included studies. $k = 8$ assessed the effectiveness of ACT, $k = 4$ assessed the effectiveness of MBSR, $k = 1$ assessed the

effectiveness of MBCT and $k = 1$ assessed the effectiveness of CFT. No eligible studies investigating the effectiveness of DBT in over-65s were found.

RoB Assessments

Experimental Designs

Appendix A presents the full results of the RoB assessment using the Downs and Black (1996) quality assessment tool. Four (66%) of the six experimental studies were rated as at moderate RoB with one study rated as at high RoB, primarily due to scoring 'No' on all internal validity items (Alonso et al., 2013). The RCT by Zhang et al. (2015) was the only experimental study rated as at low RoB or to be adequately powered/to report power analyses in enough detail to determine adequate power. This highlights a potentially significant RoB in the included experimental studies, as adequate power is essential for robust and reliable statistical findings, and the avoidance of Type II errors (Baker et al., 2020).

Quasi-experimental Designs

Appendix B shows the results of the NIH Quality Assessment Tool for Before-After (Pre-Post) Studies With No Control Group. Of the three quasi-experimental studies included in this review, one was found to be at low RoB (Gallegos et al., 2013), and two were found to be at moderate RoB (Dewey, 2018; Scott et al., 2017). In all quasi-experimental studies, study details were described adequately, and appropriate statistical analyses were used. As for the experimental studies, reporting of statistical power was poor. The presence or absence of blinded/non-blinded assessors could not be determined for any of the quasi-experimental studies, therefore the potential bias introduced by non-blinded assessors could not be excluded.

Case Reports

The full results of the JBI Critical Appraisal Checklist for Case Reports for each of the five case reports can be found in Appendix C. The included case reports were rated as at

low RoB. However, all failed to provide adequate details of the assessments or diagnostic tests used in the case being described. This may reflect the purported transdiagnostic focus of third-wave CBTs (Schaeuffele et al., 2021).

RoB by Intervention

RoB assessments were also grouped by intervention type, to examine differences in RoB for studies examining specific third-wave CBTs in older adults. For the eight studies examining ACT, overall RoB was moderate, with seven studies rated as at moderate or low RoB, and one rated as at high RoB (Alonso et al., 2013). The four studies examining MBSR were of moderate-low overall RoB, with RoB for two rated as moderate, and for two rated as low (Gallegos et al., 2013; Zhang et al., 2015). The single study assessing the effectiveness of MBCT was rated as at moderate RoB (O'Connor et al., 2014), and the single study assessing CFT was rated as at low RoB (Birdsey, 2020).

Narrative Synthesis of Effect Sizes

Sample sizes, effect sizes (Cohen's *d*) and measures of statistical significance (*p* values) for included studies are shown in Tables 4, 5 and 6, along with the results of RoB assessments. Where not reported, effect sizes were calculated by the current author if sufficient information was reported or made available (Cohen, 1992; Morris, 2008). Ernst et al. (2008) did not report effect sizes and reported insufficient data for the calculation of these. The study authors were contacted via email to request further data, but no responses were received. All effect sizes were converted to Cohen's *d* (Cohen, 1992) prior to synthesis following published guidelines (Dunlap, 1994; Fritz et al., 2012; Lenhard & Lenhard, 2016; Peterson & Brown, 2005; Rosenthal, 1994; Thalheimer & Cook, 2002).

The included studies provided a total of 21 effect sizes for older adults receiving a third-wave CBT and ten between-groups effect sizes comparing a third-wave CBT to a comparison group. Cohen (1992) provides three categories of effect size: small (d = 0.2-0.5),

medium (d = 0.5-0.8) and large (d = 0.8 and above). Effect sizes of less than d = 0.2 are considered trivial (Sullivan & Feinn, 2012). For samples/groups receiving a third-wave CBT, two of the effect sizes were trivial, ten were small, five were medium effects and four were large. For between-groups comparisons, one trivial, three small, four medium and two large effect sizes were reported.

Table 4

Effect size and RoB assessments of experimental/quasi-experimental studies measuring depression

			Depression					
			Pre-Post	Pre-Follow Up	Post-Follow Up	Between-Groups Post	Between-Groups Follow Up	RoB Assessment
Study, Intervention, Design	Sample		*d (p)*	*d (p)*	*d (p)*	*d (p)*	*d (p)*	
Alonso et al. (2013), ACT-SOC, RCT	*N* = 10	Intervention *n* = 5	0.69[a] (0.04)*	-	-	0.75 (0.45)	-	High
		Control (Waitlist) *n* =5	0.77[a] (0.04)*	-	-			
Alonso-Fernández et al. (2016), ACT-SOC, RCT	*N* = 53	Intervention *n* = 27	0.32[a] (0.05)*	-	-	0.37 (NR)	-	Moderate
		Control (Minimal Support) *n* = 26	0.01[a] (0.92)	-	-			
Dewey (2018), ACT, Quasi-experimental	*N* = 9 (Pre-Post *n* = 9, Pre-Follow	-	0.37 (0.04)*	0.54 (0.24)	0.06 (0.92)	-	-	Moderate

	Up/Post-Follow Up *n* = 7)							
Ernst et al. (2008), MBSR, N-RCT	*N* = 16	Intervention *n* = 9	NR (0.04)*	-	-	NR (0.011)*	-	Moderate
		Control (Untreated) *n* = 7	NR (NR)	-	-			
Scott et al. (2016), ACT, Quasi-experimental	*N* = 60 (Pre-Post *n* = 60, Pre-Follow Up/Post-Follow Up *n* = 30)	-	0.64 (<.001)**	0.40 (<.05)*	0.205[a] (NR)	-	-	Moderate
O'Connor et al. (2014), MBCT, N-RCT	*N* = 36	Intervention *n* = 18	0.14 (NR)	0.43[a] (NR)	0.35[a] (NR)	0.11 (NR)	0.41[a] (NR)	Moderate
		Control (Waitlist) *n* = 18	0.28 (NR)	0.05[a] (NR)	0.22[a] (NR)			
Zhang et al. (2015), MBSR,	*N* = 60	Intervention *n* = 30	1.20 (NR)	-	-	0.58 (0.03)*	-	Low

RCT	Control (Waitlist) *n* = 30	0.12 (NR)	-	-

Note. Number of decimal points for *p* values reported as in the respective paper. Statistical significance reported where available. RoB =Risk of Bias, RCT = Randomised Controlled Trial, N-RCT = Non-Randomised Controlled Trial, ACT-SOC = Acceptance and Commitment Therapy-Selective Optimisation with Compensation, ACT = Acceptance and Commitment Therapy, MBCT = Mindfulness-Based Cognitive Therapy, MBSR = Mindfulness-Based Stress Reduction, NR = Not Reported.

[a] Effect size calculated by review author.

* $p < .05$. ** $p < .001$.

Table 5

Effect size and RoB assessment of experimental/quasi-experimental studies measuring anxiety

			Anxiety					
			Pre-Post	Pre-Follow Up	Post-Follow Up	Between-Groups Post	Between-Groups Follow Up	RoB Assessment
Study, Intervention, Design	Sample		*d (p)*	*d (p)*	*d (p)*	*d (p)*	*d (p)*	
Alonso-Fernández et al. (2016), ACT-SOC, RCT	*N* = 53	Intervention *n* = 27	0.48[a] (0.01)*	-	-	0.56 (0.05)*	-	Moderate
		Control (Minimal Support) *n* = 26	0.03[a] (0.84)	-	-			
Dewey (2018), ACT, Quasi-experimental	*N* = 9 (Pre-Post *n* = 9, Pre-Follow Up/Post-Follow Up *n* = 7)	-	0.90 (<0.05)*	0.75 (0.16)	0.24 (0.67)	-	-	Moderate
Zhang et al. (2015), MBSR, RCT	*N* = 60	Intervention *n* = 30	0.31 (NR)	-	-	0.42 (0.11)	-	Low

	Control (Waitlist) n = 30	0.14 (NR)	-	-

Note. Number of decimal points for *p* values reported as in the respective paper. Statistical significance reported where available. RoB = Risk of Bias, RCT = Randomised Controlled Trial, ACT-SOC = Acceptance and Commitment Therapy-Selective Optimisation with Compensation, ACT = Acceptance and Commitment Therapy. MBSR = Mindfulness-Based Stress Reduction, NR = Not Reported.

[a] Effect size calculated by review author.

* p <.05. ** p <.001.

Timepoints

Pre-post third-wave CBT intervention group effect sizes in experimental and quasi-experimental studies showed considerable variance, and ranged from trivial to large with four large, three medium, and five small effect sizes reported, along with one trivial effect. The pre-post results of studies rated as having low RoB report large effect sizes for PA (Gallegos et al., 2013) and depression (Zhang et al., 2015). Zhang et al. (2015) also report one small pre-post effect size for anxiety. Four pre-follow up and four post-follow up effects were described across four studies, with one trivial, five small, and two medium follow up effect sizes reported.

These findings suggest that the pre-post effectiveness of third-wave CBTs is considerably varied, with reported effect sizes spread across the categories of trivial, small, medium and large. Effectiveness was reduced at follow up, where 75% of reported effect sizes were small or trivial; the effectiveness of third-wave CBTs for older adults thus appears to decrease over time.

Study Designs

Pre-post intervention effect sizes reported in the experimental studies were mixed, with four small, two medium and two large effects reported for the intervention groups. Between-groups effects were reported by six studies, with nine at post-intervention (one trivial, two small, four medium, and two large effects) and one at follow up (small effect; O'Connor et al., 2014). Only one experimental study was at low RoB (Zhang et al., 2015), reporting large and small effect sizes. These findings again show variance in effect sizes at post-intervention, suggesting that third-wave CBTs have a medium effectiveness when compared to control group conditions.

Two of the four pre-post effect sizes reported in quasi-experimental studies were large (Dewey, 2018; Gallegos et al., 2013), with single medium and small effects also reported. The study of Gallegos et al. (2013) was rated as having low RoB and had the largest sample size of the included studies (N = 100). RCT findings are generally considered as the highest standard of evidence (Lilienfeld et al., 2018). Therefore, despite the finding that 50% of quasi-experimental

effect sizes were large, the mixed findings of the experimental studies further demonstrate the considerable variance in pre-post effect sizes.

Depression and Anxiety

Pre-Post Depression and Anxiety. Of the studies reporting effects for depression at post-intervention, there was one large effect, two medium effects, two small effects, and one trivial effect. For anxiety, two small effects and one large effect were reported. The only depression and anxiety study rated as at low RoB (Zhang et al., 2015) found a large effect for depression but a small effect for anxiety. These findings are additionally robust as this study was adequately powered (as determined by a priori power analysis). Studies rated as at moderate RoB, but with the larger sample sizes of the included studies (Alonso-Fernández et al., 2016; Scott et al., 2016) reported small and medium pre-post effect sizes, respectively, for depression, and a small effect size for anxiety (Alonso-Fernández et al., 2016). However, Alonso-Fernández et al. (2016) delivered a combined ACT-SOC intervention, and therefore the unique contribution of ACT to these effects cannot be determined. Despite this, the overall findings of included studies suggest that third-wave CBTs have a moderate effect on depression, and a small effect on anxiety, at post-intervention.

Between-groups Effects. Single medium and small between-groups effects in favour of third-wave CBTs were reported for depression. A non-significant medium effect favouring the control condition was reported by Alonso et al. (2013), with greater reductions in depression for the control group than the ACT-SOC intervention group. Similarly, O'Connor et al. (2014) found that their waitlist control group showed a greater pre-post decrease in depressive symptoms than the MBCT intervention group, although the between-groups effect at post-intervention was trivial. Small non-significant and medium significant between-groups effects were reported for anxiety, with the former study (Zhang et al., 2015) being at low RoB. These findings suggest that, overall, third-wave CBT facilitates a small increase in effectiveness when compared to TAU/waitlist control conditions at post-intervention.

Follow Up. Only three experimental (RCT, N-RCT)/quasi-experimental studies measured outcomes at follow up, and effect sizes at this time point ranged from small to medium for pre-follow up effects and trivial to small for post-follow up. Follow up effects were overall smaller than at post-intervention, with no large effect sizes reported at this time point.

For depression, there were two small pre-follow up effect sizes, one of which was non-significant (O'Connor et al., 2014). One medium, non-significant pre-follow up effect was also reported (Dewey, 2018). Two small effect sizes were found at post-follow up, one of which was non-significant (Dewey, 2018) along with one trivial effect. Only O'Connor et al. (2014) reported between-groups effects at follow up, finding a small effect favouring the intervention group. These limited findings suggest that the effects of third-wave CBTs for depression may persist at follow up, albeit with smaller effects than at post intervention.

Only one effect size for anxiety at follow up was reported (Dewey, 2018), showing a medium effect in pre-follow up comparisons, and a small effect in post-follow up analyses. Conclusions about the effectiveness of third-wave CBTs for anxiety at follow up cannot be drawn based on the findings of this single study, which was at moderate RoB and had a small sample size.

Individual Therapies. Four studies reported ACT pre-post effect sizes for depression, and two for anxiety. There were two small and two medium pre-post effects for depression. For anxiety, small and large pre-post effects were reported in studies with moderate RoB.

Between-groups pre-post effect sizes were small and medium for ACT and depression, although the latter was non-significant and from a high RoB study. Only one pre-post between-groups effect was reported for ACT and anxiety, showing a small effect (Alonso-Fernández et al., 2016).

Single small and non-significant medium pre-follow up effect sizes were reported for ACT and depression, with non-significant trivial and small post-follow up effects also found. Dewey (2018) reports medium pre-follow up and small post-follow up non-significant effects of ACT for anxiety.

Only one study (Zhang et al., 2015) reported effect sizes of MBSR for depression and anxiety. They found a large post-intervention effect for depression (d = 1.20, the largest effect size reported in all included studies), and a medium between-groups effect. For anxiety, there was a non-significant, small effect after MBSR. There was a single non-significant medium between-groups effect size. Ernst et al. (2008) reported significant pre-post reductions in depression for the MBSR group, and a significant between-groups effect.

O'Connor et al. (2014) delivered MBCT in an N-RCT and found a small pre-post effect on depression for the waitlist control group but only a trivial effect for the intervention group, with a similarly trivial between-groups effect. However, small pre- and post-follow up effects were found for the intervention group, with trivial and small effects found for the control group. There was a small between-groups effect at follow up, in favour of the intervention group.

These findings show a small-medium effectiveness of ACT for depression and a small effectiveness of ACT for anxiety, although contradictory findings were reported by the two studies examining this at pre-post intervention. Only one study of MBSR, and one of MBCT, provided effect sizes for depression and anxiety, although the former was at low RoB and suggests a large effect for depression and a small effect for anxiety. MBCT was less supported, with small or trivial effects found. The effectiveness of third-wave CBTs appears to vary depending on the specific therapy used, although the disproportionate number of studies examining ACT in the current synthesis mean such findings must be interpreted with caution.

Positive/Negative Affect (PA/NA) and Psychological Wellbeing (PWB)

Pre-post effect sizes for PA, NA and PWB were reported for MBSR only, as shown in Table 6. Large and medium pre-post PA effects were reported, along with a medium between-groups effect. Notably, the large effect was reported by Gallegos et al. (2013), in a study rated as having low RoB and with the largest sample size of all eligible studies (N = 100). This study also examined the individual components of MBSR (sitting meditation, informal meditation, body scan and yoga), and found that only yoga explained unique variance in PA improvement.

Only Martins (2012) measured NA and PWB, using an RCT design. For NA there was a large pre-post intervention effect, with a non-significant, albeit large, between-groups effect. For PWB there was a medium pre-post intervention effect and a large between-groups effect. No studies examined the effectiveness of third-wave CBTs on PA, NA or PWB at follow up. While limited, these findings suggest that MBSR may be effective for affect and wellbeing and can outperform waitlist control conditions for these outcomes.

Table 6

Effect size and RoB assessment of experimental/quasi-experimental group MBSR studies measuring Positive/Negative Affect and Psychological Wellbeing

				Pre-Post	Between-Groups Post	RoB Assessment
Study, Intervention, Design	Sample		Outcome	*d (p)*	*d (p)*	
Martins (2012), MBSR, RCT	*N* = 24	Intervention *n* = 12	PA	0.42[a] (<.01)*	0.68[a] (<.01)*	Moderate
			NA	0.92[a] (<.01)*	0.90[a] (0.18)	
			PWB	0.70[a] (<.01)*	0.86[a] (<.05)*	
		Control (Waitlist) *n* = 12	PA	0.19[a] (0.06)		
			NA	0.21[a] (<.01)*		
			PWB	0.11[a] (<.05)**		
Gallegos et al. (2005), MBSR, Quasi-experimental	*N* = 100		PA	1.03 (<.001)**	-	Low

Note. Number of decimal points and *p* values/alpha levels reported as in the respective paper. RoB = Risk of Bias, RCT = Randomised Controlled Trial, MBSR = Mindfulness-Based Stress Reduction, PA = Positive Affect, NA = Negative Affect, PWB = Psychological Wellbeing.

[a] Effect size calculated by review author.

* p <.05. ** p <.001.

Case Reports

Three case reports (Birdsey, 2020; Lunde & Nordhus, 2009; Roberts & Sedley, 2016) did not report reliable or clinically significant change analyses. As such, the presence or absence of such changes was determined by the author of this review, based on previously reported reliable change indices/clinically significant change analyses (GAD-7; Boehlen et al., 2020; HADS; Hague et al., 2015; PHQ-9; Chaplin et al., 2015; GDS; Scholey & Woods, 2003; BDI; Vøllestad et al., 2011). All case reports were rated as 'include' by the quality assessment tool, demonstrating low RoB.

For ACT, two case reports demonstrated reliable and clinically significant changes in depression (Campbell et al., 2021; Roberts & Sedley, 2016), and one found no reliable or clinically significant depression changes following an ACT-CBT intervention (Lunde & Nordhus, 2009). Jourdain and Dulin (2009) found reliable post-ACT changes in health anxiety and NA which persisted at follow up, but no reliable changes in PA. Roberts and Sedley (2016) found no reliable changes in generalised anxiety. These findings support those of the experimental/quasi-experimental studies, which showed a greater effectiveness of ACT for depression than anxiety.

One case report (Birdey, 2020) examined a combination CBT and CFT intervention. No reliable or clinically significant changes were found for anxiety or depression, both of which remained above clinical cut-offs. However, the participant received double the number of CBT sessions (21 CBT vs 7 CFT), making conclusions about CFTs effectiveness difficult to draw.

Discussion

This systematic review aimed to examine RoB in, and the findings of, current research on the effectiveness of third-wave CBTs for addressing anxiety, depression, and wellbeing in those over 65 years of age using a narrative synthesis. The findings show that third-wave CBTs may provide effective psychological therapies for older adults and can outperform waitlist and TAU control conditions. However, there was considerable variance in the effect sizes reported; 10% of reported effect sizes were trivial, 42% were small, 29% were medium, and 19% were large. Overall,

effect sizes were found to be smaller at follow up than at post-intervention and effect sizes for depression were larger than for anxiety, although as mentioned above there was considerable variance in effect sizes for both outcomes. Only two studies evaluated effectiveness for PA, and only single studies examined the effectiveness of third-wave CBTs for NA and PWB.

These findings of overall small effect sizes suggest a lower effectiveness than that reported by Kishita et al. (2016) in their previous systematic review, which found a medium effectiveness of third-wave CBT for anxiety and depression in older adults. The findings of reliable/clinically significant change reported in the case reports demonstrate a potential effectiveness of third-wave CBTs for older adults and suggest that further investigation of such therapies in this population are worth pursuing with experimental studies.

Three of the four large pre-post third-wave CBT effects were in studies of group-delivered MBSR, two of which were also the only studies rated as having low RoB (Zhang et al., 2015; Gallegos et al., 2013). These findings provide robust support for the potential of group MBSR to facilitate large changes in mood for older adults.

Gallegos et al. (2013) further report that yoga alone explained unique PA improvement above other MBSR components. The reported changes in PA could therefore be due to the well-established link between increased physical activity and improved PA in older adults (Alfini et al., 2020), or/and reflect a focus on the mind-body link making MBSR particularly suitable for older adults (Hazlett-Stevens et al., 2019).

The variance in reported effect sizes, and the prevalence of small effects, lends only minimal support for the specific suitability of third-wave CBTs for older adults suggested by authors such as Petkus and Wetherell (2013). Indeed, the effect sizes of third-wave CBTs for older adults reported in the current review appear to show a lesser, rather than greater, effectiveness than those found in systematic reviews of traditional CBT in this population (Hall et al., 2016; Peng et al., 2009). Direct comparisons of third-wave and traditional CBT in older adults are needed to assess whether both waves facilitate comparable outcomes in this population. However, it appears at present that for

older adults the effectiveness of these waves differs more than for the general population, where roughly equivalent effect sizes are reported (Gloster et al., 2020; Öst, 2014).

Of the included studies, 11 reported adapting third-wave CBTs to better suit an older adult population, and the findings of effectiveness suggest that such adapted therapies can be effective. More detailed investigations of intervention areas that require adaptation, and which adaptations may make third-wave CBTs more suited to older adults, would enable greater fine-tuning to meet the specific needs of this population.

RoB in the 14 included studies was mostly moderate, and some common methodological issues were identified, including those highlighted by Öst (2008) as problems in the third-wave CBT literature generally. Reporting of statistical power was found to be a problem in all but one of the nine experimental/quasi-experimental studies (Zhang et al., 2015). Of the remaining studies, none reported a priori or post hoc power analyses. Furthermore, the presence of small sample sizes and/or non-significant effect sizes suggest that many were under-powered, increasing the risk of type II errors (Baker et al., 2020).

All experimental studies used waitlist or TAU control groups. Waitlist control conditions are unlikely to facilitate positive change, and participants in such groups may be less likely to improve than if they were not part of a study (Mohr et al., 2009). As such, intervention conditions may easily outperform waitlist controls, giving an inflated impression of their effectiveness (Mohr et al., 2009). Öst (2008) also highlighted that TAU conditions may introduce confounding factors, as they often have fewer contact hours than intervention conditions and may change during the course of the study. These comparison group concerns undermine the robustness of between-groups effects found in the current review; the higher effectiveness of a third-wave CBT could be due to a greater number of contact hours for the intervention group, or to the detrimental effects of being placed in a waitlist condition, for example.

Another concern previously identified by Öst (2008) is the use of combination therapies; four of the included studies used combinations of a third-wave CBT and an existing therapy. Such

combinations make it impossible to identify which intervention is responsible for any changes in clinical outcomes (Öst, 2008). This again undermines the strength of conclusions about third-wave CBTs effectiveness; such conclusions may be influenced by the effectiveness of these non-third-wave CBT interventions.

Clinical Practice and Future Research

The findings of this review suggest that clinicians can consider third-wave CBTs as potentially effective, adaptable therapies for older adults. Although limited, evidence with large effect sizes and generally low RoB suggests that clinicians should consider the use of MBSR in particular. However, the small number of eligible studies, small sample sizes and variance in effect sizes limits the strength of implications for clinical practice. Third-wave CBTs should, therefore, only be used for older adults once empirically supported treatments have proven unsuccessful.

Future research should aim to address the methodological limitations identified in the current review. Larger sample sizes are needed to address the current issues with statistical power, and increased reporting of power analyses is also required. Several limitations observed by Öst (2008) in the third-wave CBT literature generally also need to be addressed in the older adult literature. It would be beneficial for future studies to directly compare pure third-wave CBTs with traditional CBT and other empirically supported treatments, in order to address some of these limitations. The use of RCTs to make such comparisons would strengthen the current evidence base.

Strengths and Limitations

There are several strengths of the current systematic review. The searching of seven electronic databases ensured that the existing literature was thoroughly examined and gives confidence that eligible studies were retrieved and included. Similarly, the inclusion of grey literature and searching of grey literature databases increased the comprehensiveness of the search and results. An additional strength of including grey literature is that such studies are less at risk of publication bias (Paez, 2017).

Older adulthood has traditionally been defined as starting at age 65, however some authors have argued that this may be too young a cut off, given improvements in later life health and life expectancy (Office for National Statistics, 2019). Therefore, although the inclusion of studies using a more liberal definition of older adulthood and recruiting participants under 65 would likely have increased the number of studies eligible for inclusion in the current review, the exclusion of such studies increased the specificity of the results to older adulthood, in line with the review's aims.

The most substantial limitation of the current review is the necessary lack of a meta-analytic examination of the data reported in eligible studies. Such an analysis would have allowed the statistical investigation of the heterogeneity of results and of publication bias, along with a statistical synthesis of the effect sizes reported. However, the use of meta-analysis was precluded by the variance in study details including designs used, outcomes measured, and individual therapies examined. As such, only a narrative synthesis, in which some element of subjectivity is unavoidable (Campbell et al., 2018), can currently be used to examine this literature. This significantly decreases the robustness of the conclusions of the current review. Future research using RCT designs to examine third-wave CBTs in older adults would enable further systematic reviews to employ meta-analytic techniques and draw more robust conclusions about the overall efficacy and effectiveness of such therapies in this population.

Conclusions

This narrative review was the first to examine the effectiveness of a broad range of third-wave CBTs in older adults for the treatment of common mental health problems. The findings show that third-wave CBTs may offer an adaptable, effective treatment for depression and anxiety in older adults, although findings on the size of this effectiveness are varied and inconclusive. MBSR was found to facilitate the largest changes in the outcomes of interest for this population.

RoB in the existing evidence base was moderate, although some common issues were identified, particularly regarding statistical power. Furthermore, methodological limitations

previously identified in the general third-wave CBT literature (TAU/waitlist control conditions and combination interventions; Öst, 2008) appear also to be present in the subset of this literature focusing on older adults.

Future research, ideally utilising RCT designs, is needed to provide robust conclusions of the effectiveness of third-wave CBTs in older adults, facilitate future meta-analyses, and enable clinicians to confidently select the most appropriate psychological therapies for their clients.

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Appendix A

Results Of the Downs and Black (1998) Quality Assessments

	Reporting										*External Validity*			*Internal Validity - Bias*							*Internal Validity - Confounding*						*Power**	
Study	1	2	3	4	5*	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	*27*	Score
Alonso et al., 2013	Y	Y	Y	Y	Y (2)	Y	Y	N	N	Y	N	UD	UD	N	N	Y	Y	Y	Y	Y	N	UD	N	N	N	N	N	14
Alonso-Fernández et al., 2016	Y	Y	Y	Y	Y (2)	Y	Y	N	Y	Y	N	UD	UD	N	Y	Y	Y	Y	Y	Y	Y	UD	Y	Y	N	N	N	19
Ernst et al., 2008	Y	Y	Y	Y	P (1)	Y	Y	N	Y	Y	N	UD	UD	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	N	17
Martins, 2012	Y	Y	Y	Y	Y (2)	Y	Y	N	Y	N	N	UD	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	UD	N	Y	N	19
O'Connor et al., 2014	Y	Y	Y	Y	P (1)	Y	Y	N	Y	N	N	UD	UD	N	N	Y	Y	Y	Y	Y	Y	UD	N	N	Y	Y	N	16
Zhang et al., 2015	Y	Y	Y	Y	P(1)	Y	Y	N	Y	Y	UD	UD	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	23

Note. N = No (0), UD = Unable to determine (0), Y = Yes (1), Y(2) = Yes (2 points for this score on this item), P(1) = Partial (1 point for this score on this item)
**Power calculation for sample size reported? (Hague, Hall, & Kellett, 2016)*
***Scores classified as excellent (26-28), good (20-25), fair (15-19) or poor (<14; Meagher et al., 2020; Williams et al., 2021)*

Appendix B

Results of the NIH Quality Assessment Tool For Before-After (Pre-Post) Studies With No Control Group Quality Assessments

Study	Yes/No/CD, cannot determine; NA, not applicable; NR, not reported												**Overall appraisal: Good, Fair, or Poor**
	1	**2**	**3**	**4**	***5***	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
Dewey, 2018	Y	Y	Y	Y	***N***	Y	Y	NA	N	Y	N	NA	**Fair**
Gallegos et al., 2013	Y	Y	Y	Y	*NR*	Y	Y	NA	Y	Y	N	NA	**Good**
Scott et al., 2017	Y	Y	Y	Y	*CD*	Y	Y	NA	N	Y	N	NA	**Fair**

Notes. Y = Yes, NR = Not Reported, CD = Cannot Determine, N = No, NA = Not Applicable

Appendix C

Results of the JBI Critical Appraisal Checklist For Case Reports Quality Assessments

Study	Yes/No/Unclear/NA								**Overall appraisal:** Include/Exclude/ Seek further info
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Birdsey, 2020	Y	Y	Y	N	Y	Y	Y	Y	**Include**
Campbell et al., 2021	Y	Y	Y	N	Y	Y	N	Y	**Include**
Jourdain & Dulin, 2009	Y	Y	Y	N	Y	Y	Y	Y	**Include**
Lunde & Nordhus, 2009	Y	Y	Y	N	Y	Y	Y	Y	**Include**
Roberts & Sedley, 2016	Y	Y	Y	N	Y	Y	Y	Y	**Include**

Note. Y = Yes, N = No, NA = Not Applicable

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Section II: Research Report

Understanding the Influences of Self-Compassion and Psychological Flexibility on Life Satisfaction and Depression After Stroke.

Abstract

Objectives

Stroke survivors commonly report decreased psychological wellbeing. This study aimed to investigate whether physical/cognitive stroke severity is associated with psychological wellbeing, and if self-compassion and/or psychological flexibility moderate this relationship.

Method

A cross-sectional, quantitative, online survey design was used. Stroke survivors completed measures of stroke severity, self-compassion, psychological flexibility, and depression/life satisfaction. Correlational and moderation analyses were conducted to assess the associations between these variables.

Results

There was an association between physical/cognitive stroke severity and levels of depression (physical; b = -.055, p <.001, cognitive; b = -.087, p <.001) and life satisfaction (physical; b = .016, p <.001, cognitive; b = -.087, p = .010). Psychological flexibility was associated with depression (b = .261, p <.001) and life satisfaction (b = -.041, p <.001). Self-compassion was associated with depression only (b = -1.025, p = .049). The only significant moderation effect was that of self-compassion on the association between cognitive stroke severity and life satisfaction (p = 0.10, change R^2 = 0.19).

Conclusions

These findings suggest that more severe post-stroke difficulties are associated with higher levels of depression and lower levels of life satisfaction. Such associations are generally not moderated by psychological flexibility or self-compassion. Those who are more psychologically flexible or (to a lesser extent) self-compassionate are also less depressed, and those who are more psychologically flexible are also more satisfied with life. However, causality in these associations could not be assessed in this cross-sectional study.

Practitioner Points

- Depressive symptoms and life satisfaction are important factors to consider when working with stroke survivors, due to their association with stroke severity.
- Self-compassion and psychological flexibility may warrant consideration when working with stroke survivors who are depressed or dissatisfied with their lives.

Limitations

- The use of a cross-sectional design means that conclusions about causality in these associations cannot be drawn; it is not known which variables are influencing which, or whether unknown extraneous variables are also exerting an influence on these findings.
- Online recruitment/survey administration and the participant exclusion criteria may have limited the representativeness of the sample.
- Self-report measures of cognition may be biased by how well someone has adapted to their cognitive difficulties.
- The validity of both the AAQ-II (as a measure of psychological flexibility) and the SCS-SF (as a measure of self-compassion) has been questioned.

Keywords: ‘stroke’, ‘depression’, ‘life satisfaction’, ‘self-compassion’, ‘psychological flexibility’.

Introduction

It is estimated that over 100,000 people in the UK experience strokes each year (Patel et al., 2020; Stroke Association, 2018). Those who survive often report difficulties adjusting to life post-stroke (Large et al., 2019). According to meta-analyses, rates of post-stroke depression range from 18-33% (Hackett & Pickles, 2014; Medeiros et al., 2020), although the latter authors suggest post-stroke depression is severely under-diagnosed. Additionally, stroke survivors often feel less satisfied with their lives post-stroke (Langhammer et al., 2017; Ostwald, 2008; Wang et al., 2019).

Two psychological constructs that have been suggested to decrease depression and increase life satisfaction are self-compassion (Kılıç et al., 2021; Marshall & Brockman, 2016) and psychological flexibility (Fonseca et al., 2020; Lucas & Moore, 2020). However, at present little is known about the role of these constructs after stroke, and how they might be associated with depression and life satisfaction in stroke survivors (Large et al., 2019). The present study therefore aimed to investigate the roles of self-compassion and psychological flexibility in depression and life satisfaction after stroke.

Stroke

Stroke is one of the most common causes of death and disability across the world (Xu et al., 2020). An estimated 100,000 people experience a stroke in the UK each year, with an estimated one million people living with the consequences of stroke (Patel et al., 2020). 75% of UK strokes occur in those aged over 65 (Gorelick, 2019; Patel et al., 2020). Incidence rates are roughly equivalent between genders (Kim et al., 2019).

Strokes occur when the blood supply to areas of the brain is disrupted, resulting in damage to those areas (Chung, 2017). The effects of stroke can include decreased functioning of the limb or limbs contralateral to the hemisphere in which the stroke occurred (Bai et al., 2020), speech and language difficulties such as aphasia (De Cock, 2020), and a variety of cognitive difficulties, in areas such as executive functioning (Povroznik et al., 2018), memory (das Nair et al., 2017), and social cognition (Adams et al., 2019).

Psychological Wellbeing After Stroke

Alongside these physical and cognitive effects, stroke can have a substantial detrimental impact on psychological wellbeing (Damsbo et al., 2020). Psychological wellbeing is defined as the combination of affective and evaluative components (Busseri & Sadava 2011; Cummins et al., 2002; Diener et al., 1985). Two such components are levels of depression and life satisfaction (Chow, 2017; Uskul & Greenglass, 2005), both of which are negatively impacted by stroke (Medeiros et al., 2020; Wang et al., 2019).

Depression is the most common psychological consequence of stroke (Shi et al., 2017; Taylor-Rowan et al., 2019), with prevalence estimates of up to 33% (Das & Rajanikant, 2018; Medeiros et al., 2020; Volz et al., 2019). A number of meta-analyses have reported that physical disability (Eriksen et al., 2016; Hackett & Anderson, 2005; Shi et al., 2017), cognitive deficit (Ayerbe et al., 2013; Hackett & Anderson, 2005; Robinson & Jorge, 2016) and stroke severity (Ayerbe et al., 2013; Karakus et al., 2017; Kutlubaev & Hackett, 2014; Shi et al., 2017; Towfighi et al., 2017) predict post-stroke depression. In addition to depression, decreased life satisfaction is common after stroke (Ostwald, 2008). Reported rates of low life satisfaction range from 28% (Achten et al., 2012) to 61% (Hartman-Maeir et al., 2007). Difficulty with activities of daily living (Röding et al., 2010), younger age (Ostwald et al., 2009), deficits in concentration (Röding et al., 2010), time post-stroke (Ostwald et al., 2009), depression (Oosterveer et al., 2017; Ostwald et al., 2009) and increased stroke severity (Wang et al., 2019) may predict lower life satisfaction after stroke.

Self-compassion and psychological flexibility have been conceptualised as internal constructs which help people maintain their wellbeing in the face of significant challenges (Daks et al., 2020; Warren et al., 2016) including long-term health conditions (LTCs; Gentili et al., 2019; Baker et al., 2019). Stroke can pose one such significant and long-term health-related challenge. Self-compassion and psychological flexibility may therefore serve to maintain psychological wellbeing for those living with the consequences of stroke.

Self-compassion

Self-compassion is described as having "three faces" (Neff et al., 2018, p. 89). The first of these, 'self-kindness', involves relating to oneself with a non-judgemental, kind and understanding attitude, rather than with a self-critical and judgemental approach. The second is that rather than seeing one's suffering as distinct, separate, and purely individual, self-compassionate individuals view their experiences as part of a shared, common, human experience, referred to as 'common humanity' (Neff et al., 2018). The third 'face' of self-compassion is mindfulness; the ability to become non-judgmentally aware of one's thoughts and feelings, and to experience these fully and openly.

Self-compassion is also conceptualised as the antithesis of self-criticism (Taylor et al., 2021; Warren et al., 2016), which is often experienced by stroke survivors (Kouwenhoven et al., 2011; Robinson-Smith, 2004; Shields & Ownsworth, 2013; Townend et al., 2010). Nakase et al. (2016) examined differences between acute-phase stroke survivors with and without post-stroke depression and found that those with depression were significantly higher in self-criticism. Research by Kyeong et al. (2020) suggests that individuals with higher levels of self-criticism may perceive unmet psychological needs, causing them to feel less satisfied with their lives.

Individuals with higher self-compassion are consistently found to be less self-critical (Warren et al., 2016); accordingly, self-compassion may play a key role in wellbeing after stroke. Wakelin et al. (2022) suggest that these decreases in self-criticism occur due to the development of a compassionate internal voice, which acts to counter self-critical self-talk. As such, levels of self-compassion may be particularly important for the wellbeing of stroke survivors (Shields & Ownsworth, 2013).

Self-compassion has been found to play a role in wellbeing through its influences on both depression and life satisfaction (Kim & Ko, 2018; Pullmer et al., 2019). It has been associated with greater life satisfaction across various LTCs such as HIV (Yang & Mak, 2017), diabetes (Charzyńska et al., 2020) and multiple sclerosis (Nery-Hurwit et al., 2018). Similarly, self-

compassion has been associated with lower levels of depression in several LTCs, including epilepsy (Baker et al., 2019), diabetes (Friis et al., 2016), and breast cancer (Brown et al., 2020).

Studies examining the potential mechanisms underlying these relationships suggest that self-compassion may also play a moderating role in the relationship between health-related factors and wellbeing (Booth et al., 2019; Carvalho et al., 2019; Skinta et al., 2019; Wollast et al., 2020). Allen et al. (2012) found that those with poorer physical health, but higher self-compassion, had better wellbeing than those with poorer physical health and lower self-compassion. The majority of stroke survivors report poor physical health (Wei et al., 2020) and low levels of wellbeing (Damsbo et al., 2020); as such, those with more severe physical deficits after stroke but higher self-compassion may experience greater wellbeing than those with similar post-stroke deficits but lower self-compassion.

Self-compassion may also influence wellbeing by enabling individuals to enact adaptive coping strategies such as positive reframing and engaging social support, as suggested by Kılıç et al. (2021). Reframing and social support have been documented as important factors in adjustment and wellbeing post-stroke (Bourland et al., 2011; Lin et al., 2019; Reverté-Villarroya et al., 2020); self-compassion may therefore play a role in decreasing depressive symptoms post-stroke, via the enablement of such coping strategies.

Intentionally increasing self-compassion may directly decrease self-criticism and depression post-stroke. Compassion-Focused Therapy (CFT; Gilbert, 2014) is a third-wave Cognitive Behavioural Therapy (CBT), which aims to reduce distress through the up-regulation of a soothing affect regulation system via increases in self-compassion and decreases in self-criticism (Gilbert, 2009). A recent review of third-wave CBTs in neurological conditions (Robinson et al., 2019) reports only two studies involving stroke and CFT; one of these is a case study of CFT with a stroke survivor (Shields & Ownsworth, 2013), and the other is a study of CFT (Ashworth et al., 2015) in acquired brain injury (ABI), in which the sample included three stroke survivors (25% of the sample). Both studies report increases in self-compassion and decreases in depression following a

CFT intervention. In the latter case, reported pre-post effect sizes for depression were large, and significant decreases in self-criticism were also found (Ashworth et al., 2015).

As noted above, self-compassion has potential relevance for stroke populations. Self-compassion may exert a moderating influence on the relationship between physical health (often reduced after stroke) and wellbeing, via increased use of adaptive coping strategies known to be beneficial post-stroke (Kılıç et al., 2021; Reverté-Villarroya et al., 2020). Additionally, self-compassion has been associated with lower levels of self-criticism and depressive symptoms (commonly reported after stroke), an effect found for stroke survivors in intervention studies, alongside increases in wellbeing (Ashworth et al., 2015; Shields & Ownsworth, 2013). Self-compassion may therefore play a buffering role against the negative impacts of stroke on wellbeing, via decreases in self-criticism, and increases in adaptive coping behaviours. However, to date no research has specifically investigated this role.

Psychological Flexibility

Psychological flexibility is a construct that has been found to influence levels of depression, life satisfaction and wellbeing in both the general population (Waldeck et al., 2021) and people with LTCs (Graham et al., 2016), including stroke survivors (Crowley & Andrews, 2018). It is defined as a combination of mindfulness/self as context (focusing one's awareness on the present moment, and being conscious of this awareness; Cherry et al., 2021), acceptance/defusion (welcoming thoughts and emotions in an open manner, and viewing thoughts as language-based events; Stabbe et al., 2019), and values/committed action (being aware of, and actively pursuing, individual values; Doorley et al., 2020). As such, psychological flexibility is posited to facilitate meaningful and valued living, without the avoidance of difficult thoughts and emotions (Hayes et al., 2006).

Levels of psychological flexibility have been found to predict life satisfaction in LTC populations. For example, Graham and Rose (2017) report that psychological flexibility significantly predicted changes in life satisfaction for people with muscle disorders, and suggest that psychological flexibility can positively influence outcomes for people with high levels of disability.

As high levels of disability can be experienced by stroke survivors (Xu et al., 2020), a similar positive influence of psychological flexibility on life satisfaction after stroke appears plausible; however, investigations of these potential influences are yet to be reported.

Similarly, levels of depression vary with levels of psychological flexibility. In a recent study, Fonseca et al. (2020) found a strong negative correlation between psychological flexibility and depression. Such findings are also reported for those with LTCs; Swash et al. (2017) found a similar relationship in a sample of cancer survivors, and Kato et al. (2019) found that levels of psychological flexibility were significantly associated with levels of depression in women with chronic pain.

Furthermore, Fonseca et al. (2020) report that psychological flexibility moderates the association between number of major life events and levels of depression. They also found a similar moderating relationship in the association between negative appraisal of the impact of major life events and levels of depression. Experiencing a stroke is a major life event, often negatively appraised (Perna & Harik, 2020), and a substantial subgroup of survivors experience multiple strokes (Khanevski et al., 2019); the findings of Fonseca et al. (2020) therefore suggest that psychological flexibility could play a moderating role in the relationship between stroke and depression.

Acceptance is a core component of psychological flexibility (Waldeck et al., 2021). Crowley and Andrews (2008) found acceptance to be associated with lower psychological distress at three- and nine-months post-stroke. These authors suggest that acceptance involves the adjustment of values, and that psychological flexibility may underpin an individual's ability to successfully adjust in this way. Similarly, van Mierlo et al. (2015) examined the role of illness cognitions in life satisfaction after stroke and found that acceptance cognitions were significantly associated with higher life satisfaction. These findings point to a potentially key role of the core components of psychological flexibility in the relationship between stroke and psychological distress.

Acceptance and Commitment Therapy (ACT; Hayes et al., 2006) is a third-wave cognitive therapy which aims to reduce distress via increases in psychological flexibility (Hayes et al., 2013). ACT has been found to be effective at decreasing depression and increasing life satisfaction in those with LTCs, including traumatic brain injury (Wicksell et al., 2008; Wicksell et al., 2010; Sander et al., 2020) and stroke (Graham et al., 2015; Majumdar & Morris, 2019). Given that the proposed mechanism of ACT is the increasing of psychologically flexibility, these findings lend further support to the potential of this construct to influence levels of depression and life satisfaction in stroke survivors.

While investigations of psychological flexibility and ACT after stroke are limited, the studies reported above suggest a potential effectiveness of ACT/psychological flexibility in decreasing distress post-stroke. The empirical evidence showing a role of psychological flexibility in wellbeing is robust in other populations, including LTCs. Furthermore, several studies report that psychological flexibility moderates the associations between certain factors and depression. Taken in combination, the research described above suggests that psychological flexibility may moderate the relationship between stroke and decreased wellbeing.

There is some conceptual overlap between psychological flexibility and self-compassion. Both constructs draw heavily on the concept of mindfulness (Palmeira et al., 2017; Trindade et al., 2020), and the mindfulness element of self-compassion describes openness to thoughts and feelings in a manner similar to definitions of acceptance and defusion in psychological flexibility (Neff & Tirch, 2013). Increases in mindfulness are associated with decreases in depression, anxiety and fatigue after stroke (Lawrence et al., 2013). Self-compassion and psychological flexibility may be expected to correlate and to play similar roles after stroke due to their shared mindfulness component. Those with higher levels of one of these constructs have been found to also report higher levels of the other (Davey et al., 2020).

The Current Study

The current study investigated the relationships between stroke severity and the affective (depression) and evaluative (life satisfaction) components of psychological wellbeing. In addition, the potential moderating roles of self-compassion and psychological flexibility in these relationships were examined. In this way the current study contributes not only to the research base regarding which psychological constructs are associated with psychological wellbeing post-stroke, but also to the broader debate about the associations of self-compassion and/or psychological flexibility with psychological wellbeing.

Hypotheses

1. Physical stroke severity will show a significant, positive correlation with depression (1a) and a significant, negative correlation with life satisfaction (1b).
2. Cognitive stroke severity will show a significant, positive correlation with depression (2a) and a significant, negative correlation with life satisfaction (2b).
3. Self-compassion and psychological flexibility will be significantly positively correlated.
4. Higher self-compassion will be significantly associated with lower levels of depression (4a) and higher levels of life satisfaction (4b).
5. Higher psychological flexibility will be significantly associated with lower levels of depression (5a) and higher levels of life satisfaction (5b).
6. Higher levels of self-compassion will play a significant moderating role in the association between greater stroke severity and higher depression (6a)/lower life satisfaction (6b).
7. Higher levels of psychological flexibility will play a significant moderating role in the association between greater stroke severity and higher depression (7a)/lower life satisfaction (7b).

Method

Participants and Procedure

The survey was completed by 174 stroke survivors, of whom 117 (67%) were female. The mean age of participants was 49.3, and the countries most represented in the sample were the UK (41.6%) and the USA (28.9%). Percentages and descriptive statistics of additional demographic information are presented in Table 1.

To be eligible for participation in the study, individuals needed to be stroke survivors, 18 years old or over, and English speakers. Individuals were not eligible to participate if they were aphasic or in hospital/inpatient services. Participants were recruited via adverts (Appendix A) posted to social media hosted stroke support groups and disseminated by stroke-related organisations (Different Strokes, Headway Cambridgeshire, Stroke Foundation Australia, The Stroke Association, Action for Rehabilitation from Neurological Injury (ARNI), Headway West London, Enable Us, Headway UK, A Stroke of Luck). The advert informed participants that by completing the online survey they would have the option to enter a draw to win a £50 Amazon voucher. Ethical approval of the study was granted by the Department of Psychology Research Ethics Committee at the University of Sheffield in June 2020 (Reference number 031225; Appendix B). Data was collected between 23rd July 2020 and 12th September 2020.

The study employed a quantitative methodology, with a cross-sectional design using an online survey hosted on the Qualtrics online platform. Participants were presented with information about the study (Appendix C) and a detailed consent form (Appendix D). Once participants had confirmed that they had understood the information sheet and consented to taking part they were taken to the survey. The order of the standardised measures was randomised by the Qualtrics platform. After completing the measures, participants were shown a debrief form, with contact information for support services and the contact details initially provided on the consent form (primary/secondary researchers and contact details for making a complaint).

Power analysis was conducted a priori in order to determine the sample size necessary. Based on studies examining relationships between the key variables (Allen et al., 2012; Graham et al., 2016; Karakus et al., 2017; Krieger et al., 2016; Leahy et al., 2012), which report large effect

sizes, a power analysis was conducted with the conservative assumption of a medium effect size (f^2 = 0.15; Cohen, 1992). According to G*Power power analysis, with this anticipated effect size of f^2 = 0.15, 9 variables, and a significance level of p = 0.05, the study required a sample of N = 114 to achieve 80% power (see Appendix E). According to Cohen's tables (Cohen, 1992), the study required a similar sample size of N = 113 to achieve 80% power.

Table 1

Demographic information

Demographic	*n* (%) or *M* (*SD*)		*n* (%) or *M* (*SD*)
Sex			
Male	57 (32.9)	Female	116 (67.1)
Age	49.3 (14)		
Country of residence			
United Kingdom	72 (41.6)	New Zealand	10 (5.8)
Europe	3 (1.7)	India	4 (2.3)
USA	50 (28.9)	Korea	1 (0.6)
Canada	6 (3.5)	The Philippines	1 (0.6)
Australia	21 (12.1)	South Africa	5 (1.9)
Ethnicity			
White	154 (89)	Fijian Indian	1 (0.6)
Asian	7 (4)	Black/white	1 (0.6)
Asian American	2 (1.2)	Hispanic	2 (0.6)
Black	2 (1.2)	White/Hispanic	1 (1.2)
African American	2 (1.2)	White/Japanese	1 (0.6)
First Language			
English	168 (97.1)	Afrikaans	1 (0.6)
Korean	1 (0.6)	Hindi	1 (0.6)
Manipuri	1 (0.6)	French	1 (0.6)
Employment status			
Part-time	16 (9.2)	Not employed	25 (14.5)
Disabled/Sickness leave	61 (35.3)	Retired	37 (21.4)
Full-time	34 (19.7)		
Highest level of education			
Some college or university	53 (30.8)	High school	14 (8.1)

Postgraduate degree	30 (17.4)	College/university	46 (26.7)
Some postgraduate school	10 (5.8)	Some high school	19 (11.0)
More than one stroke			
Yes	51 (29.7)	No	121 (70.3)
Number of months Post-Stroke	61 (78.8)		

Service User Involvement

The protocol for the study and examples of patient-facing materials were presented to the Sheffield stroke patient and public involvement (PPI) panel on the 14th October 2019.

Members of the panel expressed concern about the length of the survey, and the accessibility/suitability of the measures for those with aphasia, recommending that only stroke survivors without aphasia be included in the study.

The panel additionally felt that only recruiting participants 1 year or less post-stroke (as initially proposed) would limit study recruitment and the appropriateness of the sample. Following the PPI panel and subsequent recommendations, the study protocol was adapted; stroke survivors with aphasia were excluded, and the restriction of time post-stroke was removed. However, attempts to decrease the number of measures/items were unsuccessful, due to the need for standardised measurement of several variables.

Measures

Demographics

Participants completed demographic questions about their sex, age, country of residence, ethnicity, first language, employment status, highest level of education, experience of single or multiple strokes, and time since most recent stroke (as shown in Appendix F).

Cognitive Stroke Severity

The cognition subscale of the Stroke Impact Scale 3.0 (SIS 3.0; Duncan et al., 2003; Appendix G) is a 7-item validated self-report subscale assessing cognition after stroke (Vellone et

al., 2015). Items ask about participants' memory, concentration and problem solving. The SIS 3.0 cognition subscale has demonstrated good reliability (α = .97; Vellone et al., 2015), and concurrent validity with the Mini Mental State Examination (MMSE; Folstein et al., 1983), an established measure of cognition (*r* = 0.69; Vellone et al., 2015). Higher SIS 3.0 cognition subscale scores indicate less severe effects of stroke on cognition.

Physical Stroke Severity

The Stroke Impact Scale-16 (SIS-16) is a 16-item self-report measure of the physical severity of stroke, using items from the SIS 3.0 (Duncan et al., 2003; Appendix H). Participants are asked to rate the difficulty of various physical tasks, such as climbing one flight of stairs. The SIS-16 shows good concurrent validity and excellent reliability (person separation index = 3.8, separation reliability = 0.94; Duncan et al., 2003). Higher SIS-16 scores indicate a lower physical impact of stroke.

Self-compassion

The Self-Compassion Scale Short-Form (SCS-SF; Raes et al., 2011; Appendix I) is a short-form (12 items) version of the 26-item Self-Compassion Scale (SCS; Neff & Whitaker, 2017), and shows good reliability (α = .86; Raes et al., 2011). Participants are required to rate a series of statements about how they relate to themselves. High correlations have been found between the long and short-form versions of the SCS (Raes et al., 2011), and the SCS-SF has been used with stroke populations (Shields & Ownsworth, 2013). Higher SCS-SF scores indicate higher self-compassion.

Psychological Flexibility

The Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011; Appendix J) is a widely used seven-item self-report measure of psychological flexibility (Gloster et al., 2011). Participants are asked to select how true statements relating to psychological flexibility are for them (Bond et al., 2011). The AAQ-II has been found to have good reliability (α = .84) and concurrent validity with measures of depression, anxiety and psychological distress (Bond et al., 2011).

Renshaw (2018) reports the structural validity of the AAQ-II to be strong (*H* = .92), and again reports strong correlations between the AAQ-II and measures of negative mental health.

It should be noted that the AAQ-II was initially conceived as a measure of psychological inflexibility, and so higher scores indicate lower psychological flexibility (Bond et al., 2011). However, the measure is widely used/referred to as a measure of psychological flexibility in the literature (Arslan & Allen, 2021; Grom et al., 2021; He et al., 2021; Sander et al., 2020; Thompson et al., 2021).

Depression

The Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001; Appendix K), is a nine-item measure of depression (Boothroyd et al., 2019). It has been validated with stroke survivors and found to have good sensitivity (81.8%; Prisnie et al., 2016), specificity (97.1%; Prisnie et al., 2016), internal consistency (α = .82; Turner et al., 2012) and concurrent validity with other depression measures used in stroke populations (Turner et al., 2012). Higher scores on the PHQ-9 indicate higher levels of depression.

Life Satisfaction

The Life Satisfaction Questionnaire (LiSat–11; Fugl-Meyer et al., 2002; Appendix L) is an 11-item measure of life satisfaction, which has been validated with stroke populations and found to have good reliability (individual item Kappa coefficients ranging from 0.59-0.97; Ekstrand et al., 2018). Higher LISAT-11 scores indicate higher satisfaction with life.

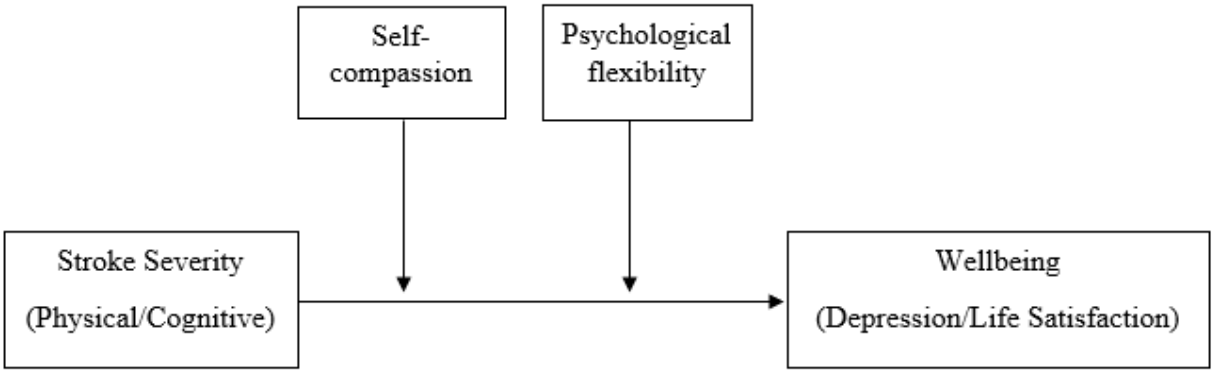
Data Analysis

Data analysis was conducted using Statistical Package for the Social Sciences (SPSS, Version 26; IMB Corp, 2017) software, with the additional PROCESS macro V3.5 (Hayes, 2012). The relationships between the variables were examined using PROCESS macro moderation analysis, as described by Hayes (2017). Four simple moderation models were tested with and without any significantly correlating covariates. The independent variables were physical stroke severity or cognitive stroke severity, and the dependent variables were depression or life

satisfaction. The potential moderators in the analysis were self-compassion and psychological flexibility, as shown in Figure 1. Models with physical or cognitive stroke severity, self-compassion, and psychological flexibility as independent variables were tested, with and without covariates. The interactions of physical/cognitive stroke severity and self-compassion/psychological flexibility were included in the models as additional independent variables. If the addition of the interaction significantly increased the amount of depression/life satisfaction variance explained by the model, this was interpreted as evidence of a moderating relationship (Hayes, 2017). The potential covariates examined in the correlation matrix/one-way ANOVAs were gender, age, and months post-stroke, as all have been reported to influence depression and life satisfaction post-stroke (Gender: Röding et al., 2010; Volz et al., 2021; Age: McCarthy et al., 2016; Gurcay et al., 2009; Months post-stroke: Ostwald et al., 2009; van Mierlo et al., 2015; Lee et al., 2018).

Figure 1

The hypothesised relationship between stroke severity and wellbeing, with the predicted moderating roles of self-compassion and psychological flexibility



Results

Missing Data

Missing data were identified, and so the randomness of missing items was checked using Little's MCAR test (Little, 1998), $x^2 = 603.245$, $df = 557$, $p = .086$. As the results of Little's MCAR test were not significant at the $p < .05$ alpha level, the null hypothesis that unanswered items were

not missing completely at random was rejected. One participant was excluded from the analysis due to five unanswered items (31.25%) on the SIS-16. Seven participants had missing items on the standardised measures, and data for missing items was inputted using techniques reported in the literature for that measure (SCS-SF: Bratt & Fagerström, 2020; LiSat-11: Wang et al., 2019; SIS-16: Green & King, 2020). Two participants did not specify how many months they were post-stroke; data was inputted as the mean months post-stroke reported by the remaining sample.

To assess the normality of data distributions, histograms and *QQ* plots were examined (as shown in Appendix M). While some variables showed skew on histograms, all were considered normally distributed on the *QQ* plots, with the exception of months post-stroke, which was skewed on both. However, Hayes (2017) states that moderation analyses using PROCESS macro V3.5 are adequately robust to be used with non-normally distributed data. Descriptive statistics for the study variables and potential covariates are shown in Table 2.

Table 2

Descriptive statistics of the study variables

Variable (*N* = 173)	*M (SD)*	Variable (N = 173)	*M (SD)*
Physical stroke severity	75.2 (20.5)	Depression	9.3 (6.4)
Cognitive stroke severity	72.7 (21.1)	Life satisfaction	3.5 (1.0)
Self-compassion	2.9 (0.8)	Months post-stroke	61.0 (78.8)
Psychological flexibility	23.6 (10.3)	Age	49.3 (13.9)

Correlation Matrix

All independent and dependent variables were correlated in the expected directions, as shown in Table 3. For the covariates, months post-stroke correlated only with physical stroke severity. Age was not significantly correlated with physical stroke severity, life satisfaction or months post-stroke. As predicted in hypotheses 1 and 2, physical and cognitive stroke severity were negatively correlated with life satisfaction and positively correlated with depression. Similarly, self-

compassion and psychological flexibility were significantly and positively correlated, as predicted in hypothesis 3.

Table 3

Pearson's r correlations between variables

	1	2	3	4	5	6	7
1. Physical stroke severity	-						
2. Self-compassion	.23**	-					
3. Psychological flexibility	-.30**	-.67**	-				
4. Depression	-.41**	-.57**	.68**	-			
5. Life satisfaction	.50**	.44**	-.59**	-.62**	-		
6. Cognitive stroke severity	.28**	.35**	-.40**	-.56**	.39**	-	
7. Months post-stroke	-.18*	-.10	-.07	-.00	-.07	.02	-
8. Age	-.06	.26**	-.23**	-.21**	.09	.24**	.06

*p <.05. **p <.001.

Moderation Analyses

As months post-stroke was only significantly correlated with physical stroke severity, and its inclusion as a covariate in the moderation models resulted in minimal changes to the results, it was not included in the final models. This decision was made to maximise the power of the main analyses. One-way ANOVAs of the relationships between the categorical variable gender and the other continuous variables were non-significant, so gender was not included as a covariate in the final models. Age and physical/cognitive stroke severity (in models where they were not the independent variable) were included as covariates. Moderation analyses were run with and without covariates, in order to reduce the risk of false positives (Simmons et al., 2011). All coefficients are unstandardised.

Moderating Effects of Self-Compassion and Psychological Flexibility on the Relationship Between Physical Stroke Severity and Depression

To examine the relationship between physical stroke severity and depression/life satisfaction, and the potential moderating roles of self-compassion and psychological flexibility, moderation models with moderator interaction terms were created, with and without covariates. A model with physical stroke severity, self-compassion and psychological flexibility as independent variables, and with age and cognitive stroke severity as covariates, was found to explain 61% of the variance in depression ($F(7, 165) = 37.525$, $p < .001$, $R^2 = .614$). Physical stroke severity, self-compassion and psychological flexibility explained significant variance in depression (see Table 4), as predicted in hypotheses 1a, 4a and 5a.

Addition of the interaction between physical stroke severity and self-compassion did not significantly change the amount of depression variance explained ($F(1, 165) = 1.747$, $p = .188$, change $R^2 = .004$), indicating that self-compassion did not moderate the relationship between physical stroke severity and depression, in contrast to hypothesis 6a. Similarly, the physical stroke severity x psychological flexibility interaction had a non-significant effect on the amount of depression variance explained ($F(1, 165) = .091$, $p = .762$, change $R^2 = .000$), and so hypothesis 7a was not supported.

For the covariates, cognitive stroke severity did explain significant variance in depression, whereas age did not. The model was also tested with these covariates removed. The significance/non-significance of relationships in the first model was unchanged, although the overall depression variance explained by the model decreased; it was found to explain 55% of this variance ($F(5, 167) = 41.081$, $p < .001$, $R^2 = .551$).

Table 4

Direct effects of variables and interactions (moderation effects) on depression

Independent Variable	Estimates		95% CI		*p*
	b	*SE*	*LL*	*UL*	
Physical stroke severity	-.055	.016	-.088	-.023	<.001
Self-compassion	-1.025	.504	-2.021	-.028	.049
Physical stroke severity x Self-compassion	.033	.025	-.016	.083	.188
Psychological flexibility	.261	.042	.176	.345	<.001
Physical stroke severity x Psychological flexibility	-.000	.002	-.004	.003	.762
Cognitive stroke severity	-.083	.016	-.116	-.050	<.001
Age	-.012	.023	-.059	.034	.611
Constant	15.876	1.567	12.781	18.971	<.001

Note: SE = Standard Error, CI = Confidence Interval, LL = Lower Level, UL = Upper Level.

Moderating Effects of Self-Compassion and Psychological Flexibility on the Relationship Between Physical Stroke Severity and Life Satisfaction

A moderation model with physical stroke severity, self-compassion and psychological flexibility as independent variables, and age and cognitive stroke severity as covariates explained 48% of the variance in life satisfaction ($F(7, 165) = 22.031$, $p < .001$, $R^2 = .483$). Physical stroke severity and psychological flexibility explained significant variance in life satisfaction, as predicted in hypotheses 1b and 5b, whereas self-compassion did not, in contrast to hypothesis 4b (see Table 5).

The proportion of life satisfaction variance explained by the model did not change following the addition of the interactions of physical stroke severity with psychological flexibility ($F(1, 165) = .010$, $p = .919$, change $R^2 = .000$) and self-compassion ($F(1, 165) = .145$, $p = .703$, change $R^2 = .000$), indicating that neither construct was a significant moderator, in contrast to hypotheses 6b and

7b. For the covariates, cognitive stroke severity and age did not explain significant variance in life satisfaction.

The model was next tested with the covariates age and cognitive stroke severity removed. The significance/non-significance of relationships in the first model were unchanged, although the overall depression variance explained by the model decreased minimally; it was found to explain 47% of the variance in life satisfaction ($F(5, 167) = 29.965$, $p < .001$, $R^2 = .472$).

Table 5

Direct effects of variables and interactions (moderation effects) on life satisfaction

Independent Variable	Estimates		95% CI		
	b	*SE*	*LL*	*UL*	*p*
Physical stroke severity	.016	.003	.010	.022	<.001
Self-compassion	.052	.093	-.131	.236	.574
Physical stroke severity x Self-compassion	.001	.004	-.007	.011	.703
Psychological flexibility	-.041	.007	-.057	-.025	<.001
Physical stroke severity x Psychological flexibility	.000	.000	-.000	.000	.919
Cognitive stroke severity	.005	.003	-.000	.001	.072
Age	-.001	.004	-.010	.007	.745
Constant	3.193	.289	2.621	3.765	<.001

Note: SE = Standard Error, CI = Confidence Interval, LL = Lower Level, UL = Upper Level.

Moderating Effects of Self-Compassion and Psychological Flexibility on the Relationship Between Cognitive Stroke Severity and Depression

To examine the relationship between cognitive stroke severity and depression/life satisfaction, and the potential moderating roles of self-compassion and psychological flexibility, moderation models with moderator interaction terms were tested, with and without covariates.

A moderation model with cognitive stroke severity, self-compassion, and psychological flexibility as independent variables, and with age and physical stroke severity as covariates, explained 60% of the variance in depression ($F(7, 165) = 35.957$, $p < .001$, $R^2 = .604$). Cognitive stroke severity and psychological flexibility explained significant variance in depression (see Table 6), supporting hypotheses 2a and 5a. The interaction of cognitive stroke severity with psychological flexibility did not change the depression variance explained by the model ($F(1, 165) = .011$, $p = .914$, change $R^2 = .000$), and therefore did not support hypothesis 7a.

Self-compassion was not significantly associated with depression (see Table 6), and its interaction with cognitive stroke severity did not change the variance in depression explained by the model ($F(1, 165) = 1.7475$, $p = .118$, change $R^2 = .004$), results which do not support hypotheses 4a and 6a. Self-compassion and psychological flexibility therefore did not moderate the relationship between physical stroke severity and depression. For the covariates, age did not explain significant variance in depression, whereas physical stroke severity explained significant variance.

Next, the model was tested with the covariates age and physical stroke severity removed. The amount of depression variance explained by the model decreased slightly; it was found to explain 57% of the variance in depression ($F(5, 167) = 29.965$, $p < .001$, $R^2 = .472$). In addition, self-compassion explained significant variance in depression ($b = -1.071$, $t(167) = -2.020$, $p = .010$); the significance/non-significance of all other relationships remained as in the model with covariates.

Table 6

Direct effects of variables and interactions (moderation effects) on depression

Independent Variables	Estimates		95% CI		
	b	*SE*	*LL*	*UL*	*p*
Cognitive stroke severity	-.087	.017	-.121	-.052	<.001
Self-compassion	-.978	.521	-2.009	.051	.062
Cognitive stroke severity x Self-compassion	-.003	.022	-.047	.040	.868

Psychological flexibility	.261	.044	.173	.350	<.001
Cognitive stroke severity x Psychological flexibility	.000	.001	-.002	.003	.914
Physical stroke severity	-.055	.016	-.088	-.023	.001
Age	-.009	.024	-.056	.038	.700
Constant	14.077	1.913	10.298	17.856	<.001

Note: SE = Standard Error, CI = Confidence Interval, LL = Lower Level, UL = Upper Level.

Moderating Effects of Self-Compassion and Psychological Flexibility on the Relationship Between Cognitive Stroke Severity and Life Satisfaction

A moderation model with cognitive stroke severity, self-compassion and psychological flexibility as independent variables and age and physical stroke severity as covariates explained 51% of the variance in life satisfaction ($F(7, 165) = 25.228$, $p < .001$, $R^2 = .517$). Cognitive stroke severity and psychological flexibility were found to explain significant variance in life satisfaction, supporting hypotheses 2b and 5b. However, the addition of the interaction between cognitive stroke severity and psychological flexibility did not increase the variance in life satisfaction explained ($F(1, 165) = .224$, $p = .636$ change $R^2 = .000$), in contrast to the expected significant moderation effect stated in hypothesis 7b.

Self-compassion was not associated with life satisfaction (see Table 7), and therefore hypothesis 4b was not supported. However the interaction between cognitive stroke severity and self-compassion explained significant variance in life satisfaction, and its addition to the model significantly increased the variance explained ($F(1, 165) = 6.637$, $p = .010$, change $R^2 = .019$), a finding which supports hypothesis 6b. For the covariates, physical stroke severity was significantly associated with life satisfaction, whereas age was not. When the covariates age and physical stroke severity were removed from the model, the life satisfaction variance explained decreased; the model was found to explain 41% of the variance in life satisfaction ($F(5, 167) = 23.211$, $p < .001$, $R^2 = .410$).

Table 7

Direct effects of variables and interactions (moderation effects) on life satisfaction

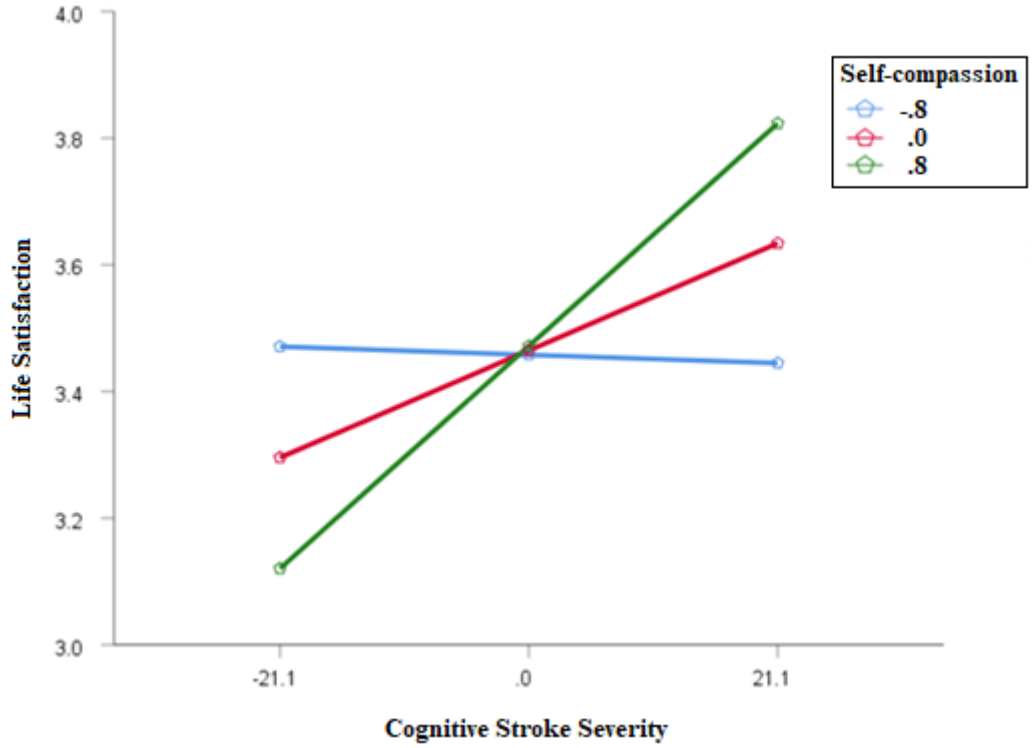
Independent Variables	Estimates		95% CI		*p*
	b	*SE*	*LL*	*UL*	
Cognitive stroke severity	.008	.003	.001	.014	.010
Self-compassion	.008	.092	-.173	.190	.929
Cognitive stroke severity x Self-compassion	.010	.003	.002	.017	.010
Psychological flexibility	-.039	.007	-.055	-.024	<.001
Cognitive stroke severity x Psychological flexibility	-.000	.004	-.000	.000	.636
Physical stroke severity	.017	.002	.011	.023	<.001
Age	-.001	.004	-.009	.007	.814
Constant	2.212	.337	1.5457	2.8790	<.001

Note: SE = Standard Error, CI = Confidence Interval, LL = Lower Level, UL = Upper Level.

The significant moderating effect of self-compassion on the cognitive stroke severity-life satisfaction relationship was examined further by analysing this moderating role at one standard deviation above the mean (+1*SD*), at the mean (*M*), and one standard deviation below the mean (-1*SD*) (see Figure 2). This revealed that when self-compassion was higher there was a greater negative association between levels of cognitive stroke severity and life satisfaction (+1*SD*; b = .0166, $t(165) = 3.312$, $p = .001$, *M*; $b = .008$, $t(165) = 2.593$, $p = .010$). However, when self-compassion was one standard deviation lower the moderation effect was non-significant (-1*SD*; b = -.000, $t(165) = -.152$, $p = .878$), and life satisfaction remained at a similar level regardless of cognitive stroke severity.

Figure 2

Interactions between cognitive stroke severity, self-compassion, and life satisfaction



Note. For self-compassion, -1*SD* = -.8, *M* = .0, and +1*SD* = .8. For cognitive stroke severity, -1*SD* = -21.1, *M* = .0, and +1*SD* = 21.1. Higher cognitive stroke severity scores indicate lower cognitive severity.

Discussion

This study investigated whether stroke survivors' levels of self-compassion and psychological flexibility correlated with their psychological wellbeing post-stroke, and whether these constructs moderated the association between stroke severity and wellbeing. Although the findings show that those more severely impacted by stroke were also more depressed, and less satisfied with their lives, the moderating effects of self-compassion were inconsistent, and no moderating effects were found for psychological flexibility. Stroke survivors who were more psychologically flexible or more self-compassionate reported less depression, and those who were more psychologically flexible reported greater life satisfaction. Average or high self-compassion was associated with a stronger negative association between cognitive stroke severity and life satisfaction; no other moderating effects were found.

As hypothesised, stroke survivors who were more severely physically and/or cognitively affected by their stroke reported being less satisfied with their post-stroke lives and reported more symptoms of depression. These results are consistent with those reported in previous studies, in which stroke severity was associated with levels of depression (Ayerbe et al., 2013; Eriksen et al., 2016; Hackett & Anderson, 2005; Kutlubaev & Hackett, 2014; Ostwald, 2008; Robinson & Jorge, 2016; Shi et al., 2017). However, the cross-sectional design of the current study means that causality cannot be determined; increased depression may have exacerbated physical stroke severity (Robinson & Spalletta, 2010) via decreases in motivation, and higher levels of hopelessness and fatigue (Chemerinski et al., 2001; Schubert & Tamaklo, 1992).

In the current study, stroke survivors who were more psychologically flexible were also found to be less depressed, as predicted. This association between psychological flexibility and depression is in line with previously reported findings (Fonseca et al., 2020). This may be due to stroke survivors who are more psychologically flexible also being more accepting of their changed lives and abilities post-stroke, adjusting their values and therefore experiencing lower levels of distress (Crowley & Andrews, 2008). Alternatively, this relationship may be due to issues with the validity of the AAQ-II, which critics suggest functions more as a measure of distress than of psychological flexibility (Wolgast, 2014). In this case, the association found in the current study would merely represent a correlation between distress and depression. Further research and more valid measures of psychological flexibility are needed to clarify these relationships in stroke survivors.

Those with higher psychological flexibility reported more satisfaction with their lives, which is consistent with previous research (Graham et al., 2016; Marshall & Brockman, 2016; Lucas & Moore, 2020). Psychological flexibility places emphasis on values and values-based living (Doorley et al., 2020), factors which are associated with life-satisfaction (Çekici et al., 2019; Hoyer et al., 2020). Stroke survivors with high psychological flexibility in the current study may have been more aware of, or have better adjusted, their values post-stroke, facilitating greater life satisfaction. Once

again, however, this study's cross-sectional design precludes conclusions about causality; while psychological flexibility may have facilitated increased life satisfaction, increased life satisfaction may, alternatively, have facilitated increases in psychological flexibility.

Psychological flexibility did not influence the relationships between physical/cognitive stroke severity and depression or life satisfaction. This contrasts with theories of psychological flexibility, which suggest that this construct moderates the impact of major life events on wellbeing by enabling the selection of behavioural repertoires which maintain functioning in the face of, and promote adaptation to, challenging situations or events (Fonseca et al., 2020). Fonseca et al. (2020) identified a key role of the appraisal of major life events, particularly at lower levels of psychological flexibility, in the association between life events and depression. Participants' appraisals of their stroke event were not measured in the current study, but may represent an influential, extraneous variable, which warrants examination in future research.

Stroke survivors who had higher levels of self-compassion reported lower levels of depression, although this association with depression was found less consistently across the moderation models than that of psychological flexibility and depression. The negative association between self-compassion and depression may be underpinned by self-compassionate stroke survivors having a more compassionate internal voice (Wakelin et al., 2022), and less self-compassionate/more self-critical stroke survivors experiencing increased depression (Nakase et al., 2016). However, a similar, but reversed, explanation of potential causality must also be considered; depression is associated with a negative view of the self and increased self-criticism (Kelly et al., 2009; Santos & do Céu Salvador, 2021). In the current study, increased depression may have led stroke survivors to become more self-critical and less self-compassionate.

Alternatively, critics of the SCS have suggested that the uncompassionate/negative items in this measure (which make up 50% of items in the SCS-SF) may assess emotional difficulties, rather than low self-compassion, and so inflate apparent relationships between self-compassion and

distress (Muris et al., 2018). As for psychological flexibility, this measurement issue could underpin the associations between self-compassion and depression found in the current study.

In contrast to psychological flexibility, there was no association between stroke survivors' levels of self-compassion and their feelings of satisfaction with life. This finding contradicts those reported in other LTC populations (Charzyńska et al., 2020; Nery-Huwit et al., 2018; Yang & Mak, 2017), but may be due to a less explicit focus on values and valued-living in self-compassion (compared to psychological flexibility).

The measurement issues of psychological flexibility and self-compassion may also explain their correlation in the current study; the AAQ-II and SCS-SF may be assessing essentially the same factor (emotional distress), rather than their proposed separate constructs. The differences in the strength of each measure's association with life satisfaction, conversely, suggests that the AAQ-II and SCS-SF may, at least to some extent, be measuring different constructs, in line with previous findings (Davey et al., 2020; Marshall & Brockman, 2016; Woodruff et al., 2014). Alternatively, this correlation may be due to the emphasis on mindfulness shared by both self-compassion and psychological flexibility (Trindade et al., 2020).

A significant moderation effect was found in only one of the four models tested. Self-compassion was found to moderate the relationship between cognitive stroke severity and satisfaction with life. Contrary to the hypothesised direction of this effect, higher self-compassion was overall associated with a stronger negative relationship between cognitive stroke severity and life satisfaction. Closer examination of these effects showed that those with lower cognitive severity benefitted from higher self-compassion and reported higher levels of life satisfaction (if also high in self-compassion). Those with higher cognitive severity, conversely, reported lower levels of life satisfaction even when reporting high self-compassion.

Causal inferences about these moderating effects cannot be drawn from the current cross-sectional study. Those with less cognitive severity (but high self-compassion) may have been less depressed and so better able to use positive reframing (Scheenen et al., 2017), facilitated by their

higher self-compassion (Allen & Leary, 2010; Kılıç et al., 2021), than those with high self-compassion but more severe cognitive difficulties. However, such effects could also be due to other unmeasured and unknown variables, influencing both self-compassion and life satisfaction. Finally, the finding of a moderation effect in only one of four models is insufficient to conclude that self-compassion plays a moderating role in wellbeing post-stroke. This finding of limited moderation effects for self-compassion contrasts with theories of how this construct functions in response to major life events. Such theories suggest that self-compassion acts as an emotion-focused coping style, which lessens the impact of major life events on wellbeing via adaptive coping (such as positive reframing) and more equanimous responses to those events, and to oneself (Allen et al., 2012; Allen & Leary, 2010). The presence of such moderation effects in stroke survivors is not supported by the current study.

Strengths and Limitations

The use of online recruitment/data collection in the current study is a source of both strengths and limitations. This method of recruitment allowed the study to recruit a sample of participants from various countries, increasing the ecological validity of the findings. Despite this, the sample was still limited in the percentage of participants from non-western cultures and the percentage of participants who identified as having a non-white ethnic background. While it may have broadened the geographical variance in the sample, online recruitment may have also limited the accessibility of the study as accessing online content can be difficult for those with disabilities (Archer et al., 2014; Lazar & Jaeger, 2011). Stroke survivors with more severe cognitive and/or physical impairments may not have been able to take part in the current study; online recruitment may therefore have also limited the generalisability of the present findings.

Another strength of this study is the use of PPI, which benefited the ethics of the study through the exclusion of those with aphasia, for whom the PPI panel felt the standardised measures would be inappropriate. The advice of the PPI panel also broadened recruitment through their

recommendation to remove a limit on time post-stroke, likely increasing the final sample size and statistical power of the study, a known benefit of PPI (Wilson et al., 2015).

The most significant limitation of the current study is the use of a cross-sectional design. Collecting data at only one timepoint makes it impossible to identify causal relationships between, or the temporal precedence of, the variables (Taris et al., 2021). As such, conclusions regarding the sources and directions of causality in this study's findings cannot be made, and the possibility that additional unknown variables influenced these findings cannot be discounted.

The use of self-report measures, particularly for assessing cognitive difficulties, may have introduced another limitation in the study. Such measures may reflect how successful individuals have been in adapting to the specific environments of their life (despite their cognitive difficulties), rather than an objective assessment of their overall cognitive functioning (Rabbitt & Abson, 1990; de Winter et al., 2015). Problems with the wording of items and items provoking an emotional reaction have also been found to negatively influence the validity of self-report cognitive measures (Hill et al., 2019). In future research, independently administered standardised cognitive assessments should be used to increase the validity of cognitive variables, and to increase the robustness of results related to these.

A further limitation related to measures is the use of the AAQ-II. This measure of psychological flexibility was chosen for its brevity, given the PPI panel's feedback that the length of the study survey would be challenging. However, the validity of the AAQ-II as a measure of psychological flexibility has been questioned. Rochefort et al. (2017) suggested that scores on the AAQ-II are highly influenced by levels of negative affect, and Wolgast (2014) found the AAQ-II to measure psychological distress, limiting the extent to which such scores reflect levels of psychological flexibility. These findings were also reported by Ong et al. (2020), who recently developed an updated version of the AAQ-II, the AAQ-3, which they found to measure a construct more distinct from measures of negative affect (than that measured by the AAQ-II). Similar, although less numerous, criticisms have been made of the SCS-SF (Muris et al., 2018). Future

research would therefore benefit from the use of this revised measure of psychological flexibility, and any improved measures of self-compassion that may be developed. This would increase the validity of findings related to these constructs and their relationships with other variables.

Future Directions and Clinical Implications

Future research should aim to replicate the findings of the current study using research designs which facilitate the establishment of causality. Longitudinal designs, for example, would allow investigations of whether psychological flexibility/self-compassion at time point A was predictive of depression/life satisfaction at a later time point B. Alternatively, between-groups experimental designs could be used to compare depression/life satisfaction in groups of stroke survivors that had and had not received interventions to increase self-compassion/psychological flexibility, such as CFT and ACT.

Sampling methods allowing the recruitment of a more representative sample of stroke survivors (i.e., those with limited computer/internet access, more severe post-stroke disabilities, and/or aphasia) would increase the generalisability of results. In addition, replication with the use of standardised/clinician-completed measures of stroke severity would bolster the robustness of any future findings. Finally, it would be beneficial for future research to investigate the specific mechanisms by which psychological flexibility and self-compassion might interact with wellbeing post-stroke.

The findings of the current study have implications for clinical practice with survivors of stroke. As lower levels of both psychological flexibility and self-compassion were associated with higher levels of depressive symptoms, clinicians working with stroke survivors experiencing depression should consider and assess these two constructs, to identify whether psychological inflexibility and/or low self-compassion also form part of the individual's presentation. Psychological flexibility was associated with life satisfaction, and so clinicians may similarly benefit from considering psychological flexibility when working with stroke survivors who reported being dissatisfied with their lives.

Both constructs are known to moderate physical health/major life events and wellbeing in the general population and those with LTCs. The lack of moderating effects in the stroke severity-depression relationship and a single moderating effect of self-compassion in the stroke severity-life satisfaction relationship do not support such an effect in stroke survivors. Furthermore, these findings do not lend support to the use of interventions focused on increasing these constructs, such as ACT and CFT, in stroke survivors. Future research into other psychological factors which may play a significant moderating role is essential and would provide valuable insights into which alternative interventions might be effective.

Conclusions

The results of the current study support previously reported findings that higher stroke severity is associated with lower psychological wellbeing, that higher levels of psychological flexibility and, to a lesser extent, self-compassion are associated with lower levels of depression in stroke survivors, and that psychological flexibility is also associated with life satisfaction in this population. Psychological flexibility and self-compassion do not appear to be significant moderators of the association between stroke severity and psychological wellbeing.

Future research should be conducted to examine the causality of the associations found in this cross-sectional study, and to identify any significant moderators of the stroke severity-psychological wellbeing association. Such research may provide guidance as to which psychological interventions warrant investigation in stroke survivors, and eventual conclusions of how to preserve or increase psychological wellbeing in this population.

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Appendix A

Recruitment Advert

Have you had a **stroke**?

Would you like to have a chance to win a

What is it?

My name is Tom Oliani, and I am currently recruiting participants for a study looking into well-being in people who have experienced a stroke.

Can I take part?

You can take part if:

1. You have experienced a stroke or multiple strokes
1. you are over 18 years of age
2. You are an English speaker

What will I have to do?

You will be asked to complete some questionnaires about your stroke, thinking styles and wellbeing. This will take 15-20 minutes.

How do I take part?

You can take part online at [**website address TBC**].

This website will also provide you with more information about the study.

People who complete the survey can enter into a draw to win a

£50 Amazon voucher.

Appendix B

Ethical Approval Certificate

The University Of Sheffield.

Downloaded: 08/06/2020
Approved: 02/06/2020

Thomas Oliani
Registration number: 180156999
Psychology
Programme: Doctorate of Clinical Psychology

Dear Thomas

PROJECT TITLE: Understanding the roles of psychological flexibility and self-compassion in depression and life satisfaction after stroke.
APPLICATION: Reference Number 031225

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 02/06/2020 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 031225 (form submission date: 12/05/2020); (expected project end date: 31/10/2021).
- Participant information sheet 1079301 version 2 (12/05/2020).
- Participant consent form 1079303 version 1 (12/05/2020).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Your responsibilities in delivering this research project are set out at the end of this letter.

Yours sincerely

Thomas Webb
Ethics Administrator
Psychology

Please note the following responsibilities of the researcher in delivering the research project:

- The project must abide by the University's Research Ethics Policy: https://www.sheffield.ac.uk/rs/ethicsandintegrity/ethicspolicy/approval-procedure
- The project must abide by the University's Good Research & Innovation Practices Policy: https://www.sheffield.ac.uk/polopoly_fs/1.671066!/file/GRIPPolicy.pdf
- The researcher must inform their supervisor (in the case of a student) or Ethics Administrator (in the case of a member of staff) of any significant changes to the project or the approved documentation.
- The researcher must comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data.
- The researcher is responsible for effectively managing the data collected both during and after the end of the project in line with best practice, and any relevant legislative, regulatory or contractual requirements.

Appendix C

Participant Information Sheet

Participant Information Sheet

1. Research Project Title:

Understanding which thinking styles play a role in wellbeing after stroke

2. Invitation

You are being invited to take part in a research project. Before you decide whether or not to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us 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. Thank you for reading this.

3. What is the project's purpose?

Research indicates that people's thinking styles can play a role in their wellbeing after a stroke. The aim of this study is to investigate the unique roles of thinking style in well-being after stroke. This research is being completed as part of a DClinPsy Clinical Psychology postgraduate course.

4. Why have I been chosen?

You have been chosen to participate in this research because:

- you responded to the recruitment advert
- you have experienced a stroke or multiple strokes
- you are an English speaker
- you are over 18 years of age
- you do not have difficulty reading or understanding words

· you are not in hospital, or living in an inpatient service

5. Do I have to take part?

It is up to you whether you take part. If you decide to take part, you will be provided with a copy of this information sheet, and asked to sign a consent form. You can withdraw at any time until you submit your survey. You do not have to give a reason, and there will be no negative consequences.
If you wish to withdraw from the research, you can click to leave the survey website.

6. What will happen to me if I take part? What do I have to do?

If you choose to take part in this research, you will complete several online questionnaires. One of these will ask for information about your age, gender, the time since your stroke, and whether you have any other long term conditions (and what these are).

The other questionnaires will be about the physical effects of your stroke, your thinking and memory, how you think about problems, how you think about yourself, and your well-being.

You will only need to complete these questionnaires once. Completing them will take roughly 15-20 minutes, although study times can vary depending upon your computer system.

7. What are the possible disadvantages and risks of taking part?

Some items on the questionnaires ask about potentially difficult topics, such as the difficulties you've experienced since your stroke, or how you feel about yourself. To answer these questions you will need to think about these things, which you may find upsetting.

If after answering these questions you would like some support, the Stroke Association Helpline can be contacted on 0303 3033 100, or by email at helpline@stroke.org.uk. They can provide support and information, and will be able to provide details of your nearest Stroke Association Emotional Support Service.

8. What are the possible benefits of taking part?

By participating in this study, you will have the option of entering a draw to win a £50 Amazon voucher. Once you have completed and submitted the questionnaires, you will be given the option

of giving a phone number or email address. This will be your entry into the draw, and the way we will contact you if you win the voucher.

Whilst there are no other immediate benefits for those people participating in the project, it is hoped that this work will contribute to our understanding of how strokes affect people's wellbeing, and what psychological factors may influence the negative impact of a stroke on a person's wellbeing.

9. Will my taking part in this project be kept confidential?

All the information that we collect about you during the course of the research will be kept strictly confidential and will only be accessible to members of the research team. You will not be able to be identified in any reports or publications unless you have given your explicit consent for this. If you are completing the survey online, your responses will be anonymous.

10. What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general

As we will be collecting some data that is defined in the legislation as more sensitive (information about your health), we also need to let you know that we are applying the following condition in law: that the use of your data is 'necessary for scientific or historical research purposes'.

11. What will happen to the data collected, and the results of the research project?

Your data will be stored in a password protected file, accessed by the principal researcher (Tom Oliani) and his supervisor (Dr Fuschia Sirois).

Your responses will be anonymous, and the numerical data you provide will be aggregated with that of other respondents, to give the researcher an idea about general trends, rather than individuals. Your data may also be used by the researchers for subsequent studies, or by other researchers, for example through the University of Sheffield's Open Access platform, or alongside any scientific publications that arise from the data. However, if the data is used in this way, your responses will remain anonymous

The results of the research, including your anonymised data, will be presented in a doctoral research thesis, submitted to the University of Sheffield. The intention of this research project is to then publish the results in a peer reviewed scientific journal. The results of the study will also be shared with the stroke organisations which have helped to advertise the study.

12. Who is organising and funding the research?

This research is being organised and funded by the University of Sheffield.

Who is the Data Controller?
The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly.

13. Who has ethically reviewed the project?
This project has been ethically approved by the University of Sheffield Psychology Department Ethics Sub-Committee (DESC).

14. What if something goes wrong and I wish to complain about the research?
If you would like to make a complaint about this project, in the first instance you should contact the lead researcher, Tom Oliani, who can be contacted at: t.oliani@sheffield.ac.uk.

If you feel that your complaint has not been handled to your satisfaction following this, you can contact;
Prof Glenn Waller, Head of Department at g.waller@sheffield.ac.uk

Or

Dr. Thomas Webb, chair of the Department Ethics Subcommittee, at t.webb@sheffield.ac.uk

If you would like to make a complaint about how your personal data has been handled, please see the information provided here: https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

15**.** **Contact for further information**

This research is being conducted by Tom Oliani, Trainee Clinical Psychologist, under the supervision of Dr. Fuschia Sirois. This research will be used to write a thesis which fulfils part of the trainee's doctoral training. If you have any questions about the research you can contact them on t.oliani@sheffield.ac.uk
Alternatively, you can email the Research Officer at a.sinha@sheffield.ac.uk

Thank you for your time, and for taking part in this research.

Appendix D

Participant Consent Form

"Understanding which thinking styles play a role in wellbeing after stroke"

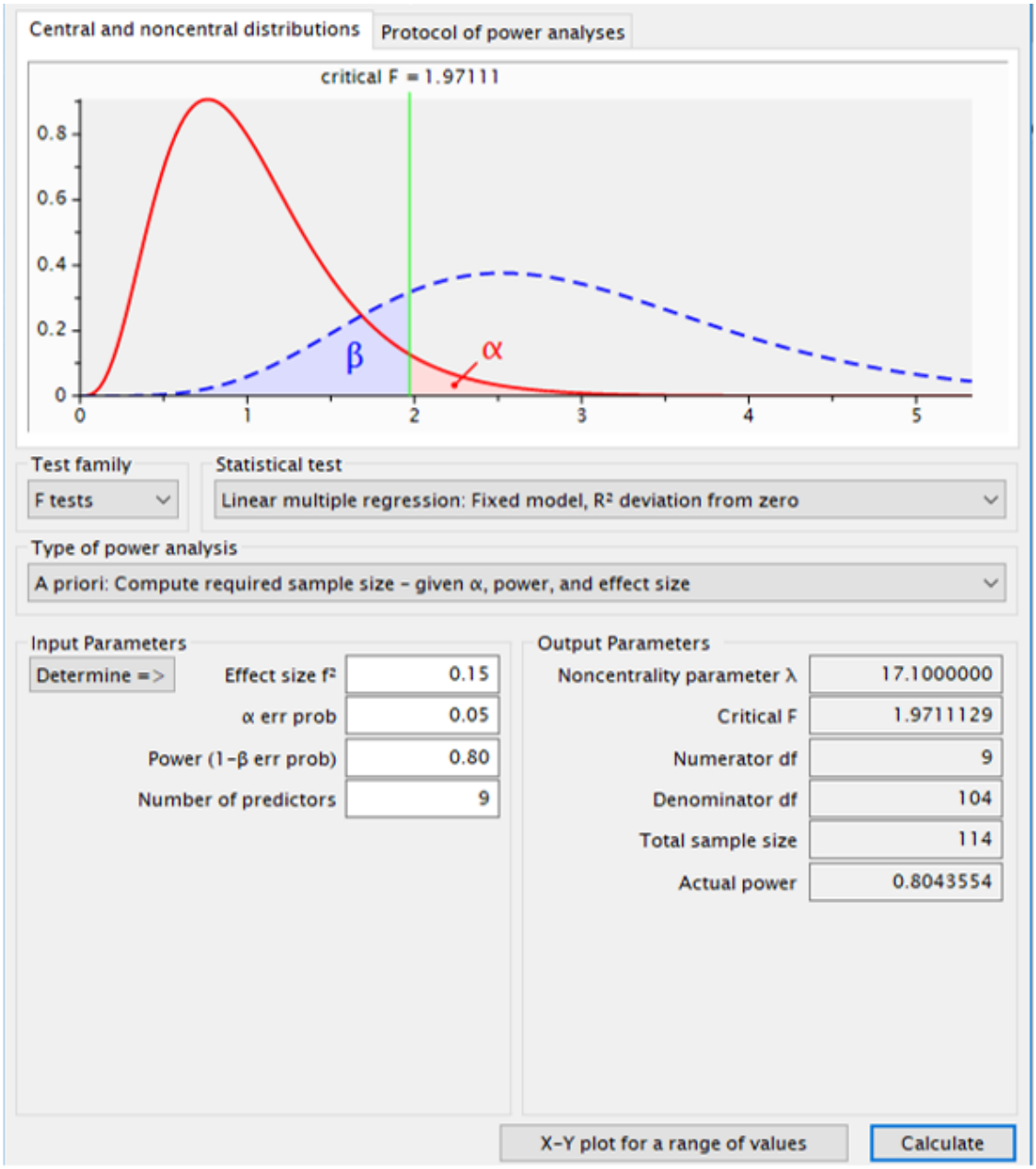
Consent Form

Please tick the appropriate boxes	**Yes**	**No**
Taking Part in the Project		
I have read and understood the project information sheet dated or the project has been fully explained to me. (If you will answer No to this question please do not proceed with this consent form until you are fully aware of what your participation in the project will mean.)		
I have been given the opportunity to ask questions about the project.		
I agree to take part in the project. I understand that taking part in the project will include completing 5 questionnaires.		
I understand that my taking part is voluntary and that I can withdraw from the study at any time: I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.		
How my information will be used during and after the project		
I understand my personal details such as name, phone number, address and email address etc. will not be revealed to people outside the project.		
I understand and agree that my words may be quoted in publications, reports, web pages, and other research outputs. I understand that I will not be named in these outputs unless I specifically request this.		
I understand and agree that other authorised researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.		
I understand and agree that other authorised researchers may use my data in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.		
I give permission for the anonymous data that I provide to be deposited in the Dept. of Psychology at the University of Sheffield so it can be used for future research and learning.		
So that the information you provide can be used legally by the researchers		
I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.		

Do you wish to continue?	Yes	No

Appendix E

G*Power A Priori Power Analysis



Appendix F

Demographic Questionnaire

General Information

Sex: ☐ Female ☐ Male ☐ Other

What is your current age?

In what country/continent do you currently live?

- ❑ United Kingdom
- ❑ Europe
- ❑ Canada
- ❑ USA
- ❑ Australia
- ❑ South America
- ❑ Other (please list) _____

What is your highest level of education?

☐ some high school ☐ some college or university ☐ some postgraduate school

☐ high school graduate ☐ college/university graduate ☐ postgraduate degree

Are you currently employed:

☐ full-time ☐ part-time ☐ not at all ☐ retired ☐ Disabled/Sickness leave

What is your first language?

_____

What ethnic/cultural background do you most identify with? (For example: White, Chinese, Latin American, Black, etc.)

_____

How long is it, in years and months, since you had a stroke?

Years: Months:

Have you experienced more than one stroke?

Yes ð No **ð**

If you have experienced more than one stroke, how many strokes have you had in total?

Are you completing this survey:

On your own ð With help from somebody **ð**

If someone is helping you, please specify their relationship to you (friend, partner etc.), and how they are helping (moving the mouse for me, reading the questions out loud etc.):

Where did you hear about this study?

	Stroke association		Different Strokes
	ANRI		Headway
	Social Media		Word of mouth
	Other (please specify)		

Appendix G

Cognitive Subscale of the Stroke Impact Scale 3.0 (SIS 3.0; Vellone et al., 2015)

These questions are about your memory and thinking.

2. In the past week, how difficult was it for you to...	**Not difficult at all**	**A little difficult**	**Somewhat difficult**	**Very difficult**	**Extremely difficult**
a. Remember things that people just told you?	5	4	3	2	1
b. Remember things that happened the day before?	5	4	3	2	1
c. Remember to do things (e.g. keep scheduled appointments or take medication)?	5	4	3	2	1
d. Remember the day of the week?	5	4	3	2	1
e. Concentrate?	5	4	3	2	1
f. Think quickly?	5	4	3	2	1
g. Solve everyday problems?	5	4	3	2	1

Appendix H

Stroke Impact Scale-16 (SIS-16; Duncan, Lai, Bode, Perera & DeRosa, 2003)

Stroke Impact Scale 16

In the past 2 weeks, how difficult was it to...	Not difficult at all	A little difficult	Somewhat difficult	Very difficult	Could not do at all
a. Dress the top part of your body?	5	4	3	2	1
b. Bathe yourself?	5	4	3	2	1
c. Get to the toilet on time?	5	4	3	2	1
d. Control your bladder (not have an accident)?	5	4	3	2	1
e. Control your bowels (not have an accident)?	5	4	3	2	1
f. Stand without losing balance?	5	4	3	2	1
g. Go shopping?	5	4	3	2	1
h. Do heavy household chores (e.g. vacuum, laundry or yard work)?	5	4	3	2	1
i. Stay sitting without losing your balance?	5	4	3	2	1
j. Walk without losing your balance?	5	4	3	2	1
k. Move from a bed to a chair?	5	4	3	2	1
l. Walk fast?	5	4	3	2	1
m. Climb one flight of stairs?	5	4	3	2	1
n. Walk one block?	5	4	3	2	1
o. Get in and out of a car?	5	4	3	2	1
p. Carry heavy objects (e.g. bag of groceries) with your affected hand?	5	4	3	2	1

Appendix I

The Self-compassion Scale-Short Form (SCS-SF; Raes, Pommier, Neff & Van Gucht, 2011)

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never				Almost always
1	2	3	4	5

_____1. When I fail at something important to me I become consumed by feelings of inadequacy.

_____2. I try to be understanding and patient towards those aspects of my personality I don't like.

_____3. When something painful happens I try to take a balanced view of the situation.

_____4. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

_____5. I try to see my failings as part of the human condition.

_____6. When I'm going through a very hard time, I give myself the caring and tenderness I need.

_____7. When something upsets me I try to keep my emotions in balance.

_____8. When I fail at something that's important to me, I tend to feel alone in my failure

_____9. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

_____10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

_____11. I'm disapproving and judgmental about my own flaws and inadequacies.

_____12. I'm intolerant and impatient towards those aspects of my personality I don't like.

Appendix J

The Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011)

AAQ-II

Below you will find a list of statements. Please rate how true each statement is for you by using the scale below to fill in your choice.

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

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

Appendix K

The Patient Health Questionnaire-9 (PHQ-9; Boothroyd, Dagnan & Muncer, 2019)

PATIENT HEALTH QUESTIONNAIRE-9 (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems? *(Use "✔" to indicate your answer)*	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

FOR OFFICE CODING 0 + _____ + _____ + _____

=Total Score: _____

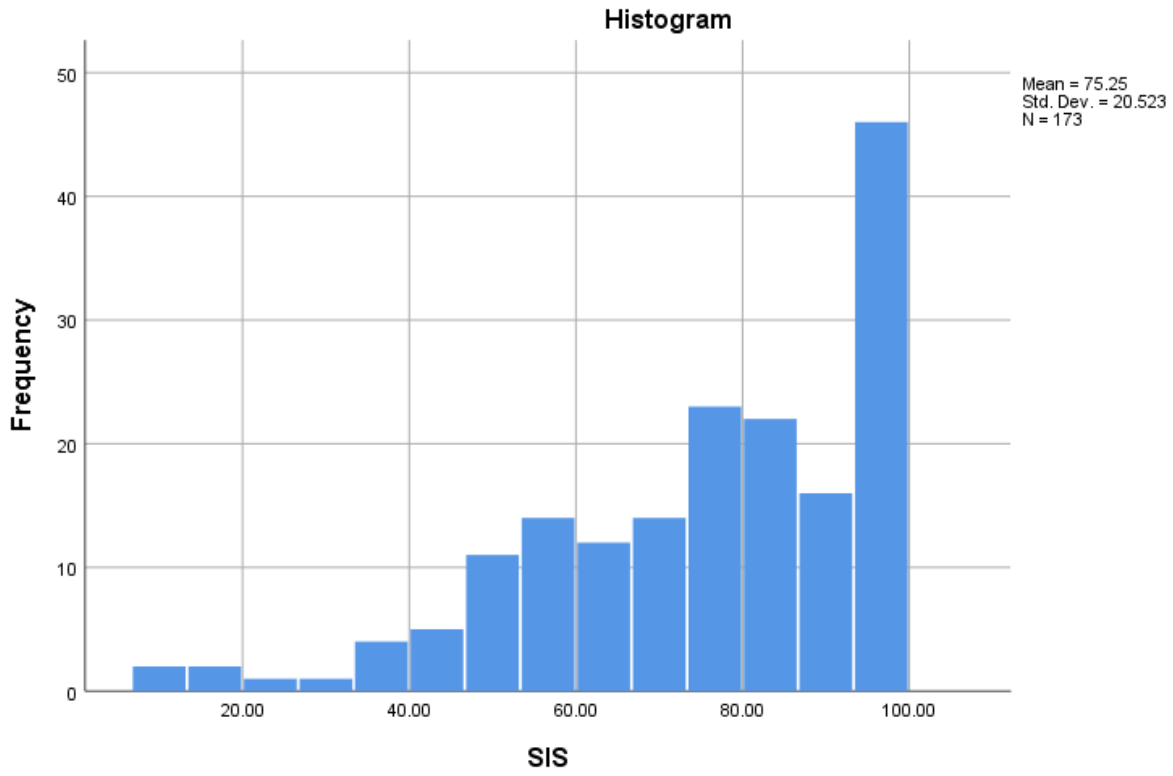
Appendix L

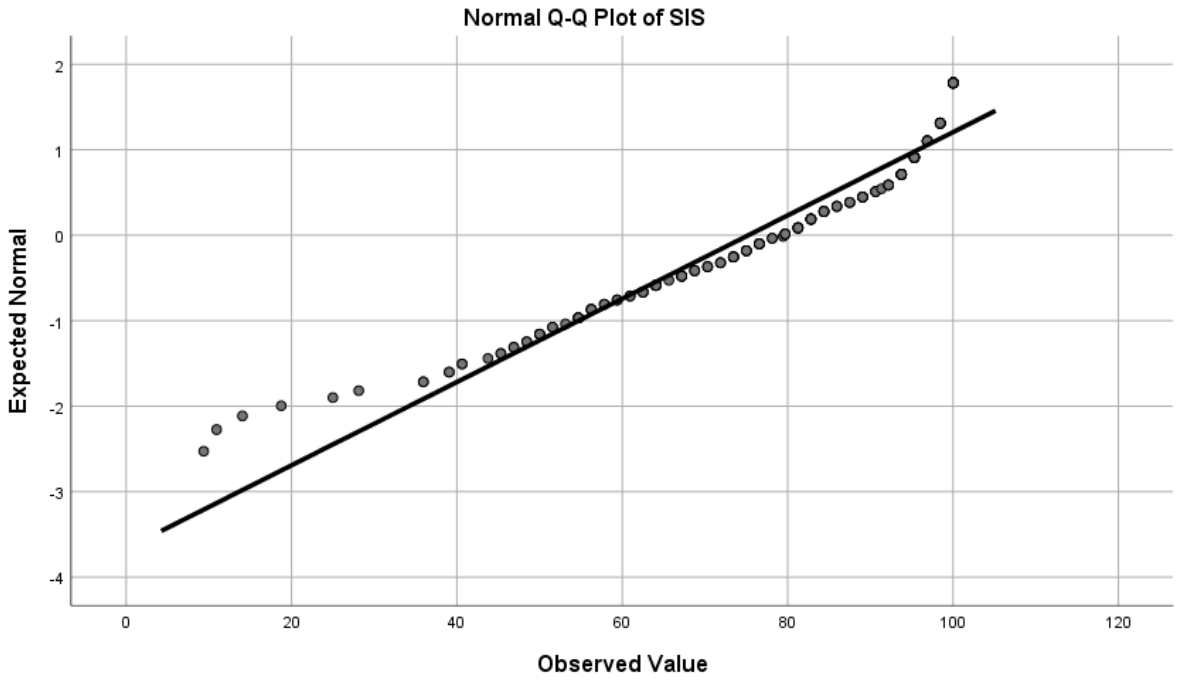
The Life Satisfaction Questionnaire-11 (LiSat-11; Fugl-Meyer, Melin, & Fugl-Meyer, 2002)

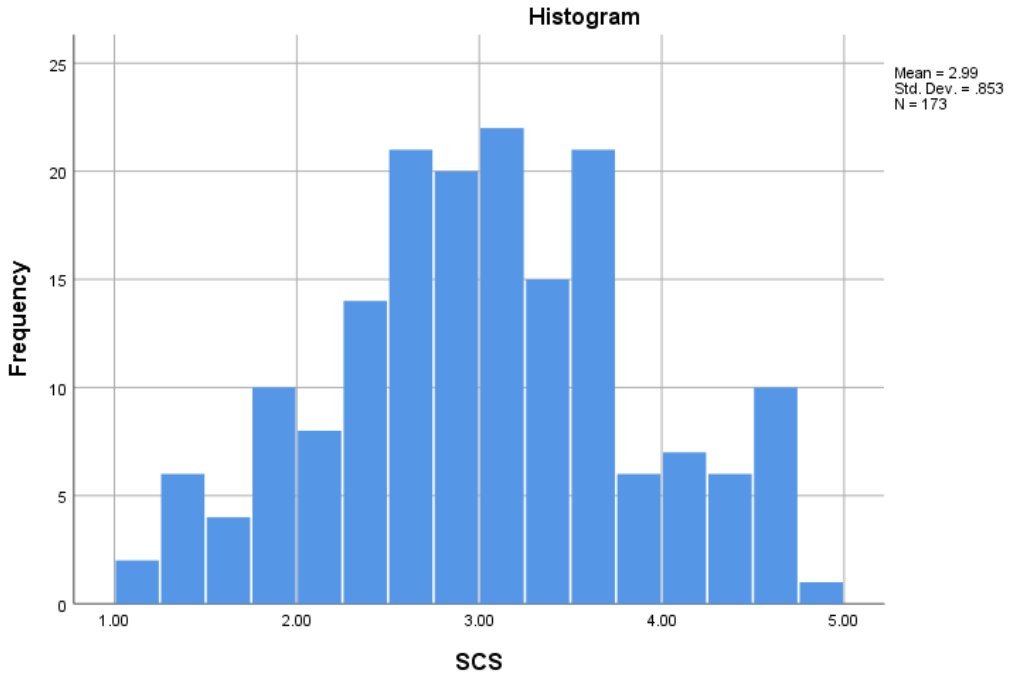
Here are a number of statements concerning how satisfied you are with different aspects of your life. For each of these statements please mark a number from 1 to 6, where 1 means very dissatisfying and 6 means very satisfying.						
1 = very dissatisfying 2 = dissatisfying 3 = rather dissatisfying 4 = rather satisfying 5 = satisfying 6 = very satisfying						
My life as a whole is	1	2	3	4	5	6
My vocational situation is	1	2	3	4	5	6
My financial situation is	1	2	3	4	5	6
My leisure situation is	1	2	3	4	5	6
My contact with friends and acquaintances is	1	2	3	4	5	6
My sexual life is	1	2	3	4	5	6
My ability to manage my self-care (dressing, hygiene, transfers etc.) is	1	2	3	4	5	6
My family life is	1	2	3	4	5	6
My partner relationship is	1	2	3	4	5	6
My physical health is	1	2	3	4	5	6
My psychological health is	1	2	3	4	5	6

Appendix M

Histograms and QQ Plots



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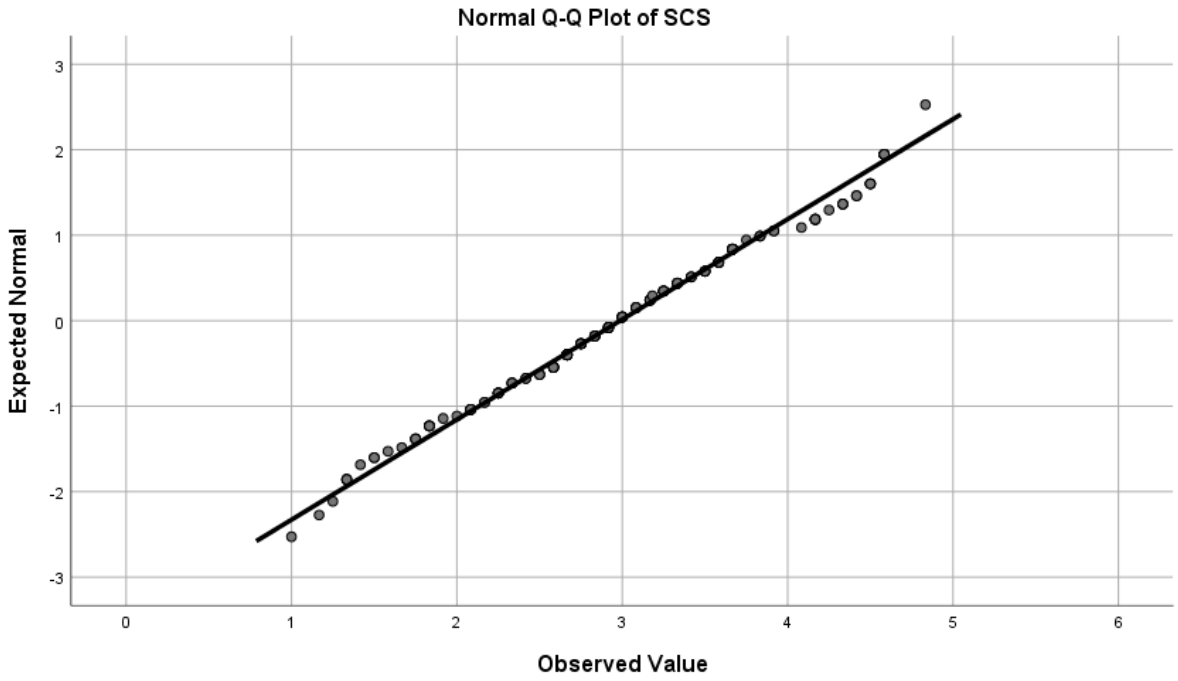
Std. Dev. = .853
N = 173
Frequency
SCS
0
5
10
15
20
25
1.00
2.00
3.00
4.00
5.00


Normal Q-Q Plot of SCS
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Observed Value
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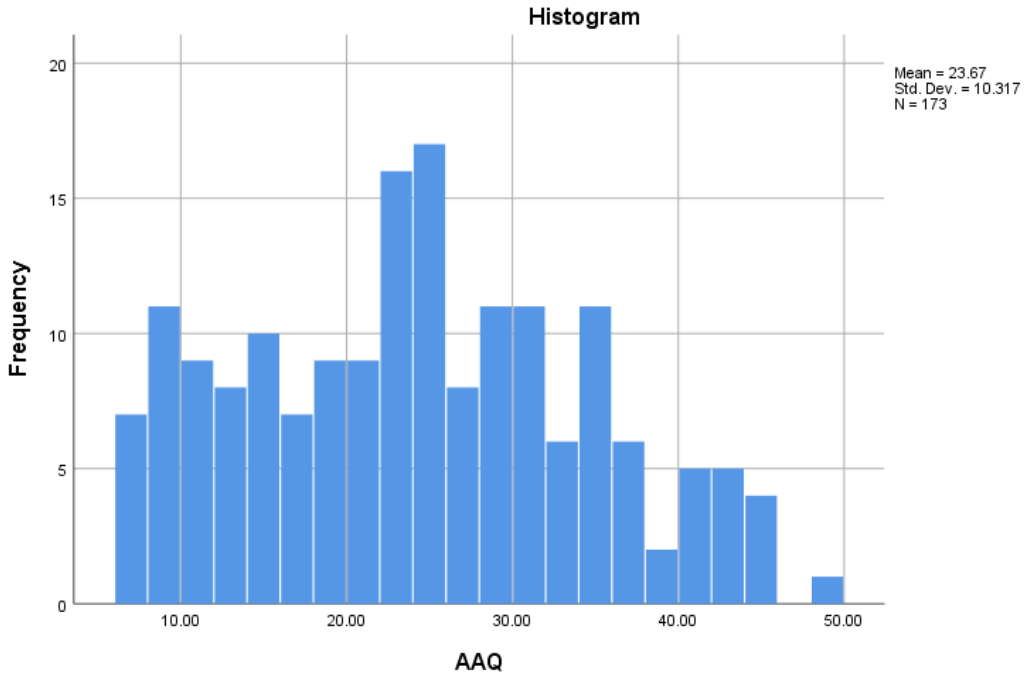
-2
-1
0
1
2
3
0
1
2
3
4
5
6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N = 173
Frequency
AAQ
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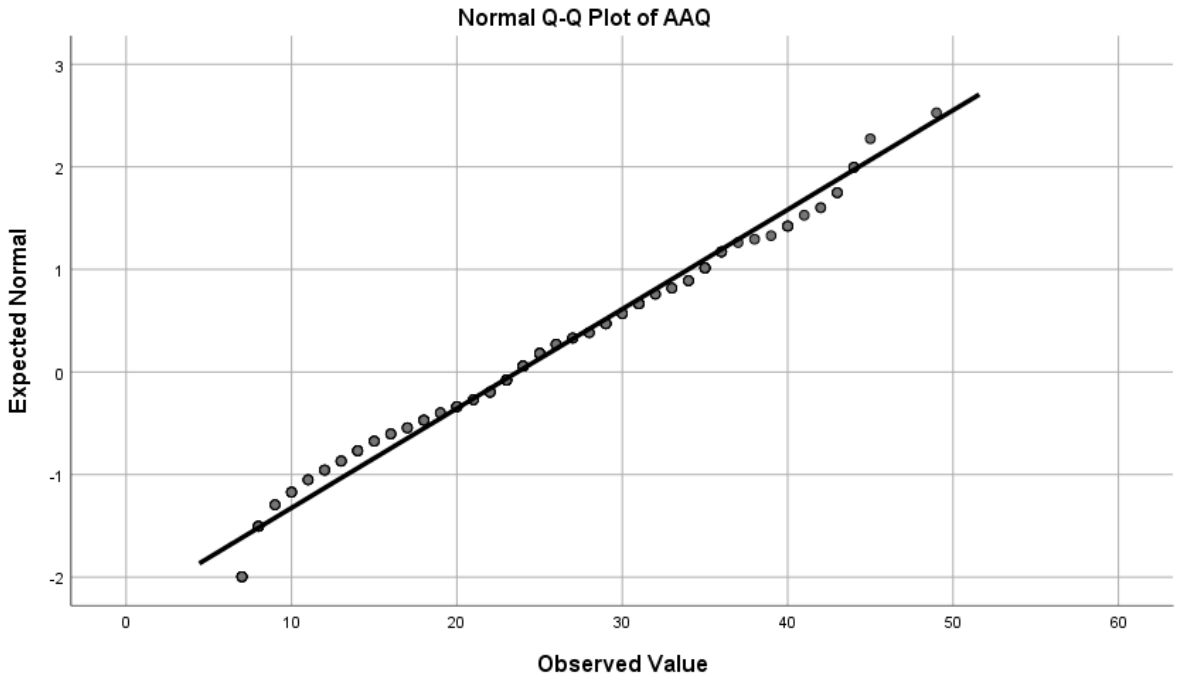
10
15
20
10.00
20.00
30.00
40.00
50.00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Observed Value
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3
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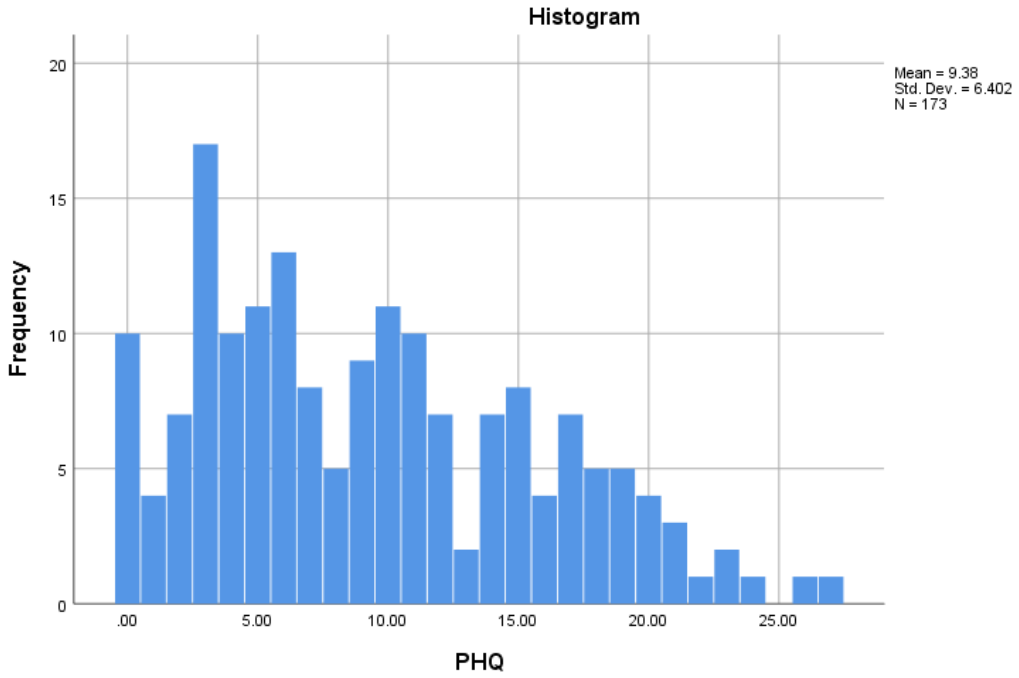
20
30
40
50
60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15
20
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5.00
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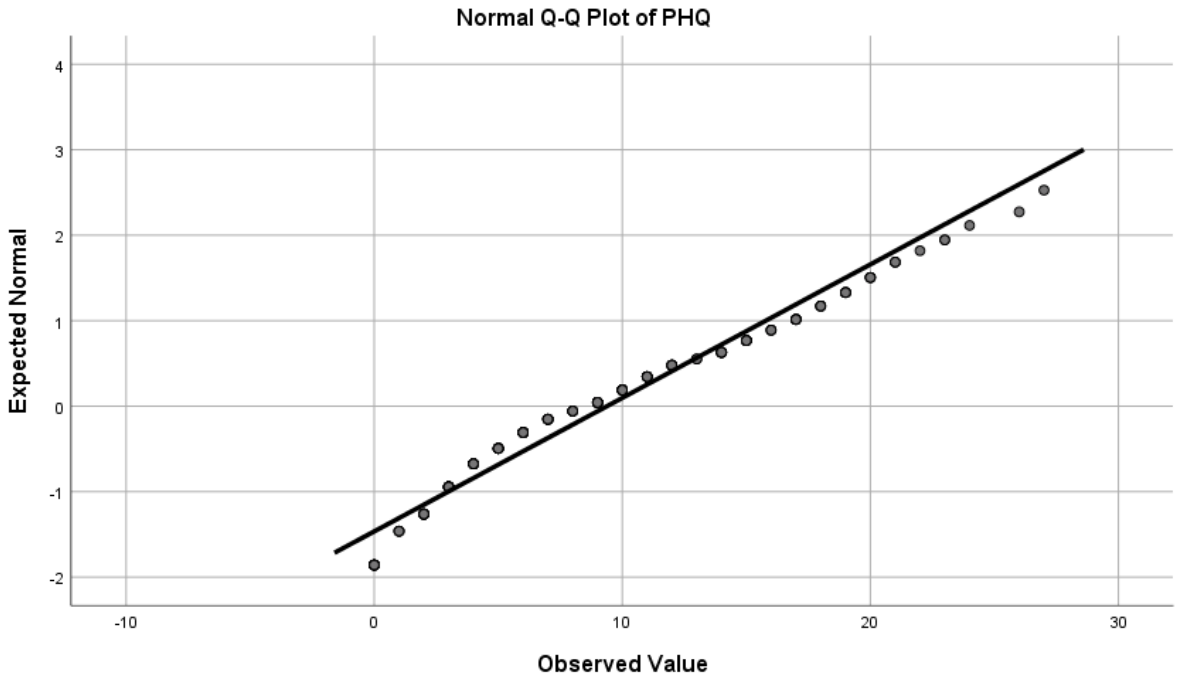
15.00
20.00
25.00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Observed Value
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0
1
2
3
4
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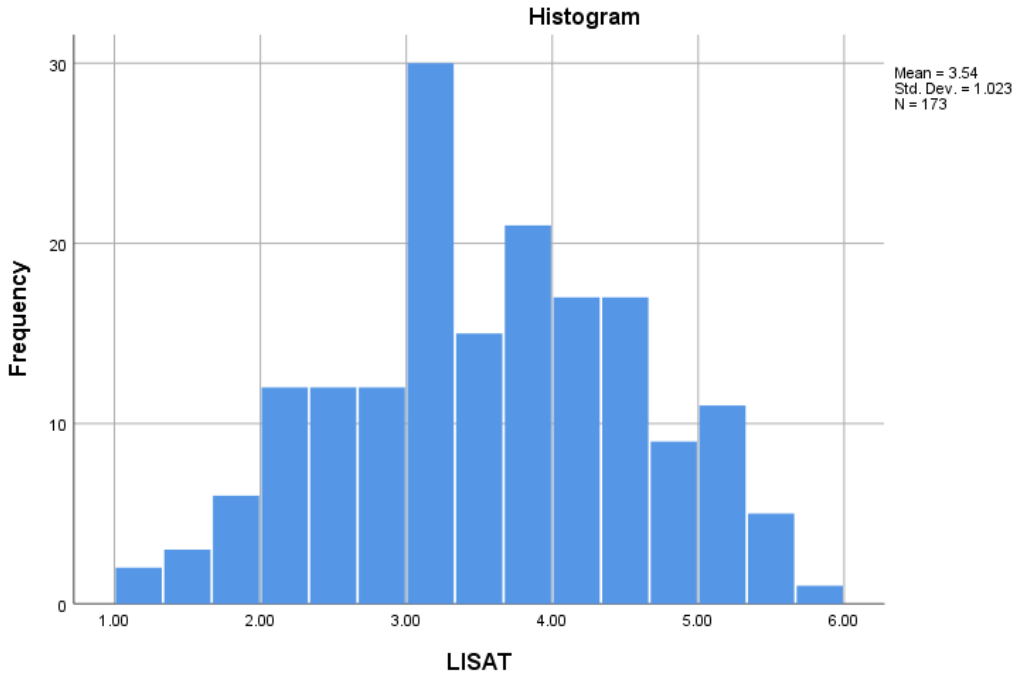
0
10
20
30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20
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0
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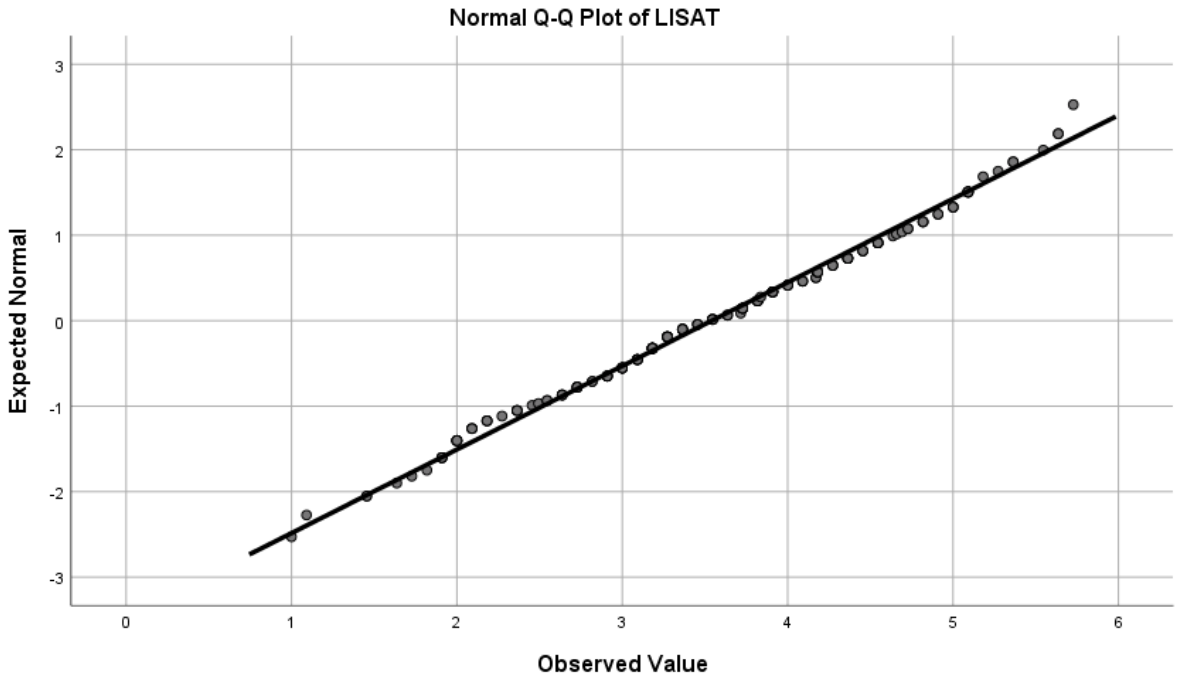
2.00
3.00
4.00
5.00
6.00
LISAT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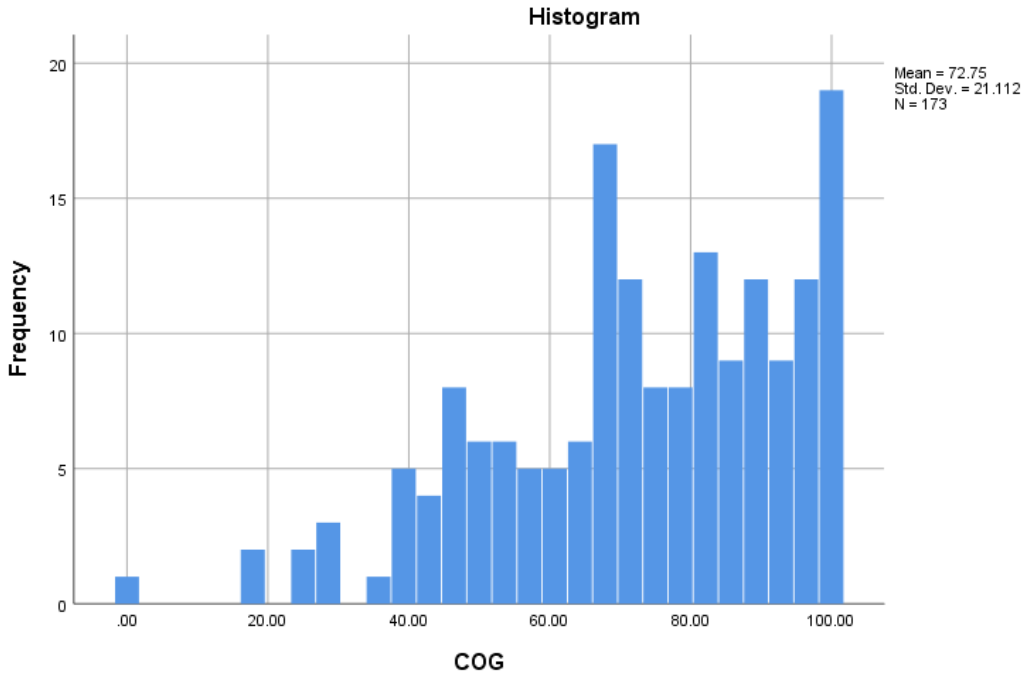
-3
0
1
2
3
4
5
6
Observed Value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Frequency
COG
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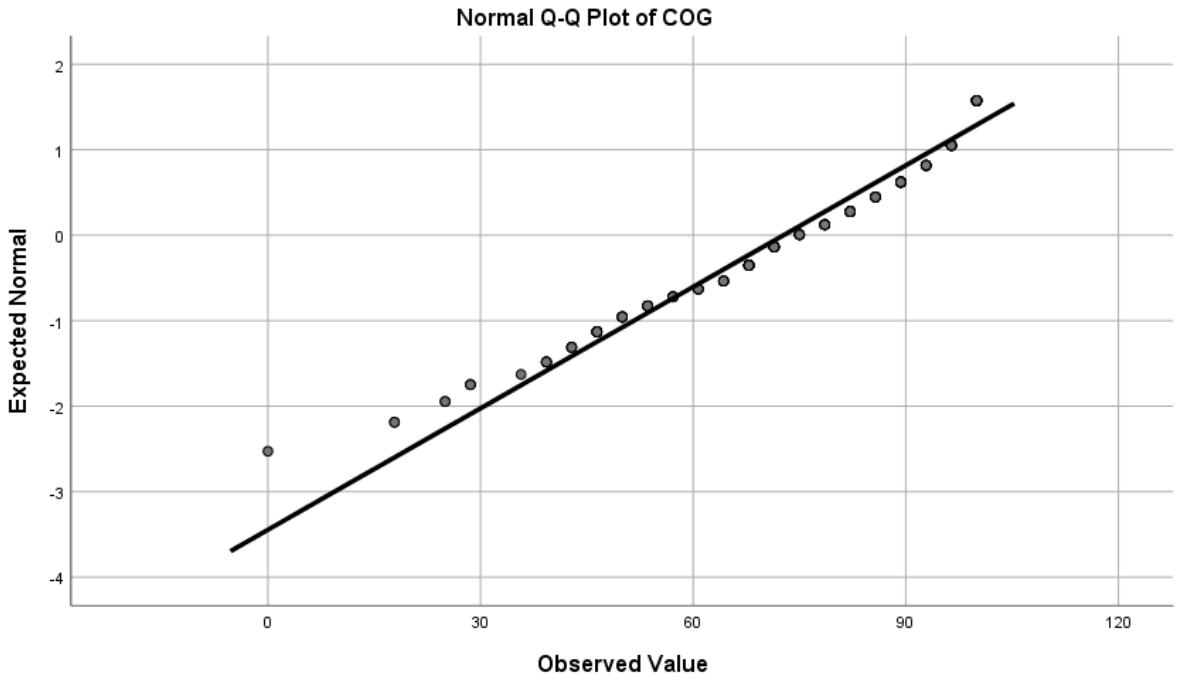
40.00
60.00
80.00
100.00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90
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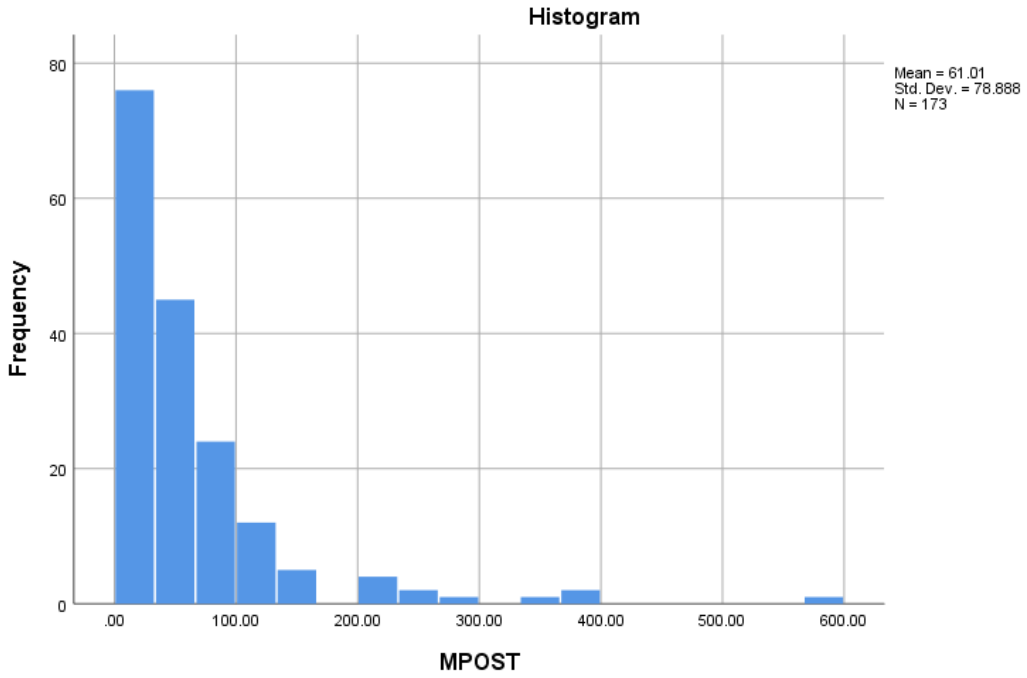
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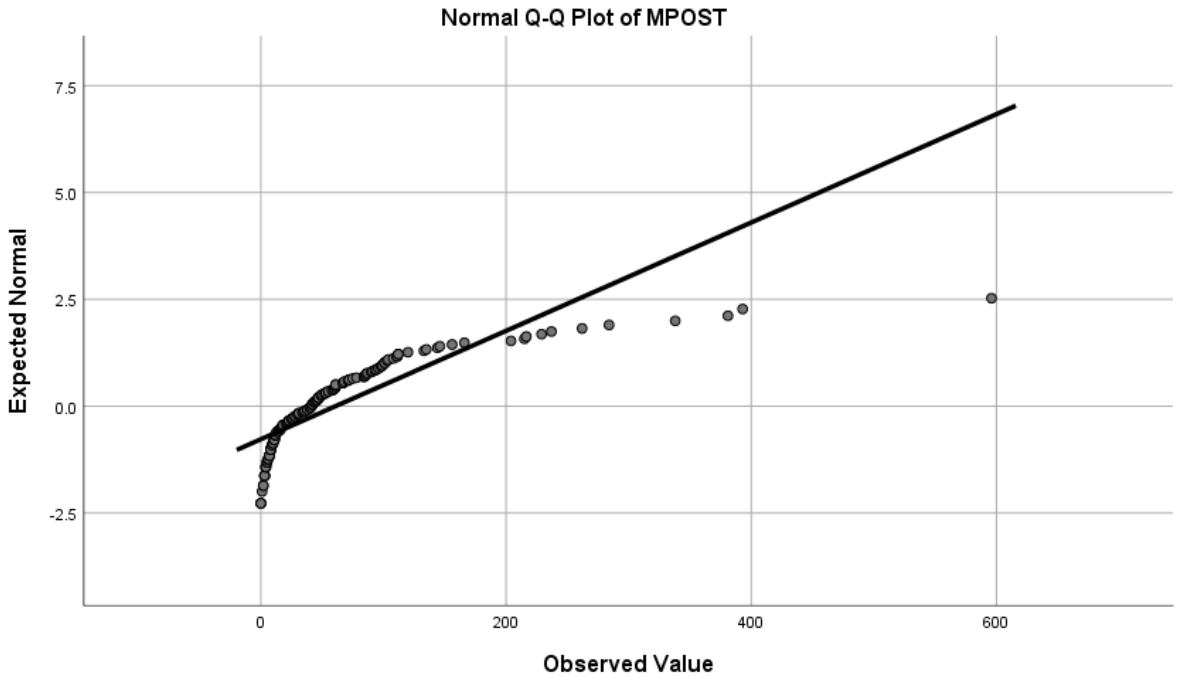
600.00
MPOST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400
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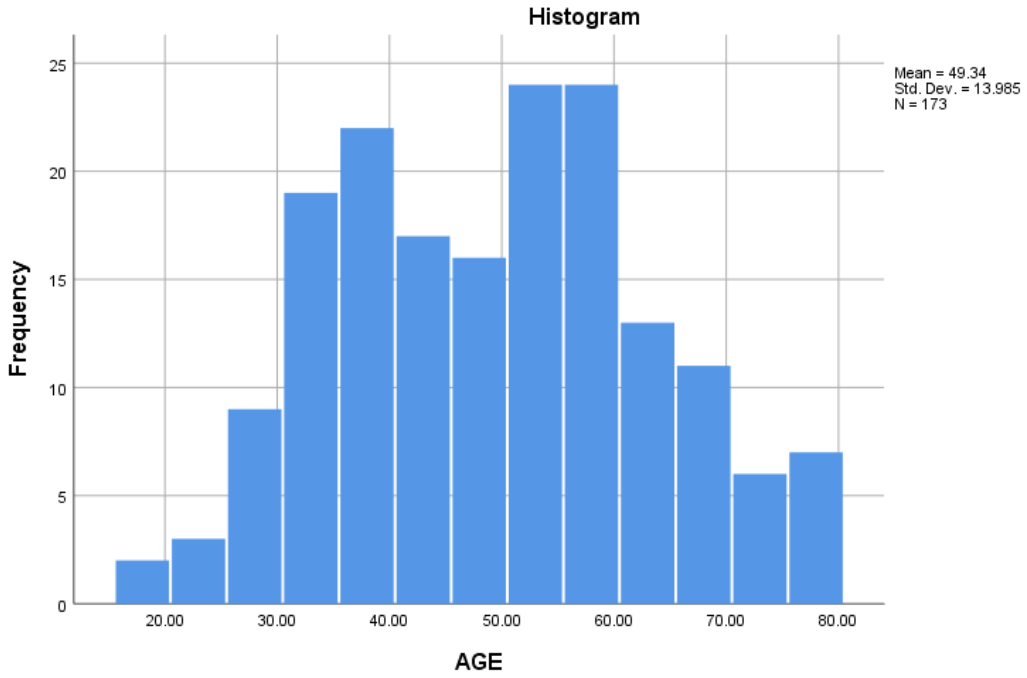
Observed Value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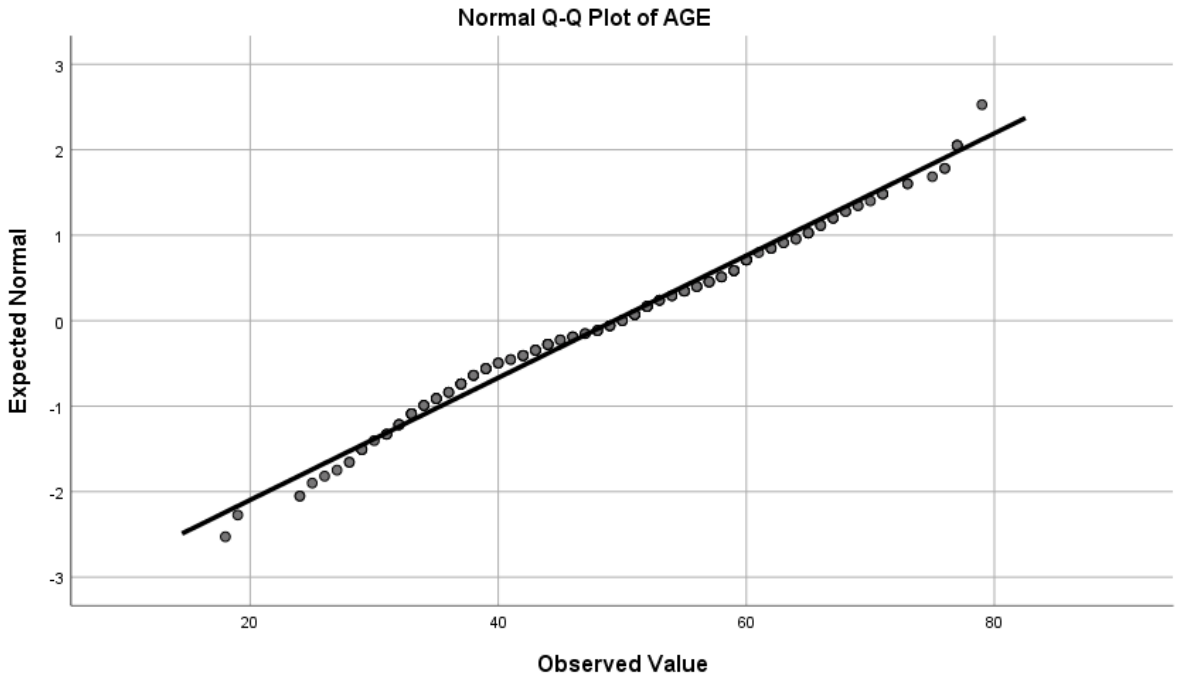
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Observed Value
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