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**Acceptance and Commitment Therapy for
Depression after Psychosis: Autobiographical
memory specificity and rumination as candidate
mechanisms of change**

And Clinical Research Portfolio

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BA (Hons) Psychology

MSc Applied Psychology for Children and Young People

Thesis submitted in partial fulfilment of the requirements for the
degree of Doctorate in Clinical Psychology

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Chapter 1: Systematic Review

A Systematic Review of Mindfulness-Based Interventions for Mental Health and Emotional Wellbeing with Children and Young People in School Settings

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Chapter 2: Major Research Project

Acceptance and Commitment Therapy for Depression after Psychosis:

Autobiographical memory specificity and rumination as mechanisms of change

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Chapter 1: Systematic Review

A Systematic Review of Mindfulness-Based Interventions for Mental Health and Emotional Wellbeing with Children and Young People in School Settings

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Abstract

Objectives: There is a need for an up to date review of the psychological outcomes of school based Mindfulness Based Interventions (MBIs) that focusses on studies carried out with non-clinical samples, identifies potential mechanisms of change, and includes structured critical appraisal of the methods and reported findings.

Methods: A systematic search strategy included an electronic search of databases (PsycINFO, MEDLINE, CINAHL, Cochrane Library, and ERIC) as well as a search of included studies' reference lists. Included studies were critically assessed using the Cochrane Risk of Bias Tool.

Results: Ten studies were eligible and included in the review. Six studies reported beneficial effects of school MBIs for mental health and emotional wellbeing; however, there were concerns regarding risk of bias across studies. Few studies used measures of mindfulness or gave explicit consideration to the change process of school MBIs. Reported findings were considered in light of methodological strengths and weaknesses.

Conclusions: There is mixed evidence regarding the effectiveness of school MBIs for promoting positive mental health and emotional wellbeing in school attending student samples. Future studies which address methodological limitations, such as small sample sizes and poor reporting of key methodological processes are needed to allow more definitive conclusions to be drawn.

Introduction

Major biological, neurodevelopmental, social and psychological changes occur during the time young people spend at school (Patton, Sawyer, Santelli, Ross, Afifi, Allen, et al., 2016). Indeed, many important health and social problems start around middle childhood, continue developing through adolescence, and peak in young adulthood (World Health Organisation, 2017).

Mindfulness-based interventions (MBIs) are one approach to promoting health and well-being for school-aged young people. Schools offer a highly accessible setting to deliver such interventions. Consequently, a number of mindfulness programs for school have been developed and implemented in the last decade (McKeering & Hwang, 2018; Meiklejohn, Phillips, Freedman, Griffin, Biegel, Roach, et al., 2012). Initial reviews suggest MBIs are acceptable, feasible and beneficial for younger children and adolescents, clinical and non-clinical young people, and in a wide variety of settings including school (Felver, Hoyos, Tezanos, & Singh, 2016; McKeering & Hwang, 2018; Zenner, Herrleben-Kurz, & Walach, 2014; Zoogman, Goldberg, Hoyt, & Miller, 2014). Zenner et al.'s (2014) systematic review and meta-analysis detailed significant positive effects of school MBIs including improvements in cognitive performance and resilience. Felver et al.'s (2016) systematic review reported similar findings including beneficial effects of MBIs for anxiety, depression, affect, and suicidal ideation. Carsley, Khoury, and Heath's (2017) meta-analysis reported significant effects of moderators such as program facilitator, developmental stage of pupil, and intervention dose on outcomes for those who had participated in an MBI. Rationale for this Review

Research investigating MBIs in schools is developing fast. Three reviews to date have examined school MBIs; however, these have had a number of methodological limitations (Carsley et al., 2017; Felver et al., 2016; Zenner et al., 2014). No review examining school MBIs effect on psychological outcomes has focussed on studies carried out with students across what are typically considered school-age years (i.e. 5 to 18 years old) and reflective of a general classroom (i.e. not targeted based on specific emotional, learning, behavioural or intellectual difficulties). Additionally, no review has explicitly considered examination of the change process, through which school

MBIs may have their effects. The importance of examining how interventions work has been highlighted as a key step in the development and evaluation of complex interventions (Medical Research Council, 2000; Craig, Dieppe, Macintyre, Michie, Nazareth, & Petticrew, 2008). Furthermore, only McKeering and Hwang (2018) has applied any form of critical appraisal tool to studies reviewed – and that was restricted to studies examining school MBIs with early adolescents. This systematic review will address these limitations and provide an account of RCTs examining the effects of school MBIs on mental health and emotional wellbeing with school-aged children and young people who are reflective of a general classroom. Additionally, we will examine reported findings, relating to effectiveness for mental health and emotional wellbeing, in light of methodological strengths and weaknesses as assessed using a critical appraisal tool. This should provide insight into the evidence examining school MBIs, and meaningful implications for those carrying out and researching such interventions with students in line with evidence based practice (EBP). In this educational context, accurate insight and meaningful implications should inform EBP to ensure decisions about the implementation of interventions are based on an understanding of what is and is not reliable evidence (Hempenstall, 2006; McKeering & Hwang, 2018).

Aims

- 1) To describe the characteristics of Randomised Controlled Trials (RCTs) which have systematically evaluated a MBI with children and young people in school settings.
- 2) To describe and critically analyse what markers of efficacy have been used in RCTs of MBI for mental health and well-being in schools.
- 3) To identify and describe any moderators and mediators of outcome examined in trials.
- 4) To assess the quality of the research of papers included in the review.

Methods

Search Strategy

Five electronic databases were searched for relevant published research on the seventh of May 2019: PsycINFO, MEDLINE, CINAHL, Cochrane Library, and ERIC. Subject

headings and keywords relating to mindfulness and young people were combined into the search strategy (Appendix 1.2) which was finalised following consultation with a librarian. Search terms were tailored for each database and designed to promote sensitivity. The search did not have a start or end date limit. The references of included studies were also reviewed for further suitable studies.

Study Selection

Studies were included if they examined an MBI delivered to school students in their school environment using an RCT design. Studies were excluded if they used only a component of mindfulness; were not available in English; were not published in a peer-reviewed journal; did not include outcome measures related to mental health or emotional well-being; participants did not represent a 'general classroom' (i.e. had been specifically recruited based on emotional, learning, behavioural, or intellectual criteria); or included participants outside the 5-18 years old age range.

The search process is summarised in Figure 1.

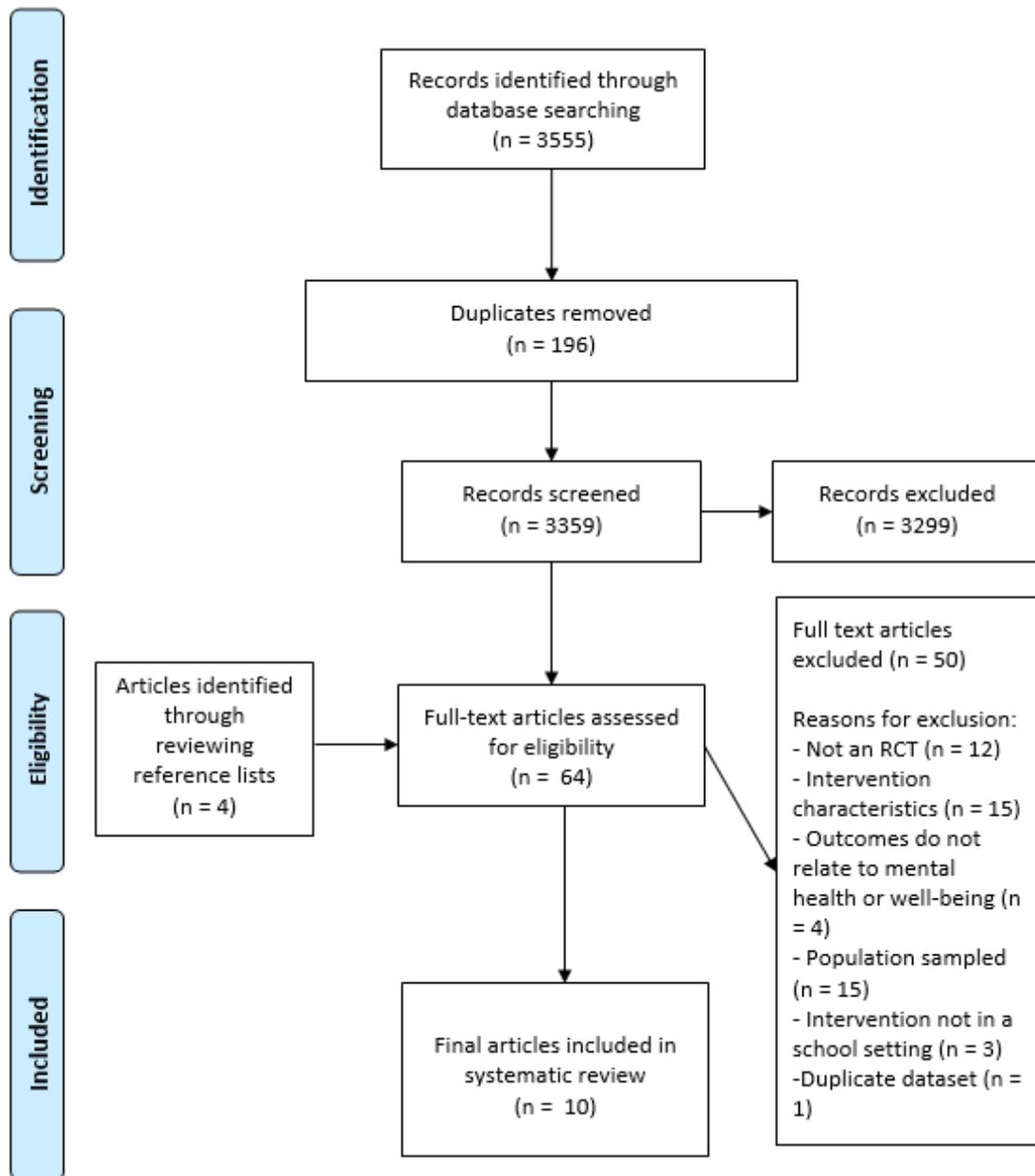


Figure 1

PRISMA diagram showing the systematic search process.

Data Extraction

A data extraction table was compiled for the ten included studies (see Table 1 in Results). This table standardised the extraction of information across studies so that it could be synthesized and compared in light of aims detailed above. Table 1 provides a full but concise description of each study in terms of authorship, year of publication and country, design, sample characteristics, programme characteristics, outcome measures used and reported findings.

Quality Appraisal

The Cochrane Risk of Bias Tool (Higgins and Green, 2011) was used to assess quality of design and execution of included studies. This does not use scales to inform a summary score but rather requires assessment across seven areas of methodology. The researcher categorises each domain as low-risk, high-risk or unclear-risk, and provides evidence to support each judgement. This allowed evaluation of reported findings in light of identified risk of bias ratings across domains and provided a summary of strengths and limitations of research reviewed. Included studies' risk of bias ratings are summarised in Table 3. Tables detailing support for judgements made in risk of bias domains across studies are available in Appendix 1.3. The author and another Trainee Clinical Psychologist reviewed all studies included. Disagreements were resolved through discussion until one-hundred percent agreement was reached.

Results

Table 1

Summary description of characteristics for studies review

| Study & Country | Design | Participants | Programme | Outcome Measures* ** | Reported Findings Relating to Mental Health and Emotional Wellbeing |
|-----------------------------------|---|---|--|---|---|
| Atkinson & Wade (2015), Australia | Mindfulness-based intervention vs dissonance-based intervention (DBI), and school class as usual control, at baseline, post-intervention, and 6-month follow up Unit of randomization: School classes | 347 female students (all female) Age: 14 – 18 years (M= 15.70, SD= 0.77) Ethnicity: Caucasian (84%), Asian (8%), African (1%), and Other (4%) Number randomized: 347 (MBI – 138; DBI - 108; Control – 101) | MBI utilised included mindfulness and acceptance-based practice, with some exercises from MBCT for depression, relating to body image. Duration: 1 x (length in minutes– NR) lesson per week for 3 weeks. Facilitators: 1 ‘expert facilitator’ who, in addition to facilitating M programme, provided a 2-hour training session for 3 postgraduate Psychology students who | Mental health and emotional wellbeing measures: <i>Affect</i> - PANAS-X Non mental health or emotional wellbeing measures: - EDE-Q - DEBQ-R - SATAQ-3 - CIA Mindfulness: N/R Mechanisms of change: N/R | Univariate ANOVAs and independent sample t-tests. No statistically significant differences between MBI and DBI control group in relation to affect - or any other outcome measure (ps > .05). No significant impact of MBI on affect (p > .05). Further analyses focussed primarily on effects of expert facilitator across interventions. There were no significant differences in affect |

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| | | | were to act as facilitators. | | between expert-facilitator groups and non-expert facilitator groups (ps > .05). |
| Crescentini, Capurso, Furlan, & Fabbro (2016), Italy | Mindfulness-based intervention vs reading and commenting on a book active control group at baseline and post-intervention. Unit of randomization: School classes | 31 children (15 males, 16 females). Age: 7 – 8 years (Overall M and SD – N/R) <i>MBI</i> (M= 7.3, SD= 0.5) <i>Control</i> (M = 7.4, SD = 0.5) Ethnicity: N/R (“children in the two groups had the same ethnic and linguistic background, with every child being Italian mother-tongue”) Number randomized: 31 | MBI utilised included mindfulness-oriented meditation, adapted for children, and based on the MBSR protocol. Duration: 3 x 60-minute lessons per week for 8 weeks. Facilitators: 2 mindfulness-meditation instructors with several years of experience with this technique and working in educational settings. | Mental health and emotional wellbeing measures: <i>Anxiety and Depression</i> - CBCL-TRF - CTRS-R <i>Depression</i> - SMFQ Non mental health or emotional wellbeing measures: N/R Mindfulness measures: N/R Mechanisms of change measures: N/R | Multivariate ANOVAs (with Bonferroni adjusted alphas). No significant differences between treatment and control groups in effects on anxiety or depression (ps > .05). Both MBI and active control condition were found to have a significant positive effect in reducing anxiety (CBCL-TRF - Internalizing), (ps < .05) No significant effect of either group intervention on depression scores (SMFQ) (ps > .05). |

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| | | (MBI = 16; Reading = 15). | | | |
| <p>Franco, Manas, Cangas, & Gallego (2011), Spain</p> | <p>Mindfulness-based intervention vs control group at pre and post-intervention.</p> <p>Unit of randomization: Individual participants</p> | <p>61 high school students (31 males; 29 females)</p> <p>Age: 16 – 18 (M= 16.75, SD = 0.83)</p> <p>Ethnicity: N/R</p> <p>Number randomized: 61 (MBP = 31; Control = 30).</p> | <p>The mindfulness programme consisted of learning a mindfulness technique called Meditación Fluir. The main goal of this technique is notice rather than challenge thoughts, and accept any idea that might appear or emerge spontaneously. It looks to develop a state of full attention to thoughts, while being aware that they are not permanent.</p> <p>Duration: 1 x 90-minute session per week for 10 weeks.</p> <p>Facilitators: N/R</p> | <p>Mental health and emotional wellbeing measures:</p> <p><i>Anxiety</i></p> <p>- STAI</p> <p>Non mental health or emotional wellbeing measures:</p> <p>- (SCQ-36)</p> <p>-Academic Performance</p> <p>Mindfulness measures: N/R.</p> <p>Mechanisms of change measures: N/R</p> | <p>Dependent and Independent t-tests</p> <p>Significant improvement in state and trait anxiety scores (ps < .05), as well as all other outcome measures for MBI group at post-test. No significant difference between outcome measures at pre and post-test for control group (ps > .05).</p> <p>Significantly greater improvement in state and trait anxiety scores (ps < .005), as well as all other outcome measures, compared to control group (ps < .05).</p> |
| <p>Johnson, Burke, Brinkman &</p> | <p>Mindfulness-based intervention without parental</p> | <p>555 year 7 (primary school) and year 8 (secondary school)</p> | <p>The mindfulness-based intervention chosen was the .b (“Dot be”)</p> | <p>Mental health and emotional wellbeing measures:</p> | <p>One-way ANOVAs, linear maximum modelling, and</p> |

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| Wade (2017), Australia | involvement, compared to mindfulness-based programme with parental involvement, and normal curricular lessons control group at baseline, post-intervention, and 3-month follow up. Unit of randomization: School classes | students (303 males; 251 females) Age: Age Range: N/R (M= 13.44, SD = 0.33) Ethnicity: N/R Number randomized: 560 (Mindfulness without parents= 186; Mindfulness with parents= 192; Control = 182). | Mindfulness in Schools curriculum which. This is based on MBCT/MBSR but adapted for adolescents in line with principles identified from reviews of effective school-based mental health and wellbeing programmes. Duration: 8 x 35 – 60-minute lessons (Number of weeks N/R) Facilitators: All mindfulness groups were facilitated by one of the authors who had ten years personal practice in mindfulness and .b curriculum certification. | <i>Anxiety and Depression</i> - DASS-21 Wellbeing measures - WEMWBS Non mental health or emotional wellbeing measures - EDE-Q Mindfulness measures: - CAMM Mechanisms of change measures: <i>Mediators:</i> N/R <i>Moderators:</i> <i>Mindfulness</i> - CAMM <i>Home Practice</i> - HPQ | hierarchical multiple regressions. No significant differences between groups for changes in anxiety and depression (DASS-21) or other outcome measures at pre and post-intervention (ps > .05). No significant effects of moderators (ps > .05) |
| Mendelson, Greenberg, Dariotis, Gould, Rhoades, & | Mindfulness-based intervention compared to waiting list control at baseline | 97 fourth and fifth grade students (38 males; 59 females). | Key intervention components of the mindfulness and yoga based intervention included yoga-based physical activity, | Mental health and emotional wellbeing measures: <i>Depression</i> - SMFQ-C | Multiple regressions. MBI group found to have significantly greater improvements in three of five aspects of stress |

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| <p>Leaf (2010), USA</p> | <p>and post-intervention Unit of Randomization: Schools</p> | <p>Age: Overall age range: N/R. (Overall M and SD- N/R) Fourth Graders: (N= 55, M= 9.7, SD= 0.7); Fifth Graders (N= 42, M= 10.6, SD= 0.7). Ethnicity: African American (83.5%), Latino (4.1%), Mixed Race (7.2%). Number randomized: 97 (MBI= 50; Control= 47).</p> | <p>breathing techniques, and guided mindfulness practices. Duration: 4 x 45-minute groups per week for 12 weeks. Facilitators: Groups were facilitated by 2 instructors from the third sector organisation, Holistic Life Foundation.</p> | <p><i>Stress</i> - RSQ <i>Affect</i> - EPI Non mental health or emotional wellbeing measures: - PIML Mindfulness measures: N/R. Mechanisms of change measures: -Cognitive and Emotion Regulation: - RSQ</p> | <p>(RSQ – Rumination, Emotional Arousal, and Intrusive Thoughts) than controls (ps < .05).</p> |
| <p>Napoli, Krech, & Holley (2005), USA</p> | <p>Mindfulness-based intervention compared to waiting list control at baseline and post-intervention Unit of Randomization:</p> | <p>228 first, second and third grade students (120 males; 108 females) Age: N-R Ethnicity: N/R Number randomized: 228</p> | <p>The Attention Academy Programme MBI aimed to help students improve their quality of life through practicing mindfulness. The goals of the programme were to help students learn to increase their attention to</p> | <p>Mental health and emotional wellbeing measures: <i>Anxiety</i> - TAS Non mental health or emotional wellbeing measures:</p> | <p>T -Tests for changes in scores for each intervention group and between intervention groups. Significant reduction in test anxiety (TAS) for MBI (p < .05). Reductions in test anxiety (TAS) were</p> |

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| | Individual participants | (MBI= 114; Control= 114). | the present experience; approach experiences without judgment; and view experiences as independent and novel. Duration: 2 x 45-minute groups per month for 6 months Facilitators: Groups were facilitated by 2 professionally trained mindfulness training instructors. | - ACTeRS - TEA-Ch Mindfulness measures: N/R. Mechanisms of change measurs: N/R. | significantly greater for the MBI than the waiting list control group (p < .001). |
| Quach, Jastrowski, & Alexander (2016), USA | Mindfulness-based intervention compared to a Hatha yoga intervention, and waitlist control group Unit of randomization: Individual participants | 198 junior high school students (76 males; 122 females). Age: 12 - 15 years (M= 13.18, SD= 0.72). Ethnicity: Spanish/ Hispanic/ Latino (65.7%; 20.3%; Bircacial (7.5%); Caucasian (1.2%); African-American (1.2%); Native | The MBI utilised was based on MBSR. ‘Developmentally appropriate’ modifications were made to the protocol used. Duration: 2 x 45-minute groups per week for 4 weeks. Facilitators: Groups were facilitated by 2 instructors with ‘extensive’ training in mindfulness meditation. | Mental health and emotional wellbeing measures: <i>Anxiety</i> SCARED <i>Stress</i> - PSS-10 Non mental health or emotional wellbeing measures: - AOSPAN Mindfulness measures: | Mixed-design ANOVAs (with Bonferroni adjusted alphas). No significant differences found between MBI, Hatha Yoga, and waiting-list control groups on mental health and emotional wellbeing outcomes (anxiety; stress). (ps > .05). All three groups showed reductions in |

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| | | American (2.9%); Other (1.2%). Number randomized: 186 (MBI= 61; Hatha yoga= 68, Control= 57). | | - CAMM Mechanisms of change measures: N/R. | stress scores (PSS-10) at post-intervention (ps < .01) |
| Sibinga, Perry-Parrish, Chung, Johnson, Smith, & Ellen (2013), USA | Mindfulness-based intervention compared to health education control condition at baseline, post-intervention and 3-month follow up Unit of Randomization: Individual participants | 41 seventh and eighth grade students (41 males; 0 females). Age: 11 – 14 years (M= 12.5, SD= NR) Ethnicity: N/R Number randomized: 41 (MBI= 22; Health Education Control= 19). | The MBI was based on MBSR. The structured programme, previously adapted for urban youth, focussed on teaching purposeful, non-judgemental attention to the happenings of the present moment. Duration: 1 x 50-minute session per week for 12 weeks Facilitators: Groups were facilitated by a trained instructor with over ten years of experience in mindfulness instruction with youth. | Mental health and emotional wellbeing measures: <i>Depression</i> - CDI <i>Anxiety</i> - PGDS - MAS-C <i>Affect</i> - PANAS <i>Stress:</i> - PSS-10 <i>Mood:</i> - DES <i>Anger:</i> - STAI | Multi-variate linear regression and within-groups regressions. MBI group showed significantly lower anxiety scores (MAS-C) than the active control group at post-intervention (d= .79, p < .05). |

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| | | | | <p>- TAS</p> <p>Non mental health or emotional wellbeing measures:</p> <p>- COPE-I</p> <p>- Sleep diary.</p> <p>- Physiological measures of sleep quality including ‘respironics and actiwatch’.</p> <p>Mindfulness measures:</p> <p>- CAMM</p> <p>Mechanisms of change measures: N/R.</p> | |
| <p>Van der Weijer-Bergsma, Langenberg, Brandsma, Oort, & Bogels (2014), Netherlands</p> | <p>Mindfulness-based intervention compared to waiting list control group at baseline, pre-test, post-test, and follow-up test</p> <p>Unit of Randomization: School classes</p> | <p>199 public elementary school students (89 males; 110 females).</p> <p>Age: 8 – 12 years (M= 9.92, SD= 0.923).</p> <p>Ethnicity: N/R</p> <p>Number randomized: 199</p> | <p>The Mindful Kids MBI was developed by developed by two of the authors. The programme was based on MBSR and MBCT training for adults and inspired by the Mindful Schools programme.</p> | <p>Mental health and emotional wellbeing measures:</p> <p><i>Anxiety</i></p> <p>- SCARED-71</p> <p>Non mental health or emotional wellbeing measures:</p> <p>- SOC-</p> <p>- EAQ-30</p> | <p>Multilevel Regression Analysis</p> <p>No significant differences between MBI and control groups in anxiety (SCARED-71) at any time point (ps > .05).</p> <p>Exploratory analyses were taken as suggesting those with</p> |

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|-------------------|--|---|---|---|--|
| | | (MBI= 95; Control= 104). | <p>Duration: 2 x 30 minute sessions per week for 6 weeks</p> <p>Facilitators: The MBI was provided by a mindfulness trainer experienced in delivering adult groups who also had a background of school teaching, yoga teaching, and family counselling.</p> | <ul style="list-style-type: none"> - NPDK - SDSC - CCP-R <p>Mindfulness measures: N/R</p> <p>Mechanisms of change measures:</p> <p><i>Mediators:</i> N/R</p> <p><i>Moderators:</i></p> <ul style="list-style-type: none"> - Gender - Age - Rumination - NPDK | high levels of rumination will benefit most from the MBI, However, these proposed benefits did not relate to mental health or emotional wellbeing outcomes. |
| White (2012), USA | Mindfulness-based intervention compared to waiting list control condition at allocation and post-intervention Unit of Randomization: Schools | 155 fourth and fifth grade students (all female). Age: 8 – 11 years (M= 9.9, SD= 0.720). Ethnicity: White (83.3%); African American (1.3%); Asian (3.9%); Latina (2.6%); Multiple (1.3%); | The Mindful Awareness for Girls through MBI was based on MBSR but focused primarily on the yoga element. Developmental adaptations were made to the MBSR approach. Duration: 1 x 1 hour per week for 8 weeks Facilitators: MBI was led by the | <p>Mental health and emotional wellbeing measures:</p> <p><i>Stress</i></p> <ul style="list-style-type: none"> - FBS <p>Non mental health or emotional wellbeing measures:</p> <ul style="list-style-type: none"> - SCSi -SPP-C | Repeated-measures ANOVAs. No significant difference in perceived stress was found between the intervention and control groups: (p > .05) However, the interaction between time and group was identified as approaching |

| | | | | | |
|--|--|---|--|---|--|
| | | Native American (1.3%) Number randomized: 155 (MBI= 70; Control= 85). | 'interventionist and research assistants'. | Mindfulness measures: - MTAS-A Mechanisms of change measures: N/R | significance (p = .060) with a small effect size (h = 0.02). Compared with the control group, the MBI reported higher levels of stress post-intervention |
|--|--|---|--|---|--|

Note: MBI= Mindfulness based intervention; N/R = Not reported; M = Mean; SD = Standard deviation.

* ACTeRS (ADD-H Comprehensive Teacher Rating Scale), AOSPAN (Automated Operation Span Task), CAMM (Child and Adolescent Mindfulness Measure), CBCL-TRF (Child Behaviour Checklist-Teacher Report Form), CCP-R (Caring Community Profile-Revised, Translated into Dutch), CDI (Children's Depression Inventory), CIA (The Clinical Impairment Assessment of Eating Disorders), COPE-I (The COPE Inventory), CTRS-R (Conners Teachers Rating Scales – Revised), DASS-21 (Depression Anxiety Stress Scale Short-form), DEBQ-R (The Dutch Eating Disorder Questionnaire- Restraint), DES (Differential Emotions Scale), STAEI (State-Trait Anger Expression Inventory), EAQ-30 (Emotion Awareness Questionnaire Revised - 30 Item, Translated into Dutch), EDE-Q (Eating Disorder Examination— Questionnaire), EPI (The Emotional Profile Inventory), FBS (The Feel Bad Scale), SCSi (The Schoolagers' Coping Strategy Inventory), HPQ (Homework Practice Questionnaire), MAS-C (Multidimensional Anxiety Subscale for Children), MTAS-A (Mindful Thinking and Action Scale for Adolescents), NPDK (Non-Productive Thoughts Questionnaire for Children, Translated into Dutch), PANAS-X (Positive and Negative Affect Schedule), PGDS (The Self-Assessment Perceived Global Distress Scale), PIML (Relationships with Peers and School People in My Life), PSS-10 (Perceived Stress Scale- 10 Item), RSQ (Responses to Stress Questionnaire), SATAQ-3 (Socio-cultural Attitudes Towards Appearance Scale), SCARED (Screen for Child Anxiety and Related Emotional Disorders), SCARED-71 (Screen for Child Anxiety Related Emotional Disorders-71) Item, Parent Version, Translated into Dutch), SCQ-36 (Self-Concept Questionnaire 36), SDSC (Sleep Disturbance Scale for Children, Translated into Dutch), SMFQ (Short Mood and Feelings Questionnaire), SOC-C (Sense of Coherence Questionnaire for Children, Translated into Dutch), SPP-C (The Schoolagers' Coping Strategy Inventory), STAI (State-Trait Anxiety Inventory), TAS (Test Anxiety Scale), TEA-Ch (Test of Everyday Attention for Children), The Aggression Scale (TAS), WEMWBS (Warwick-Edinburgh Mental Wellbeing Scale).

** Further detail on measures used in included studies may be found in Appendix 1.4.

All studies included were published between 2005 and 2016 and carried out in high-income countries.

Design

Four of the six studies used a cluster-randomized design (Atkinson & Wade, 2015; Crescentini et al., 2016; Johnson et al., 2017; Van der Weijer-Bergsma et al., 2014) with two of these using school as the unit of randomization (Mendelson et al., 2010; White, 2012). Cluster randomization offers practical advantages for studies looking to examine the effectiveness of an intervention, particularly in terms of efficiency for group meetings. However, it can represent more of a risk of bias (Chandler, Juhlin, Fransson, Caster, Edwards et al., 2017). With regards to cluster-randomization by class or school, it is important to meaningfully examine similarities and differences in these units of randomisation which may confound interpretation of any treatment effects. None of the studies included using cluster-randomization appeared to do this.

Participants

1,855 young people participated across the ten studies reviewed. Sample size varied largely and ranged from 31 (Crescentini et al., 2016) to 347 students (Atkinson & Wade, 2015). Recent evidence suggests the developmental stage of participants may have a considerable impact on how effective MBIs offered to them are. For example, Carsley et al.'s (2017) meta-analysis asserted studies examining MBI pre-post effects on mental health and well-being outcomes in late adolescent (15 to 18 years) participants, found greater effects than those with middle childhood (6 to 10 years) and early-adolescent (11 to 14 years) participants. The majority of studies reviewed would seem to have included participants who would be considered middle childhood to early adolescent, as defined by Carsley et al.'s (2017) classifications. This may mean that these studies were less likely to show high-rates of effectiveness.

Five studies did not report information regarding ethnicity of participants (Crescentini et al., 2016; Franco et al., 2011; Napoli et al., 2005; Johnson et al., 2017; Van der Weijer-Bergsma et al., 2014). In the high-income countries where studies were carried out, young people from ethnic minority background have been found to experience

higher levels of stressors, such as poverty and discrimination, associated with poorer mental health and emotional wellbeing outcomes (Reynolds, Temple, Robertson, & Mann, 2001). Recent, non-RCT, studies have found beneficial effects of school MBIs for the mental health and emotional wellbeing of such young people (Black & Fernando, 2014; Fung, Guo, Jin, Bear, & Lau, 2016). That such a central factor was not considered in half of the studies included is a serious limitation for the evidence base and interpretation of findings reported.

Interventions and Outcome Measures

Key aspects of interventions reported for each study are presented in Table 2. Studies varied considerably in level of detail provided about MBIs.

A wide range of psychological variables were used to assess mental health and emotional wellbeing across interventions. Therefore, it is perhaps unsurprising that outcome measures used as markers of efficacy varied considerably across studies. This may help account for inconsistencies in reported findings however is most likely reflective of differences between studies in location, participant characteristics, researcher aims and biases, and intervention aspects.

Six studies did not include a measure of mindfulness (Atkinson & Wade; Crescentini et al., 2016; Franco et al., 2011; Mendelson et al., 2010; Napoli et al., 2005; Van der Weijer-Bergsma et al, 2014). Only Mendelson et al., (2010) explicitly proposed a mechanism of change for examination. They proposed the effects of the MBI would be mediated by ‘cognitive and emotion regulation’. However, the authors reported that mediation could not be examined due to the small sample size. Crescentini et al., (2016) highlighted the importance of considering their findings in relation to change process and suggested future studies give careful consideration to this. Two studies examined moderators of the effects of school MBIs on mental health and emotional wellbeing outcomes (Johnson et al., 2017; Van der Weijer-Bergsma et al., 2014). Proposed moderators included gender, age, rumination (Van der Weijer-Bergsma et al., 2014) and amount of home practice (Johnson et al., 2017). Only rumination significantly moderated school MBI effects on mental health and emotional wellbeing.

Table 2

Key Aspects of MBIs in Included Studies.

| | Breath Awareness | Working with Thoughts and Emotions | Education | Awareness of Senses and Practices of Daily Life | Body Scan | Body Practices (I.e. Yoga) | Mindful Movement | Kindness Practices | Group Discussion | Home Practice |
|-------------------------------|------------------|------------------------------------|-----------|---|-----------|----------------------------|------------------|--------------------|------------------|---------------|
| Atkinson & Wade (2015), | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | ✓ |
| Crescentini et al. (2016), | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Franco et al (2011) | ✓ | ✓ | | | ✓ | | | | | |
| Johnson, et al. (2017) | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| Mendelson et al. (2010) | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| Napoli et al. (2005) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Quach et al. (2016) | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | ✓ |
| Sibinga et al. (2013) | | | | ✓ | | | | | | |
| Weijer-Bergsma et al., (2014) | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | |
| White (2012) | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | ✓ |

Note: An unticked box does not necessarily mean that this intervention component was not part of the MBI but rather that it was not reported in the study.

Reported Findings and Critical Appraisal

It should be noted, none of the studies included examined effects of school MBIs on subsequent development of significant mental health difficulties that could require intervention. This means it is difficult to make interpretations about the effectiveness of school MBIs in relation to preventative beneficial effects. Instead, beneficial effects reported related to wider psychological variables associated with mental health difficulties. Six of the ten studies reported significant beneficial effects of school MBIs for aspects of mental health and emotional wellbeing (Crescentini et al., 2016); Franco et al (2011); Mendelson et al., (2010); Napoli et al., (2005); Quach et al., (2016); Sibinga et al., (2013). Four studies reported such significant beneficial effects in comparison to a control condition (Franco et al., 2011; Mendelson et al., 2010; Napoli et al., 2005; Sibinga et al., 2013). Only Sibinga et al. (2013) found beneficial effects for a school MBI in the context of comparison with an active control group (health-education classes). This may reflect a limitation of the studies reviewed. Comparison of school MBIs effects on mental health and emotional wellbeing, in relation to comparison against another active intervention would allow more effective consideration of whether these meet evidence-based practice guidelines (Hempenstall, 2006). However, as may be seen in Table 4, Sibinga et al. (2013) scored comparatively well across risk of bias domains. It is noteworthy that Sibinga et al. (2013) was one of only two studies not assigned a high-risk classification in any domain. This study was also assigned more low-risk classifications than any other study reviewed. Other studies reporting beneficial effects of MBIs in comparison to control groups received more mixed risk ratings across domains. Indeed, all three of these studies received only two out of six low-risk classifications. Additionally, there is a high rate of unclear-risk classifications across these three studies: ranging from three to five out of six.

Sample size would also seem a potential limitation of studies reporting beneficial effects of MBIs. Three of the six studies reporting beneficial effects included fewer than 100 participants (Crescentini et al., 2016; Mendelson et al., 2010; Sibinga et al., 2013). Crescentini et al. (2016) and Sibinga et al. (2013) reported findings based on what may be considered very small sample sizes.

Four studies did not find support for school MBIs having significant beneficial effects on aspects of mental health and emotional wellbeing (Atkinson & Wade, 2015; Johnson et al., 2017; Van der Weijer-Bergsma et al., 2014; White, 2012). Two studies reported findings suggestive of the school MBIs having negative effects (Johnson et al., 2017; White, 2012). Johnson et al. (2017) found those in the MBI group reported significantly higher levels of anxiety post-intervention. Similarly, White (2012) found a trend of MBI groups with and without parental involvement reporting higher levels of anxiety post-intervention. Such effects have been demonstrated previously in studies of MBIs with adults (Brooker, Julien, Webber, Chan, Shawyer, et al., 2013). Both studies suggested that these effects may be the result of an increase in mindful awareness of negative emotional experiences. This was supported, to an extent by findings relating to improvements in mindfulness scores in Johnson et al. (2017).

There would also seem to be trends in relation to whether studies reported beneficial effects and how many times mindfulness groups met. For example, the MBI group in Sibinga et al. (2013), who found beneficial effects in comparison to an active control conditions, met once a week for 12 weeks. The MBI group in Atkinson & Wade (2015), who did not find such beneficial effects, met once a week for three weeks. This general pattern across studies suggests there may be a dose effect of school MBIs that helps to account for differences in effectiveness.

Risk of Bias Ratings

The high number of low-risk ratings for incomplete outcome data and selective reporting is a strength of studies reviewed. Generally, studies did a good job of accounting for missing data and managing it appropriately in their analysis. Similarly, across the board, studies generally reported all expected outcomes and always reported all pre-specified outcomes.

Limitations across studies reviewed largely concerned risk of bias relating to randomization, concealment, and blinding procedures used. Only three of ten studies were assigned a low-risk of bias rating for the random sequence generation domain (Atkinson & Wade, 2015; Johnson et al., 2017; Sibinga et al., 2013). Crescentini et al. (2016) was the only study assigned a low-risk rating for the blinding of participants and personnel and blinding of outcome assessment domains. These limitations provide a

serious threat to attempted interpretation of the literature. For example, high or unclear risk of bias ratings across the majority of studies reviewed could mean that those involved, whether researchers, teachers, or young people, knew treatment group status, therefore providing an opportunity for expectation or placebo effects to influence responses and ratings.

Table 3

Risk of Bias Summary Table

| | Random sequence generation (selection bias) | Allocation concealment (selection bias) | Blinding of participants and personnel (performance bias) | Blinding of outcome assessment (detection bias) | Incomplete outcome data (attrition bias) | Selective reporting (reporting bias) | Other bias |
|-------------------------------|---|---|---|---|--|--------------------------------------|------------|
| Atkinson & Wade (2015) | + | ? | - | - | + | + | - |
| Crescentini et al., (2016) | ? | ? | + | + | + | + | - |
| Franco et al., (2011) | ? | ? | ? | ? | ? | + | + |
| Johnson et al., (2016) | + | ? | - | - | + | + | - |
| Mendelson et al., (2010) | ? | ? | ? | - | + | + | - |
| Napoli et al., (2005) | ? | ? | ? | ? | - | + | + |
| Quach et al., (2016) | ? | ? | ? | ? | + | + | + |
| Sibinga et al., (2013) | + | + | ? | ? | + | + | + |
| Van der Weijer-Bergsma (2012) | ? | ? | ? | ? | + | + | - |
| White (2012) | ? | ? | ? | - | + | + | - |

- + = Low risk of bias
- = High risk of bias
- ? = Unclear risk of bias

Discussion

A discussion of the key findings of the review are now provided with reference to the extant literature. The methodological strengths and limitations of the evidence base, and the review itself, are discussed before implications for future research and clinical practice.

Outcomes Used

Effects of school MBIs were measured in relation to a wide variety of psychological outcomes including anxiety, depression, anxiety and depression, affect, stress, anger, and mood. Some studies appeared to focus on a single construct while others assessed a wide variety of factors. None of the studies examined the effects of school MBIs on the subsequent development of significant mental health difficulties that could require intervention. Hence, the primary prevention effects of MBI programmes does not yet seem to have been established. In a number of studies, examination of school MBI effects on mental health and emotional wellbeing in order to inform universal school mental health promotion programmes was not the primary focus. Some studies looked to examine mental health and emotional wellbeing as a secondary aim or as part of another more specific primary aim, such as the prevention of risk factors associated with eating disorders (e.g. Atkinson & Wade, 2015). The use of a wide variety of outcome measures, even in relation to just one of the psychological constructs chosen for examination (i.e. anxiety), highlights difficulties relating to how to accurately capture the outcomes of MBIs.

Given the diverse range of outcomes used as markers of efficacy, it may be helpful to consider what outcomes young people, who receive the intervention, as well as those in their wider care system, would consider meaningful. It has been asserted that public, and particularly participant, involvement in research can provide a better understanding of what outcomes are important to measure in studies examining intervention effectiveness (Gorst et al., 2016).

Reported Findings

The level of heterogeneity across included studies makes it very difficult to make direct comparisons in terms of reported findings. Studies varied widely across a number of

important areas including content and delivery of interventions, sample characteristics, outcomes, and measures used. It is therefore difficult to effectively directly compare findings and this may help account for mixed findings with regards to risk of bias in methodologies detailed and findings reported. However, the majority of studies reviewed reported evidence of significant beneficial effects for mental health and emotional wellbeing in school MBIs. However, as discussed above, none of the studies included reported findings in relation to the subsequent development of significant mental health difficulties. All beneficial effects were reported in the context of wider associated psychological factors. Only Sibinga et al. (2013) reported beneficial effects in comparison to an active control condition. Generally, evidence reviewed which reported beneficial effects of school MBIs was of mixed quality – as considered through the lens of the Cochrane Risk of Bias Tool. There were generally high levels of unclear risk ratings across domains for these studies. This may reflect poor reporting of methodological procedures, particularly relating to randomization, allocation concealment, and blinding processes. It should be noted that this was not the case for Sibinga et al. (2013) which received only two unclear risk of bias ratings for two domains – with all other domains being deemed low-risk of bias. However, a number of studies reporting beneficial effects of MBIs, including Sibinga et al. (2013), did so using small sample sizes. No study included examined the effects of school MBIs on the subsequent development of significant mental health difficulties that could require intervention. Hence, the primary prevention effects of MBI programmes does not yet seem to be established.

Change Process

Another aim of the present review was to identify and describe any moderators and or mediators of outcomes examined in reported trials. So far, little consideration has been given to examining change process across studies reviewed. Mendelson et al. (2010) was the only study to explicitly propose a mechanism of change for examination. However, this was not examined using inferential statistics due to their small sample size. Johnson et al. (2017) and Van der Weijer-Bergsma et al. (2014) examined potential moderators of change in school including gender, age, rumination, mindfulness, and home practice. Of these, only rumination was reported to moderate intervention effectiveness however this did not relate to mental health and emotional

wellbeing outcome measures. The importance of examining how interventions work is a key step for the development and evaluation of complex intervention (Craig et al., 2008). Such examination provides invaluable insight into issues central to maximising intervention effectiveness (Craig et al., 2008). Therefore, this would seem a considerable limitation of studies reviewed and a clear direction for future research.

Strengths and Limitations

The majority of studies used waiting lists or ‘classes/ curriculum as usual’ as control groups. Treatment as usual is a credible comparison as it gives insight into the prospective benefits of a supplementary mental health programme. However, comparisons with active control groups allow more effective evaluation of treatment effects (Campbell, Fitzpatrick, Haines, Kinmonth, Sandercock, Spiegelhalter et al., 2000). These should constitute a credible alternative intervention that is established or has clear theoretical or empirical support for its implementation (Campbell et al., 2000). Additionally, there were concerns for risk of bias relating to randomization, concealment, and blinding procedures used across studies reviewed. Furthermore, several studies reviewed used a cluster-randomization design. Again, this may have been for practical reasons (E.g. minimising disruption to time in class). However, studies employing cluster randomization failed to adequately account for similarities and differences in these units of randomization pre-intervention. This may confound interpretation of results including any possible treatment effects. Additionally, with searches being limited to RCTs, published in peer-reviewed journals in English, it is clear the search strategy employed was not exhaustive. These criteria may help explain issues identified relating to the countries studies were carried out in and ethnicities reported - or not reported.

Areas for Future Research

There is evidence to suggest that school MBIs for mental health and emotional wellbeing are worthy of continued empirical examination. Future studies would do well to address design limitations identified in studies included in the present review such as small sample sizes and a lack of appropriate active control groups. Additionally, future research in this area would benefit from some consensus on what outcomes are most meaningful to mental health and emotional wellbeing – and what measures should be

used to measure these outcomes. As part of this process, it may be helpful to consider what outcomes young people and those who care for them see as central to their mental health and emotional wellbeing. Future studies would also do well to consider the change process through which school MBIs may have beneficial effects on prevention of mental health difficulties and promotion of emotional wellbeing. This may include careful consideration of factors related to research design and analyses to address common problems (e.g. lack of power; temporal precedence) in examination of mechanisms of change. Future studies could also look to address reporting of key methodological procedures such as randomisation, allocation concealment, and blinding which make it hard to establish risk of bias in the areas and therefore negatively affects interpretation of findings.

Conclusions

The ten studies included in this review provide mixed evidence regarding the benefits of school based MBIs for mental health and emotional wellbeing. Analysis of studies reviewed found that school MBIs are being used for a range of psychological variables related to mental health and emotional wellbeing. Indeed, such heterogeneity is evident across a number of areas across including content and delivery of interventions, sample characteristics, outcomes considered, and measures used. This has adverse implications for how effectively methodologies detailed and findings reported can be compared. More specifically, surprisingly few studies measured mindfulness or gave consideration to the change process through which MBIs may have their effects. Limitations regarding study design and the quality of studies included make it hard to effectively interpret reported findings. Further addressing such limitations would allow more confident conclusions about the effectiveness of school MBIs for mental health and emotional wellbeing.

References

- Atkinson, M.J. and Wade, T.D., 2015. Mindfulness-based prevention for eating disorders: A school-based cluster randomized controlled study. *International Journal of Eating Disorders*, 48(7), pp.1024-1037.
- Black, D.S. and Fernando, R., 2014. Mindfulness training and classroom behaviour among lower-income and ethnic minority elementary school children. *Journal of Child and Family Studies*, 23(7), pp.1242-1246.
- Brooker, J., Julian, J., Webber, L., Chan, J., Shawyer, F. and Meadows, G., 2013. Evaluation of an occupational mindfulness program for staff employed in the disability sector in Australia. *Mindfulness*, 4(2), pp.122-136.
- Campbell, M., Fitzpatrick, R., Haines, A., Kinmonth, A.L., Sandercock, P., Spiegelhalter, D. and Tyrer, P., 2000. Framework for design and evaluation of complex interventions to improve health. *The BMJ*, 321, pp.694-696.
- Carsley, D., Khoury, B. and Heath, N.L., 2018. Effectiveness of mindfulness interventions for mental health in schools: A comprehensive meta-analysis. *Mindfulness*, 9(3), pp.693-707.
- Cates, C.J., Stovold, E. and Welsh, E.J., 2014. How to make sense of a Cochrane systematic review. *Breathe*, 10(2), pp.134-144.
- Chandler, R.E., Juhlin, K., Fransson, J., Caster, O., Edwards, I.R. and Norén, G.N., 2017. Current safety concerns with human papillomavirus vaccine: a cluster analysis of reports in VigiBase. *Drug Safety*, 40(1), pp.81-90.
- Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I. and Petticrew, M., 2008. Developing and evaluating complex interventions: the new Medical Research Council guidance. *The BMJ*, 337, pp. 1655-1780.

Crescentini, C., Capurso, V., Furlan, S. and Fabbro, F., 2016. Mindfulness-oriented meditation for primary school children: Effects on attention and psychological well-being. *Frontiers in Psychology*, 7, pp. 805-816.

Franco, C., Mañas, I., Cangas, A.J. and Gallego, J., 2011. Exploring the effects of a mindfulness program for students of secondary school. *International Journal of Knowledge Society Research (IJKSR)*, 2(1), pp.14-28.

Felver, J.C., Hoyos, C.E., Tezanos, K. and Singh, N.N., 2016. A systematic review of mindfulness-based interventions for youth in school settings. *Mindfulness*, 7(1), pp.34-45.

Fung, J., Guo, S., Jin, J., Bear, L. and Lau, A., 2016. A pilot randomized trial evaluating a school-based mindfulness intervention for ethnic minority youth. *Mindfulness*, 7(4), pp.819-828.

Kirkham, J.J., Gorst, S., Altman, D.G., Blazeby, J.M., Clarke, M., Devane, D., Gargon, E., Moher, D., Schmitt, J., Tugwell, P. and Tunis, S., 2016. Core outcome set—STAndards for reporting: the COS-STAR statement. *PLoS medicine*, 13(10), p.e1002148.

Gu, J., Strauss, C., Bond, R. and Cavanagh, K., 2015. How do mindfulness-based cognitive therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies. *Clinical Psychology Review*, 37, pp.1-12.

Hempenstall, K., 2006. What does evidence-based practice in education mean? *Australian Journal of Learning Difficulties*, 11(2), pp.83-92.

Higgins, J.P. and Green, S. (eds), 2011. *Cochrane handbook for systematic reviews of interventions* (Vol. 4). John Wiley & Sons.

Johnson, C., Burke, C., Brinkman, S. and Wade, T., 2017. A randomized controlled evaluation of a secondary school mindfulness program for early adolescents: Do we have the recipe right yet? *Behaviour Research and Therapy*, 99, pp.37-46.

Lawrence, D., Johnson, S., Hafekost, J., Boterhoven de Haan, K., Sawyer, M., Ainley, J. and Zubrick, S.R., 2015. *The mental health of children and adolescents: Report on the second Australian child and adolescent survey of mental health and wellbeing*.

Canberra: Department of Health, views 04 April 2019,

<<https://www1.health.gov.au/internet/main/publishing.nsf.mental-pubs-m-child2>

McGorry, P.D., Goldstone, S.D., Parker, A.G., Rickwood, D.J. and Hickie, I.B., 2014. Cultures for mental health care of young people: an Australian blueprint for reform. *The Lancet Psychiatry*, 1(7), pp.559-568.

McKeering, P. and Hwang, Y.S., 2018. A systematic review of mindfulness-based school interventions with early adolescents. *Mindfulness*, 10(4), pp.593-610.

Meiklejohn, J., Phillips, C., Freedman, M.L., Griffin, M.L., Biegel, G., Roach, A., Frank, J., Burke, C., Pinger, L., Soloway, G. and Isberg, R., 2012. Integrating mindfulness training into K-12 education: Fostering the resilience of teachers and students. *Mindfulness*, 3(4), pp.291-307.

Mendelson, T., Greenberg, M.T., Dariotis, J.K., Gould, L.F., Rhoades, B.L. and Leaf, P.J., 2010. Feasibility and preliminary outcomes of a school-based mindfulness intervention for urban youth. *Journal of Abnormal Child Psychology*, 38(7), pp.985-994.

Napoli, M., Krech, P.R. and Holley, L.C., 2005. Mindfulness training for elementary school students: The attention academy. *Journal of Applied School Psychology*, 21(1), pp.99-125.

Patton, G.C., Sawyer, S.M., Santelli, J.S., Ross, D.A., Afifi, R., Allen, N.B., Arora, M., Azzopardi, P., Baldwin, W., Bonell, C. and Kakuma, R., 2016. Our future: a Lancet commission on adolescent health and wellbeing. *The Lancet*, 387(10036), pp.2423-2478

Quach, D., Mano, K.E.J. and Alexander, K., 2016. A randomized controlled trial examining the effect of mindfulness meditation on working memory capacity in adolescents. *Journal of Adolescent Health*, 58(5), pp.489-496.

Reynolds, A.J., Temple, J.A., Robertson, D.L. and Mann, E.A., 2001. Long-term effects of an early childhood intervention on educational achievement and juvenile arrest: A 15-year follow-up of low-income children in public schools. *JAMA*, 285(18), pp.2339-2346.

Sibinga, E.M., Perry-Parrish, C., Chung, S.E., Johnson, S.B., Smith, M. and Ellen, J.M., 2013. School-based mindfulness instruction for urban male youth: A small randomized controlled trial. *Preventive Medicine*, 57(6), pp.799-801.

Van de Weijer-Bergsma, E., Langenberg, G., Brandsma, R., Oort, F.J. and Bögels, S.M., 2014. The effectiveness of a school-based mindfulness training as a program to prevent stress in elementary school children. *Mindfulness*, 5(3), pp.238-248.

World Health Organization, 2017. *The Partnership for Maternal, Newborn and Child Health 2016 Annual Report: Coming of age in a time of transition*, World Health Organization, viewed 05 April 2019, <<https://apps.who.int/iris/bitstream/handle/10665/258801/WHO-FWC-NMC-17.1-eng.pdf>

White, L.S., 2012. Reducing stress in school-age girls through mindful yoga. *Journal of Pediatric Health Care*, 26(1), pp.45-56.

Zenner, C., Herrnleben-Kurz, S. and Walach, H., 2014. Mindfulness-based interventions in schools—a systematic review and meta-analysis. *Frontiers in Psychology*, 5, pp.603-622.

Zoogman, S., Goldberg, S.B., Hoyt, W.T. and Miller, L., 2015. Mindfulness interventions with youth: A meta-analysis. *Mindfulness*, 6(2), pp.290-302.

Chapter 2: Major Research Project

Acceptance and Commitment Therapy for Depression after Psychosis: Autobiographical memory specificity and rumination as mechanisms of change

Word Count: 7,295

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Abstract

Background: Understanding how interventions work is a key step in the development and evaluation of complex interventions. Based on previous research, autobiographical memory specificity and rumination are candidate mechanisms of change. Our aim was to explore mechanisms of therapeutic change in the context of a pilot trial of Acceptance and Commitment Therapy (ACT) for people with a diagnosis of schizophrenia and major depression.

Method: The ACT for Depression After Psychosis Trial (ADAPT; Gumley et al., 2017) provided repeated measures data that allowed exploration of the change process in ACT for depression after psychosis. Participants who met criteria for schizophrenia and major depression were randomly allocated to standard care or standard care plus up to 5-months of individual ACT for depression after psychosis (ACTdp). Primary outcomes administered on entry to the study (pre-randomisation), at 5-months (post-treatment), and at 10-months (follow up) included the Beck Depression Inventory (BDI), Calgary Depression Scale for Schizophrenia (CDSS), the Kentucky Inventory of Mindfulness Skills (KIMS), and the Acceptance and Action Questionnaire (AAQ). Candidate mechanisms of change were assessed using Ruminative Response Scale (RRS) and the Autobiographical Memory Test (AMT).

Results: Significant correlations between change scores were found for BDI and proposed mechanisms of change at 5-months (Rumination: $r = 0.60$, $p < .05$; Overgeneral memory responses: $r = 0.67$, $p < .05$; memory recall latency: $r = -0.84$, $p < .01$) and 10-months (Rumination: $r = 0.80$, $p < .01$; Overgeneral memory responses: $r = 0.61$, $p < .01$). Changes in CDSS depression and rumination scores were significantly correlated at 10-months (Rumination: $r = 0.76$, $p < .01$). In order to examine hypotheses that aspects of autobiographical memory specificity would vary by treatment group, cue word valence, and time of assessment, three-way mixed ANOVAs were performed for percentage of overgeneral memories recalled, and emotional tone of events recalled. Significantly more overgeneral responses were recalled for negative cue words ($F(1, 22) = 17.817$, $p < .001$, partial eta squared = .447). Additionally, significantly more negative feeling was evoked for memories recalled in response to negative cue words ($F(1, 17) = 83.232$, $p < .001$, partial eta squared = .839). A three-way interaction was found for cue word x time point x treatment group's effect on

feeling evoked by memories recalled ($F(2, 15) = 6.251, p < .013$, partial eta squared = .455). Post-hoc analysis found the negative feeling evoked by memories recalled in response to negative cue words was significantly reduced in the ACT group post-treatment. For the ACT group, the difference between mean feeling evoked to negative cue words at baseline and 5-months was 2.72, (95% CI [-5.115, -0.318], $p < .013$).

Application: This study provides insight into the change mechanisms through which interventions like ACTdp may produce beneficial effects. Preliminary findings suggest ACT may facilitate positive change for those experiencing depression after psychosis by reducing cognitive avoidance and enhancing ability to tolerate recollection and discussion of emotionally challenging events.

Introduction

Depression has long been observed in psychosis (Barnes, Curson, Liddle, & Patel, 1989). This can occur before, during, or after an acute psychotic episode. Prevalence estimates for depression in the context of psychosis range from 33% to 75% (Upthegrove, 2009) and it has been associated with a number of negative outcomes including unemployment, treatment non-adherence, increased hospital admissions, and suicide (Sands & Harrow, 1999; Upthegrove, 2009).

ACT for Depression after Psychosis

Acceptance and Commitment Therapy (ACT) has been proposed as a promising psychological intervention for depression after psychosis (Gumley et al., 2017; White, Gumley, McTaggart, Rattrie, McConville, Cleare, et al., 2015). ACT is a form of behavioural therapy that explicitly focuses on decreasing experiential avoidance. It aims to do this through strategies such as mindful acceptance, psychological flexibility, and encouraging participants to engage in personal value-based behaviour (Bohlmeijer, Fledderus, Rokx, & Pieterse, 2011; Hayes, Strosahl, & Wilson, 1999). Randomised control trials (RCTs) have provided support for ACT as an effective intervention for depression in non-psychotic populations (Hacker, Stone, & MacBeth, 2015; Ost, 2008). Similarly, RCTs investigating ACT for psychosis in clinical populations have reported beneficial effects such as improvements in affect and reductions in negative symptoms, distress associated with hallucinations, and rehospitalisation rates (Bach & Hayes, 2002; Gaudio & Herbert, 2006; White, Gumley, McTaggart, Rattrie, McConville, Cleare, et al., 2011). However, the mechanisms of change through which ACT interventions for depression, particularly in the context of psychosis, facilitate change have not been examined extensively.

ACT Mechanisms of Change

Examining how interventions work is as a key step in the development and evaluation of all complex interventions (Craig, Dieppe, Macintyre, Michie, Nazareth, & Petticrew, 2008). Analyses of change mechanisms may allow crucial insight into issues central to maximising intervention efficacy – such as why an intervention is successful,

unsuccessful, or has unintended consequences (Craig et al., 2008). Increasing emphasis is being placed on the need to develop causal models of psychological mechanisms implicated in mental health difficulties (Brown, Waite, & Freeman, 2019). It has been argued that repeated-measures experimental designs where possible sources of change are manipulated, in order to examine their relationship with outcomes, are the gold standard for this. This is because they more effectively increase understanding of clinical phenomena and the interventions that target them by shedding light on mechanisms of change involved in the change process (Brown et al., 2019). Gumley and colleagues' (2017) ACT for Depression After Psychosis (ADAPT) Trial provides repeated measures data that allows such exploration of the change process in ACT for depression in the context of psychosis.

Autobiographical Memory Specificity

Autobiographical memory is the part of memory involved in the encoding, storage and recall of personally experienced events (Williams, 2007). This includes personal semantic memory such as knowledge of personal facts and episodic memory that typically concerns information from personal experience such as the place, time, and people involved in a situation (Williams, 2007). Deficits in episodic memory may present as an overgeneral memory retrieval style. This is where an individual asked to recall an event with detail of a specific time and place instead gives an account of a non-discriminate extended event or a collection of repeated events (Wood, McLeod, & Brewin, 2006; Warren & Haslam, 2007).

Overgeneral memory is recognised as a feature and possible maintaining factor in depressed mood. A number of different theories have been proposed for the overgeneral memory retrieval found in depressed individuals. Williams (1996), for example, proposed that the adverse emotional experience associated with recall of specific negative event-related information may result in the searching of memories being prematurely truncated at an overgeneral level of description (Warren & Haslam, 2007). In this way, overgeneralised memory may constitute a form of cognitive and emotional avoidance where a depressed individual avoids thinking about memories in any great detail in order to prevent feared emotional distress. Employing this coping strategy in the long term may become maladaptive as overgeneral memory is positively associated

with difficulties implicated in the development and maintenance of depression, such as poorer problem-solving and lessened ability to imagine future events (Evans, Williams, O’Loughlin, & Howells, 1992; Pollock & Williams, 2001; van Vreeswijk & de Wilde, 2004). ACT may facilitate improvements in depression after psychosis by tackling factors implicated in its maintenance such as overgeneralised memory. ACT interventions may do this by helping people with depression and psychosis develop skills necessary to recall and tolerate unpleasant experiences such as memories.

Rumination

Rumination may also act as a mechanism of change in ACT interventions for depression after psychosis. Nolen-Hoeksema (1985) asserted that rumination contributes to the maintenance of depression by focussing individuals’ thinking on the causes and consequences of problems relating to their depressed state thus preventing problem solving. Several systematic and meta-analytic reviews have provided support for the positive association between rumination and depression (Morrison & O’Connor, 2008; Querstret & Cropley, 2013; Strauss, Thomas, & Hayward, 2015). It has also been positively associated with a number of other maintaining factors such as reduced problem solving and social withdrawal (Watkins & Moulds, 2005; Van Zalk & Tillfors, 2017).

Few studies have explicitly examined the role of rumination in relation to depression in the context of psychosis. However, Hartley and colleagues (2014) found rumination significantly positively associated with negative emotion elicited by delusional and hallucinatory experiences in a sample of participants with a diagnosis of schizophrenia. Therefore, it is unsurprising interventions that look to reduce rumination have been proposed as a way of reducing emotional distress in individuals with psychosis (Jones & Fernyhough, 2009). In fact, it may be that this represents an important mechanism through which any beneficial effects of ACT for depression after psychosis (ACTdp) are achieved. ACT may do this by allowing a greater capacity to observe and accept difficult experiences, including thoughts, without becoming entangled in them as one may when ruminating.

Aims and Hypotheses

The primary aim of the study was to examine any trends suggesting that change in autobiographical memory specificity and/or rumination may act as mechanisms of change in ACTdp. Based on existing theory and empirical evidence, we tested the following hypotheses:

- 1) Changes in depression for the ACT Group will be related to reductions in rumination and improvements in autobiographical memory specificity. We will test these effects by correlating change scores in the key mechanisms (rumination on the RRS and proportion of specific memories recalled) with depression change scores.
- 2) Changes in aspects of autobiographical memory specificity will vary by treatment group, cue-word valence, and time of assessment. We will test these effects by examining interactions between aspects of autobiographical memory specificity (percentage of overgeneral memory responses and feeling evoked by memories recalled on the AMT) and treatment group, cue word valence, and time of assessment.

Method

Design

The present study was a secondary analysis of Gumley et al.'s (2017) data gathered as part of the ADAPT trial - a Parallel group Randomised Open Blinded Evaluation (PROBE) of Acceptance and Commitment Therapy for depression after psychosis (ACTdp). Ethical approval of Gumley et al. (2017) was provided by West of Scotland Research Ethics Committee and managerial approval was provided by NHS Greater Glasgow & Clyde.

Participants

Table 1 describes participant characteristics. Participants included outpatients aged 16 and over. Inclusion criteria required prospective participants to be receiving anti-psychotic medication, psychiatric follow-up, and follow up from a secondary

community-based mental health care service. Participants were also required to meet DSM-IV-TR criteria for schizophrenia and major depression. Participants were assessed on all outcome measures on entry to the study (pre-randomisation), at 5-months (post-treatment), and 10-months (follow up).

Table 1

Participant demographic characteristics

| | Statistic* | All Participants (n = 29) | Standard Care (n = 14) | Standard Care plus ACT (n = 15) |
|---------------------------|--|--------------------------------------|-----------------------------------|--|
| Age | N _{obs} (N _{miss}) Mean (SD) | 29 (0) 46.50 (9.00) | 14 (0) 46.20 (8.90) | 15 (0) 46.80 (9.30) |
| Gender: | N _{obs} (N _{miss}) | 29 (0) | 14 (0) | 15 (0) |
| - Male | N (%) | 19 (65.50) | 9 (64.29) | 10 (66.67) |
| - Female | N (%) | 10 (34.50) | 5 (35.71) | 5 (33.33) |
| Ethnicity: | N _{obs} (N _{miss}) | 29 (0) | 14 (0) | 15 (0) |
| - White | N (%) | 27 (93.10) | 12 (85.71) | 15 (100) |
| - Asian | N (%) | 1 (3.45) | 1 (7.14) | 0 (0) |
| - African | N (%) | 1 (3.45) | 1 (7.14) | 0 (0) |
| Years of Education | N _{obs} (N _{miss}) Mean (SD) | 28 (1) 13.23 (4.21) | 13 (1) 14.02 (4.93) | 15 (0) 12.51 (3.44) |
| Highest Education: | N _{obs} (N _{miss}) | 27 (2) | 13 (1) | 14 (1) |
| - Primary or Less | N (%) | 4 (14.81%) | 2 (15.39%) | 2 (14.28%) |
| - Secondary | N (%) | 9 (33.33%) | 3 (23.07%) | 6 (42.86%) |
| - Tertiary/ Further | N (%) | 13 (48.15%) | 7 (53.85%) | 6 (42.86%) |
| - Other General | N (%) | 1 (3.70%) | 1 (7.69%) | 0 (0.00%) |
| - Not Known | N (%) | 0 (0.00%) | 0 (0.00%) | 0 (0.00%) |

*N_{obs}= Number of participants for whom this information was recorded; N_{miss}= Number of participants for whom this information was not recorded.

Measures

Primary Outcomes

The Beck Depression Inventory (BDI-II) (Beck, Steer, & Brown, 1996) is a well-established 21-item self-report measure of depression. In this measure, higher scores

are reflective of greater difficulties with depression. It is considered to have strong levels of reliability and validity (Richter, Werner, Heerleing, Kraus, & Sauer, 1998). In the present study Cronbach's Alpha was $\alpha = 0.91$ (95% CI, 0.88 – 0.94).

The Calgary Depression Scale for Schizophrenia (CDSS) (Addington, Addington, & Schissel, 1990). This 9-item observer rated measure assesses symptoms of depression in the context of schizophrenia. In this measure, higher scores are reflective of greater difficulties with depression in the context of schizophrenia. It attempts to differentiate between depression and the negative and positive symptoms of schizophrenia. Inter-rater reliability for the CDSS was 92% (range 67%– 100%) and intra-class correlation coefficient was ICC= 0.68 (95% CI, 0.46 – 0.82).

Candidate Mechanisms of Change

The Ruminative Response Scale (RRS) (Treynor, Gonzalez, & Nolen-Hoeksema, 2003) and Autobiographical Memory Test (AMT) (Williams & Broadbent, 1986) were used to assess the proposed mechanisms of change: rumination and autobiographical memory, respectively.

The RRS is a 10-item self-report measure of rumination. It asks participants to rate the frequency with which they engage in thought or action representative of rumination when sad or depressed. In this measure, higher scores are reflective of greater difficulties with rumination. It has been identified as having good levels of reliability and internal consistency (Gumley et al., 2016). In the present study Cronbach's alpha was $\alpha = 0.83$ (95% CI, 0.72 – 0.91).

The AMT is a single-word cueing paradigm measure of autobiographical memory based on classic work of memory retrieval by Galton. It has been identified as having good levels of reliability and construct validity (Ros, Romero, Ricarte, Serrano, Nieto, & Latorre, 2018). Participants are asked to describe a specific personally experienced event which could be located in time and place in response to six positive and six negative cue words. Positive cue words used were 'happy, proud, relieved, pleased, excited, and hopeful'. Negative cue words presented were 'miserable, guilty, angry, insecure, lazy, and uncomfortable'. Participants were allowed up to 30 seconds to

provide a response. Responses were coded as specific, extended, categorical, association or uninterpretable. Overgeneral responses included those coded as extended, categorical, or association. The emotional tone of events recalled were recorded, as were response times (using a hand held stopwatch). After all items were completed, participants were reminded of the events they recalled and asked to detail how they now felt remembering the events. Both the emotional tone and feeling evoked by memories recalled were scored on a scale from ranging from -5 to +5. Guidance given to researchers recording responses to the AMT is summarised in Table 2.

Table 2

AMT response recording guidance for researchers

| AMT Category | AMT Category Recording Guidance |
|-------------------------|--|
| Response Type: | |
| Specific | A single event, located in time and place and lasting no longer than 1 day. |
| Overgeneral | A single event lasting longer than 1 day which has a definite beginning and end. |
| -Extended | A response detailing multiple occurrences of the same event. |
| -Categorical | A response representing an association to the cue word rather than a specific memory. |
| -Association | |
| Uninterpretable | Responses which did not qualify as a memory or were clearly delusional. |
| Response Latency | Record time taken (in seconds) to complete recall of memory from presentation of word cue. Responses which take longer than 30 seconds should be recorded as 30 seconds. |
| Emotional Tone | Score described how the participant felt at the time of the event on a scale from -5 (most negative) to +5 (most positive). |
| Feeling Evoked | Score described how the participant felt recalling this memory on a scale from -5 (most negative) to +5 (most positive). |

Treatments

Acceptance and Commitment Therapy for Depression after Psychosis

Participants randomised to this treatment group received up to 5-months of individual ACTdp. ACTdp is based on the rationale that experience of psychosis can be a source of personal shame and represent an ominous threat to social, interpersonal, and vocational prospects (Gumley et al., 2016). The treatment can be split up into three phases. Phase one is used to facilitate engagement and formulation. Phase two primarily involves progressing with the ACT intervention. Phases three centres around looking to the future after the ACT intervention (Gumley et al., 2016).

Standard Care

The treatment received by all participants in the trial was examined to assess what constituted standard care (not including ACTdp) (Gumley et al., 2016). As a minimum, in order to be included, all participants had to be receiving antipsychotic medication and follow up from a specialist mental health service.

Procedure

Further detail regarding pilot trial procedure including participant entry, randomisation, follow-up, blinding, inter-rater reliability, and management of serious adverse events can be found in Gumley et al. (2017).

Results

Descriptive Statistics

As a pilot study, we sought to test our measures and analytic methods in order to ascertain if any of the results fitted with our hypothesised mechanisms of change. Given the preliminary nature of the work and the small sample, we were also interested in examining descriptive patterns in the study data. Descriptive statistics for the BDI, CDSS, and RRS are presented in Table 3. Descriptive statistics for response styles that memories recalled during the AMT were classified as are presented in Table 5. Descriptive statistics for emotional tone, feeling evoked, and response latency for memories recalled during the AMT are presented in Table 6.

Table 3

Primary outcomes and rumination by treatment group at baseline, 5-months, and 10-months

| | Statistic | Baseline | 5-months | 10-months |
|---|---------------------------------------|-----------------|-----------------|------------------|
| Participants | | | | |
| -Standard Care | N _{obs} (N _{miss}) | 14 (0) | 14 (0) | 13 (1) |
| -Standard Care plus ACT | N _{obs} (N _{miss}) | 15 (0) | 13 (2) | 12 (3) |
| Calgary Depression Scale for Schizophrenia | | | | |
| -Standard Care | Mean (SD) | 14.79 (5.63) | 17.64 (9.78) | 9.77 (6.01) |
| -Standard Care plus ACT | Mean (SD) | 13.07 (4.01) | 12.85 (7.71) | 9.00 (5.29) |
| Beck Depression Inventory | | | | |
| -Standard Care | Mean (SD) | 29.86 (14.26) | 25.21 (11.33) | 25.54 (14.20) |
| -Standard Care plus ACT | Mean (SD) | 33.33 (11.11) | 18.30 (8.60) | 21.08 (14.68) |
| Ruminative Response Scale | | | | |
| -Standard Care | Mean (SD) | 70.85 (14.18) | 65.57 (20.44) | 69.77 (15.91) |
| -Standard Care plus ACT | Mean (SD) | 71.07 (9.58) | 63.85 (12.95) | 61.58 (17.67) |

*N_{obs}= Number of participants for whom this information was recorded; N_{miss}= Number of participants for whom this information was not recorded.

Proposed Mechanisms of Change in ACTdp

In order to allow examination of hypothesis 1 (changes in depression for the ACT Group will be related to reductions in rumination and improvements in autobiographical memory specificity), change scores for the BDI, CDSS, RRS and AMT at 5- and 10-months were calculated. Table 4 summarises observed correlations between these change scores at 5- and 10-months. All significant reported correlations relate to the ACT group as no significant correlations were found for the standard care group. Change in BDI score was significantly correlated with change in rumination ($r = 0.60$, $p < .05$), overgeneral responses ($r = 0.67$, $p < .05$), uninterpretable/ no responses ($r = -0.73$, $p < .05$), and response latency ($r = -0.84$, $p < .01$) at 5-months. Additionally, change in BDI score was significantly correlated with changes in rumination ($r = 0.80$,

$p < .01$) and overgeneral memory responses ($r = 0.61, p < .01$) at 10-months. With respect to change in CDSS score, significant correlations were observed with changes in overgeneral memory responses ($r = 0.67, p < .05$), uninterpretable/ no responses ($r = -0.63, p < .05$), and response latency ($r = -0.78, p < .01$) at 5-months. Additionally, change in CDSS score was significantly correlated with change in rumination ($r = 0.76, p < .01$) at 10-months.

Table 4

Associations between change scores for primary outcomes and proposed mechanisms of change

| | RRS | Specific | OGM | Uninterpretable | Response Latency | Emotional Tone | Feeling Evoked |
|-------------------------------------|------------|-----------------|------------|------------------------|-------------------------|-----------------------|-----------------------|
| <i>Standard Care Group</i> | | | | | | | |
| BDI Score | | | | | | | |
| -5-months | -0.33 | -0.09 | -0.08 | -0.16 | 0.05 | 0.38 | 0.38 |
| -10-months | 0.05 | 0.03 | -0.33 | 0.48 | 0.22 | 0.30 | 0.15 |
| CDSS Score | | | | | | | |
| -5-months | 0.17 | -0.27 | 0.32 | 0.11 | 0.19 | 0.36 | 0.22 |
| -10-months | 0.42 | -0.33 | 0.02 | 0.45 | 0.17 | -0.10 | -0.11 |
| <i>Standard Care plus ACT Group</i> | | | | | | | |
| BDI Score | | | | | | | |
| -5-months | 0.60* | 0.14 | 0.67* | -0.73** | -0.84** | -0.43 | -0.21 |
| -10-months | 0.80** | -0.33 | 0.61* | -0.43 | -0.45 | -0.23 | -0.23 |
| CDSS Score | | | | | | | |
| -5-months | 0.55 | -0.19 | 0.67* | -0.63* | -0.78** | -0.28 | -0.34 |
| -10-months | 0.76** | -0.31 | 0.48 | -0.26 | -0.28 | -0.43 | -0.51 |

* = $p < 0.05$

** = $p < 0.01$

Autobiographical Memory Specificity

In order to examine hypothesis 2 (changes in aspects of autobiographical memory specificity will vary by treatment group, cue-word valence, and time of assessment), three-way mixed ANOVAs were performed for the percentage of memories recalled

classified as overgeneral; and the feeling evoked by memories recalled. These looked at respective interactions with cue word, time of assessment, and treatment group.

As analysis included three-way mixed ANOVAs across two selected dependent variables, a Bonferroni adjustment was made to alpha levels used. Bonferroni p-value adjustments are conventionally thought of as somewhat conservative (Cabin & Mitchell, 2000; Chen, Feng, & Yi, 2017; Day & Quinn, 1989). However, in light of a number of considerations relating to design, methodology, and analysis, post-hoc analysis such as Fisher's Protected Least Squares, Tukey's Honest Significant Difference, and Scheffe Test were considered inappropriate. These considerations included some variables (treatment group; cue word valence) having only two levels, the presence of repeated measures variables (cue word valence; time of assessment), and post-hoc analysis being unplanned. In light of these considerations, Bonferroni p-value adjustments across three-way ANOVAs were identified as the most appropriate means of controlling risk of Type 1 error (Althouse, 2016; Armstrong, 2014; Cabin & Mitchell, 2000; Chen et al., 2017; Day & Quinn, 1989). The standard alpha where $p < .05$ is typically used to indicate a significant result was adjusted so that ($\alpha_{\text{altered}} = (0.05 / 2) = 0.025$) $p < .025$. Additionally, in order to allow independent consideration of p-value adjustments made, non-significant results were reported using exact p-values rather than in relation to a conventional threshold or the adjusted alpha (i.e. $p > .05$ or $p > .025$) (Althouse, 2016).

Overgeneral Memory

There was a significant main effect for the within-subjects factor cue word: $F(1, 22) = 17.817$, $p < .001$, partial eta squared = .447. Within-subjects contrasts showed more overgeneral memory responses for negative cue words than positive cue words ($p < .001$). The main effect of the within-subjects factor time was not significant: $F(2, 21) = 0.832$, $p = .449$, partial eta squared = .073, nor was the main effect of the between-subjects factor treatment group: $F(1, 22) = 0.172$, $p = .742$, partial eta squared = .005. The treatment group by cue word interaction was not significant: $F(1, 22) = .364$, $p = .553$, partial eta squared = .016, nor were the other two main interactions: treatment group by time: $F(2, 21) = 1.172$, $p = .401$, partial eta squared = .083, and cue word by time: $F(2, 21) = 2.292$, $p = .126$, partial eta squared = .179. Finally, the three-way

interaction effect between cue word, time, and treatment group was also not significant:
 $F(2, 21) = 0.116, p = .891, \text{partial eta squared} = .011.$

Table 5

Response style percentage by treatment group and cue word valence

| Response Style | Statistic | Standard Care (n=14) | Standard Care plus ACT (n=15) |
|---|------------------|---------------------------------|--|
| <i>All Cue Words</i> | | | |
| Specific | | | |
| - Baseline | Mean (SD) | 58% (24%) | 50% (25%) |
| - 5-months | Mean (SD) | 55% (23%) | 53% (32%) |
| - 10-months | Mean (SD) | 51% (36%) | 51% (30%) |
| Overgeneral | | | |
| - Baseline | Mean (SD) | 27% (20%) | 36% (27%) |
| - 5-months | Mean (SD) | 34% (20%) | 26% (19%) |
| - 10-months | Mean (SD) | 28% (25%) | 22% (22%) |
| Uninterpretable/ No Response | | | |
| - Baseline | Mean (SD) | 14% (19%) | 14% (15%) |
| - 5-months | Mean (SD) | 11% (15%) | 22% (32%) |
| - 10-months | Mean (SD) | 21% (39%) | 28% (29%) |
| <i>Positive Cue Words</i> | | | |
| Specific | | | |
| - Baseline | Mean (SD) | 67% (22%) | 59% (26%) |
| - 5-months | Mean (SD) | 60% (28%) | 54% (36%) |
| - 10-months | Mean (SD) | 55% (34%) | 48% (41%) |
| Overgeneral | | | |
| - Baseline | Mean (SD) | 17% (17%) | 28% (25%) |
| - 5-months | Mean (SD) | 29% (23%) | 25% (18%) |
| - 10-months | Mean (SD) | 24% (23%) | 21% (26%) |
| Uninterpretable/ No Response | | | |
| - Baseline | Mean (SD) | 16% (21%) | 13% (14%) |
| - 5-months | Mean (SD) | 11% (18%) | 21% (35%) |
| - 10-months | Mean (SD) | 21% (29%) | 28% (41%) |
| <i>Negative Cue Words</i> | | | |
| Specific | | | |
| - Baseline | Mean (SD) | 50% (29%) | 38% (32%) |
| - 5-months | Mean (SD) | 50% (26%) | 44% (32%) |
| - 10-months | Mean (SD) | 48% (33%) | 48% (39%) |
| Overgeneral | | | |
| - Baseline | Mean (SD) | 38% (31%) | 50% (30%) |
| - 5-months | Mean (SD) | 39% (26%) | 34% (25%) |
| - 10-months | Mean (SD) | 32% (23%) | 26% (28%) |
| Uninterpretable/ No Response | | | |
| - Baseline | Mean (SD) | 12% (21%) | 12% (23%) |
| - 5-months | Mean (SD) | 11% (16%) | 22% (30%) |
| - 10-months | Mean (SD) | 20% (31%) | 26% (42%) |

Feeling Evoked by Recalled Memories

There was a significant main effect of the within-subjects factor cue word: $F(1, 17) = 83.232$, $p < .001$, partial eta squared = .839. Within-subjects contrasts showed more negative feeling was evoked in memories recalled for negative cue words than positive cue words ($p < .001$). The main effect of the within-subject factor time was not significant: $F(2, 15) = 1.853$, $p = .191$, partial eta squared = .198, nor was the main effect of the between-subjects factor treatment group: $F(1, 16) = .156$, $p = .698$, partial eta squared = .010. The treatment group by cue word interaction was not significant: $F(1, 16) = 0.340$, $p = .568$, partial eta squared = .021, nor were the other two way interactions: treatment group by time: $F(2, 15) = 2.904$, $p = .086$, partial eta squared = .279, and cue word by time $F(2, 15) = 1.332$, $p = .293$, partial eta squared = .151. Finally, there was a significant three-way interaction between cue word, time, and treatment group: $F(2, 15) = 6.251$, $p < .013$, partial eta squared = .455.

Post-hoc analysis found a statistically significant two-way interaction between cue word and time for the ACT group: $F(2, 16) = 14.040$, $p < .013$, partial eta squared = .443, but not for the standard care group: $F(2, 16) = 1.858$, $p = .188$, partial eta squared = .188. There was a statistically significant simple main effect of time for the ACT group responses to negative cue words: $F(2, 16) = 4.944$, $p < .013$, partial eta squared = .382, but not for positive cue words $F(2, 22) = 1.177$, $p = .327$, partial eta squared = .097. For ACT group feeling evoked by negative cue words, all simple pairwise comparisons were run between the different time points. The mean feeling evoked was -2.86 (SD = 2.19) at baseline, -0.14 (SD = 2.46) at 5-months, and 1.55 (SD = 2.17) at 10-months. The negative feeling evoked by memories recalled in response to negative cue words was significantly reduced in the ACT group post-treatment. For those in the ACT group, the difference between mean feeling evoked to negative cue words at baseline and 5-months was 2.72, 95% CI [-5.115, -0.318], $p < .013$.

Table 6

Mean item emotional tone, feeling evoked, and response latency for events recalled by treatment group and cue word at baseline, 5-months, and 10-months

| | Statistic | Standard Care (n=14) | Standard Care plus ACT (n=15) |
|--|------------------|---------------------------------|--|
| <i>Emotional Tone of Events Recalled</i> | | | |
| All cue words | | | |
| - Baseline | Mean (SD) | 0.52 (2.30) | -0.12 (2.31) |
| - 5-months | Mean (SD) | 0.70 (1.43) | 0.84 (1.39) |
| - 10-months | Mean (SD) | -0.02 (1.74) | 0.86 (1.95) |
| Positive cue words | | | |
| - Baseline | Mean (SD) | 3.71 (1.39) | 2.28 (3.18) |
| - 5-months | Mean (SD) | 3.91 (1.47) | 3.31 (1.73) |
| - 10-months | Mean (SD) | 2.97 (1.16) | 3.62 (1.16) |
| Negative cue words | | | |
| - Baseline | Mean (SD) | -3.55 (1.73) | -4.05 (1.03) |
| - 5-months | Mean (SD) | -2.71 (1.85) | -2.15 (1.43) |
| - 10-months | Mean (SD) | -3.30 (1.49) | -2.35 (2.75) |
| <i>Feeling Evoked for Events Recalled</i> | | | |
| All cue words | | | |
| - Baseline | Mean (SD) | 0.78 (1.48) | 0.77 (1.48) |
| - 5-months | Mean (SD) | 0.93 (1.69) | 1.49 (1.67) |
| - 10-months | Mean (SD) | 0.67 (2.08) | 0.83 (1.38) |
| Positive cue words | | | |
| - Baseline | Mean (SD) | 2.57 (1.99) | 2.75 (1.71) |
| - 5-months | Mean (SD) | 3.38 (1.65) | 2.79 (1.98) |
| - 10-months | Mean (SD) | 2.53 (2.70) | 2.30 (1.88) |
| Negative cue words | | | |
| - Baseline | Mean (SD) | -2.35 (2.21) | -2.85 (2.20) |
| - 5-months | Mean (SD) | -2.00 (2.75) | -0.14 (2.46) |
| - 10-months | Mean (SD) | -1.31 (1.71) | -1.24 (2.17) |
| <i>Response Latency in Seconds</i> | | | |
| All cue words | | | |
| - Baseline | Mean (SD) | 12.32 (5.61) | 10.46 (5.56) |
| - 5-months | Mean (SD) | 11.26 (5.92) | 9.49 (4.07) |
| - 10-months | Mean (SD) | 11.07 (4.56) | 10.04 (4.51) |
| Positive cue words | | | |
| - Baseline | Mean (SD) | 13.10 (5.92) | 9.73 (4.98) |
| - 5-months | Mean (SD) | 12.14 (7.35) | 8.74 (4.35) |
| - 10-months | Mean (SD) | 11.19 (6.24) | 10.44 (6.93) |
| Negative cue words | | | |
| - Baseline | Mean (SD) | 10.86 (6.32) | 10.84 (6.49) |
| - 5-months | Mean (SD) | 10.70 (5.77) | 9.73 (4.13) |
| - 10-months | Mean (SD) | 10.88 (4.92) | 9.57 (5.89) |

Discussion

The primary aim of the present study was to examine rumination and autobiographical memory specificity as proposed mechanisms through which an ACT intervention for depression after psychosis may produce therapeutic change.

There was support for hypothesis 1, that reduced rumination and increased recall specificity would be associated with improvements in depression scores in the ACTdp group. Indeed, significant correlations between these proposed mechanisms of change and depression were found only for the ACT group. Significant positive correlations were found between change scores for rumination and change scores for self-reported depression in the ACT group. Similarly, significant positive correlations were found between change scores for aspects of autobiographical memory specificity, including percentage of responses classified as overgeneral and response latency, and change scores for self-reported depression, in the ACT group. Interestingly, change scores for observer-rated depression (CDSS) in the ACT group correlated only with change scores for rumination. The finding of stronger trends, in terms of ACT's effects on depression after psychosis, for self-report measures of depression than observer-rated measures of depression is consistent with previous research including Bach and Hayes (2002) and Gumley et al. (2017).

The observed significant correlations between depression and proposed mechanisms of change are consistent with the ACT therapeutic model. This proposes that avoidance of unpleasant experiences, including memories, will increase depression. Therefore, it may be that by allowing individuals to develop strategies such as mindful acceptance and psychological flexibility - and encouraging them to engage in personal value-based behaviour - ACT facilitates the skills necessary to disrupt primary maintaining factors in depression. The present findings suggest that individuals experiencing depression after psychosis may be able to use these skills to reduce their propensity to engage in maladaptive coping strategies, which reflect forms of cognitive and emotional avoidance, such as rumination and overgeneral memory.

With regards to hypothesis 2, there was limited evidence that autobiographical memory functioning varied by treatment group, cue word valence, and time of assessment. Three-way ANOVAs showed that both overgeneral autobiographical memory and the feeling evoked by memories recalled interacted with cue word valence. Negative cue words triggered a greater percentage of overgeneral memories across treatment groups. However post-hoc analysis of

the three-way interaction for feelings evoked by memories found that the ACT group described significantly more positive feelings in response to negative cue words at post-treatment than at baseline. This suggests that ACT may have beneficial effects for depression after psychosis by changing negative emotional reactivity to recall of past experiences. This would be an important area for further exploration in future research. One of the key factors implicated in the development and maintenance of depression, including after psychosis, is avoidance as a means of reducing negative emotional reactions to unpleasant experiences (Warren & Haslam, 2007; Williams, 1996). Such effects may therefore have considerable implications in terms of reducing the need to engage in a maladaptive coping strategy that is associated with a range of negative outcomes relating to depressed mood.

Descriptive findings relating to response specificity and response latency at baseline are consistent with general patterns that would be expected across general, outpatient and inpatient populations. The outpatient participants in the present study returned recollections that were *more* overgeneral than has been found with healthy controls but *less* overgeneral than has been found with inpatient schizophrenia samples (D'Argembeau, Raffard, & Van der Linden, 2008; Feinstein, Goldberg, Nowlin, & Weinberger, 1998; Kaney, Bowen-Jones, & Bentall, 1999; Wood et al., 2006; Ricarte, Hernandez, Latorre, Danion, & Berna, 2014; Riutort, Cuervo, Danion, Peretti, & Salame, 2003). Similarly, consistent with the possibility that shorter response times reflect avoidance of difficult memories, response latencies were shorter in the present study than has been reported with healthy controls and longer than with inpatient schizophrenia samples (Berna, Pogtheegadoo, Aouadi, Ricarte, Alle et al., 2016; Kaney et al., 1999; Wood et al., 2006). However, it should be noted that alternative interpretations of slower response latencies in depressed individuals have been proposed. The negative impact of low mood and depression on cognitive performance is well established (Lee, Hermens, Porter, & Redoblado-Hodge, 2012). Therefore, the longer response latencies identified in the present study could be interpreted as reflective of greater difficulties with depression rather than less avoidance. This could be an important area for further exploration in future research.

The present study has some limitations that need to be considered when interpreting the results. Examination of proposed mechanisms of change was undertaken with a small sample of only 29 participants and without a design that allowed mediation to be robustly examined. Mechanisms of change were measured before, during, and after intervention. However, conclusions about mediation could have been drawn more confidently should measures used

have been administered at several time points during the intervention phase. As such, it is difficult to make any confident predictions in relation to temporal precedence. However, such a comprehensive examination of mediation was not the aim of the present study. Additionally, analysis included a post data-collection Bonferroni adjustment of p-values. This has commonly been asserted a conservative means of addressing the risk of Type 1 error that can lead to increased risk of Type 2 error. However, given the relatively small number of comparisons being made; unequal group sizes; repeated measures factors being included; and that treatment group and cue word valence both only had two groups, this was considered the most appropriate course. Additionally, exact p-values were reported for statistically non-significant findings so that readers can see the impact of adjusting p-values to manage Type 1 error and make independent judgements about how this appears to have affected reported findings. Of course, there is a risk of type 2 error and any future research looking to build on the present studies' findings would do well to consider overall descriptive trends and effect sizes presented, as well as significance levels. Indeed, this is usually a sound plan when considering results of any pilot study or study utilising a relatively small sample size. However, when considering such descriptive trends, it is important to note the high levels of dispersion reported throughout results. This may also be related to the small sample size. Nevertheless, it is imperative to be appropriately cautious when interpreting descriptive statistics with this level of dispersion – particularly when looking to make comparisons with a control group. It is also important to consider the implications of missing data. Three participants in the ACT group, and one in the treatment as usual group, were lost to follow-up. It is possible that the higher number of those being lost to follow up in the ACT group relates to them being asked to recall and discuss potentially distressing memories. Nevertheless, the loss of such a considerable amount of a small sample size is further reason for caution when interpreting the findings detailed above.

Conclusion

Depression is one of the major contributors to poorer quality of life with psychosis and schizophrenia. Helping individuals develop skills in managing difficult experiences and live in a way that is consistent with their personal values may help reduce distress and improve quality of life. Early evidence suggests ACT may offer such benefits to those experiencing depression in the context of psychosis. However, a greater understanding of the mechanisms through which any positive effects of ACT interventions are facilitated is still needed. Further

research in this area may allow crucial insight into issues central to maximising intervention efficacy and greater understanding of the processes involved in the development and maintenance of depression in the context of psychosis. Preliminary findings in the present study suggest ACT may facilitate positive change for those experiencing depression after psychosis by reducing cognitive and emotional avoidance, in the form of rumination and overgeneral memory, and enhancing ability to tolerate recollection and discussion of emotionally challenging events. It may be that by helping individuals to develop strategies such as mindful acceptance and psychological flexibility - and encouraging them to engage in personal value-based behaviour - ACT facilitates the skills necessary to disrupt primary maintaining factors in depression.

References

- Addington, D., Addington, J. and Schissel, B., 1990. A depression rating scale for schizophrenics. *Schizophrenia Research*, 3(4), pp.247-251.
- Althouse, A.D., 2016. Adjust for multiple comparisons? It's not that simple. *The Annals of Thoracic Surgery*, 101(5), pp.1644-1645.
- Armstrong, R.A., 2014. When to use the Bonferroni correction. *Ophthalmic and Physiological Optics*, 34(5), pp.502-508.
- Bach, P. and Hayes, S.C., 2002. The use of acceptance and commitment therapy to prevent the rehospitalization of psychotic patients: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 70(5), p.1129-1139.
- Baer, R.A., Smith, G.T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D. and Williams, J.M.G., 2008. Construct validity of the five-facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment*, 15(3), pp.329-342.
- Baron, R.M. and Kenny, D.A., 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), p.1173-1182.
- Beck, A.T., Steer, R.A. and Brown, G.K., 1996. Beck depression inventory-II. *San Antonio*, 78(2), pp.490-498.
- Berna, F., Potheegadoo, J., Aouadi, I., Ricarte, J.J., Allé, M.C., Coutelle, R., Boyer, L., Cuervo-Lombard, C.V. and Danion, J.M., 2015. A meta-analysis of autobiographical memory studies in schizophrenia spectrum disorder. *Schizophrenia Bulletin*, 42(1), pp.56-66.
- Bohlmeijer, E.T., Fledderus, M., Rokx, T.A.J.J. and Pieterse, M.E., 2011. Efficacy of an early intervention based on acceptance and commitment therapy for adults with depressive symptomatology: Evaluation in a randomized controlled trial. *Behaviour Research and Therapy*, 49(1), pp.62-67.
- Bond, F.W., Hayes, S.C., Baer, R.A., Carpenter, K.M., Guenole, N., Orcutt, H.K., Waltz, T. and Zettle, R.D., 2011. Preliminary psychometric properties of the Acceptance and Action Questionnaire–II: A revised measure of psychological inflexibility and experiential avoidance. *Behaviour Therapy*, 42(4), pp.676-688.

- Cabin, R.J. and Mitchell, R.J., 2000. To Bonferroni or not to Bonferroni: when and how are the questions. *Bulletin of the Ecological Society of America*, 81(3), pp.246-248.
- Campbell, M., Fitzpatrick, R., Haines, A., Kinmonth, A.L., Sandercock, P., Spiegelhalter, D. and Tyrer, P., 2000. Framework for design and evaluation of complex interventions to improve health. *The BMJ*, 321, pp.694-696
- Chen, S.Y., Feng, Z. and Yi, X., 2017. A general introduction to adjustment for multiple comparisons. *Journal of Thoracic Disease*, 9(6), pp.1725-1729.
- Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I. and Petticrew, M., 2008. Developing and evaluating complex interventions: the new Medical Research Council guidance. *The BMJ*, 337, p.p.970-986.
- D'Argembeau, A., Raffard, S. and Van der Linden, M., 2008. Remembering the past and imagining the future in schizophrenia. *Journal of Abnormal Psychology*, 117(1), pp.247-251.
- Day, R.W. and Quinn, G.P., 1989. Comparisons of treatments after an analysis of variance in ecology. *Ecological Monographs*, 59(4), pp.433-463.
- Evans, J., Williams, J.M.G., O'Loughlin, S. and Howells, K., 1992. Autobiographical memory and problem-solving strategies of parasuicide patients. *Psychological Medicine*, 22(2), pp.399-405.
- Feinstein, A., Goldberg, T.E., Nowlin, B. and Weinberger, D.R., 1998. Types and characteristics of remote memory impairment in schizophrenia. *Schizophrenia Research*, 30(2), pp.155-163.
- Gaudio, B.A. and Herbert, J.D., 2006. Acute treatment of inpatients with psychotic symptoms using acceptance and commitment therapy: Pilot results. *Behaviour Research and Therapy*, 44(3), pp.415-437.
- Gumley, A., White, R., Briggs, A., Ford, I., Barry, S., Stewart, C., Beedie, S., Clarke, C., MacLeod, R., Lidstone, E., Nam, J., & McLeod, H.J. 2016. A parallel group randomised open blinded evaluation of Acceptance and Commitment Therapy for Depression After Psychosis: A Pilot Trial Protocol (ADAPT). *Psychosis*, 8(2), pp.143-155.

- Hacker, T., Stone, P. and MacBeth, A., 2016. Acceptance and commitment therapy—do we know enough? Cumulative and sequential meta-analyses of randomized controlled trials. *Journal of Affective Disorders*, 190, pp.551-565.
- Hartley, S., Haddock, G., e Sa, D.V., Emsley, R. and Barrowclough, C., 2014. An experience sampling study of worry and rumination in psychosis. *Psychological Medicine*, 44(8), pp.1605-1614.
- Hayes, S.C., Strosahl, K. and Wilson, K.G., 1999. Acceptance and commitment therapy: Understanding and treating human suffering. *New York: Guilford*.
- Jones, S.R. and Fernyhough, C., 2009. Rumination, reflection, intrusive thoughts, and hallucination-proneness: towards a new model. *Behaviour Research and Therapy*, 47(1), pp.54-59.
- Kaney, S., Bowen-Jones, K. and Bentall, R.P., 1999. Persecutory delusions and autobiographical memory. *British Journal of Clinical Psychology*, 38(1), pp.97-102.
- Lee, R.S., Hermens, D.F., Porter, M.A. and Redoblado-Hodge, M.A., 2012. A meta-analysis of cognitive deficits in first-episode major depressive disorder. *Journal of Affective Disorders*, 140(2), pp.113-124.
- Öst, L.G., 2008. Efficacy of the third wave of behavioural therapies: A systematic review and meta-analysis. *Behaviour Research and Therapy*, 46(3), pp.296-321.
- Pollock, L.R. and Williams, J.M.G., 2001. Effective problem solving in suicide attempters depends on specific autobiographical recall. *Suicide and Life-Threatening Behaviour*, 31(4), pp.386-396.
- Querstret, D. and Cropley, M., 2013. Assessing treatments used to reduce rumination and/or worry: A systematic review. *Clinical Psychology Review*, 33(8), pp.996-1009.
- Ricarte, J.J., Hernández, J.V., Latorre, J.M., Danion, J.M. and Berna, F., 2014. Rumination and autobiographical memory impairment in patients with schizophrenia. *Schizophrenia research*, 160(1-3), pp.163-168.
- Ros, L., Romero, D., Ricarte, J.J., Serrano, J.P., Nieto, M. and Latorre, J.M., 2018. Measurement of overgeneral autobiographical memory: Psychometric properties of the autobiographical memory test in young and older populations. *PloS One*, 13(4), pp. 320-338.

- Sands, J.R. and Harrow, M., 1999. Depression during the longitudinal course of schizophrenia. *Schizophrenia Bulletin*, 25(1), pp.157-172.
- Strauss, C., Thomas, N. and Hayward, M., 2015. Can we respond mindfully to distressing voices? A systematic review of evidence for engagement, acceptability, effectiveness and mechanisms of change for mindfulness-based interventions for people distressed by hearing voices. *Frontiers in Psychology*, 6, pp.420-436.
- Treynor, W., Gonzalez, R. and Nolen-Hoeksema, S., 2003. Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research*, 27(3), pp.247-259
- Uptegrove, R., 2009. Depression in schizophrenia and early psychosis: implications for assessment and treatment. *Advances in Psychiatric Treatment*, 15(5), pp.372-379.
- Van Vreeswijk, M.F. and de Wilde, E.J., 2004. Autobiographical memory specificity, psychopathology, depressed mood and the use of the Autobiographical Memory Test: A meta-analysis. *Behaviour Research and Therapy*, 42(6), pp.731-743.
- Van Zalk, N. and Tillfors, M., 2017. Co-rumination buffers the link between social anxiety and depressive symptoms in early adolescence. *Child and Adolescent Psychiatry and Mental Health*, 11(1), pp.412-243.
- Warren, Z. and Haslam, C., 2007. Overgeneral memory for public and autobiographical events in depression and schizophrenia. *Cognitive Neuropsychiatry*, 12(4), pp.301-321.
- Watkins, E.D. and Moulds, M., 2005. Distinct modes of ruminative self-focus: impact of abstract versus concrete rumination on problem solving in depression. *Emotion*, 5(3), pp.319-331.
- Wood, N., McLeod, H.J., and Brewin, C.R., 2006. Autobiographical memory deficits in schizophrenia. *Cognition and Emotion*, 20(3-4), pp.536-547.
- White, R., Gumley, A., McTaggart, J., Rattrie, L., McConville, D., Cleare, S. and Mitchell, G., 2011. A feasibility study of Acceptance and Commitment Therapy for emotional dysfunction following psychosis. *Behaviour Research and Therapy*, 49(12), pp.901-907.
- White, R.G., Gumley, A.I., McTaggart, J., Rattrie, L., McConville, D., Cleare, S., McLeod, H.J. and Mitchell, G., 2015. Acceptance and Commitment Therapy for depression following psychosis: An examination of clinically significant change. *Journal of Contextual Behavioural Science*, 4(3), pp.203-209.

Whitehead, C., Moss, S., Cardno, A., Lewis, G. and Furtado, V.A., 2002. Antidepressants for people with both schizophrenia and depression. *Cochrane Database of Systematic Reviews*, (2). CD002305.

Williams, J.M. and Broadbent, K., 1986. Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology*, 95(2), pp.144-163.

Williams, J.M.G. and Scott, J., 1988. Autobiographical memory in depression. *Psychological Medicine*, 18(3), pp.689-695.

Williams, J.M.G., Barnhofer, T., Crane, C., Herman, D., Raes, F., Watkins, E. and Dalgleish, T., 2007. Autobiographical memory specificity and emotional disorder. *Psychological Bulletin*, 133(1), pp.122-148.

Wykes, T., Reeder, C., Landau, S., Everitt, B., Knapp, M., Patel, A. and Romeo, R., 2007. Cognitive remediation therapy in schizophrenia: randomised controlled trial. *The British Journal of Psychiatry*, 190(5), pp.421-427.

Appendices

Appendices: Systematic Review

Appendix 1.1: Mindfulness – Instructions for Authors Editorial Procedure

This journal follows a double-blind reviewing procedure. Authors are therefore requested to submit:

A blinded manuscript without any author names and affiliations in the text or on the title page. Self-identifying citations and references in the article text should be avoided.

A separate title page, containing title, all author names, affiliations, and the contact information of the corresponding author. Any acknowledgements, disclosures, or funding information should also be included on this page.

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Online Submission

Please follow the hyperlink “Submit online” on the right and upload all of your manuscript files following the instructions given on the screen.

Please ensure you provide all relevant editable source files. Failing to submit these source files might cause unnecessary delays in the review and production process.

Title Page

The title page should include:

The name(s) of the author(s)

A concise and informative title

The affiliation(s) and address(es) of the author(s)

The e-mail address, and telephone number(s) of the corresponding author

If available, the 16-digit ORCID of the author(s)

Abstract

Please provide of structured abstract of up to 250 words

Keywords

Please provide 4 to 6 keywords which can be used for indexing purposes.

Structured Abstract

The structured abstract of up to 250 words with four labelled sections should containing the following, with sub-section headers in bold:

- a. Objectives: Problem being addressed in the study
- b. Methods: The participants, essential features of the study method
- c. Results: The basic findings, including effect sizes and confidence intervals and/or statistical significance levels
- d. Conclusions: What the authors conclude from study results

Text Formatting

Manuscripts should be submitted in Word.

Use a normal, plain font (e.g., 10-point Times Roman) for text.

Use italics for emphasis.

Use the automatic page numbering function to number the pages.

Do not use field functions.

Use tab stops or other commands for indents, not the space bar.

Use the table function, not spreadsheets, to make tables.

Use the equation editor or MathType for equations.

Save your file in docx format (Word 2007 or higher) or doc format (older Word versions).

Headings

Please use no more than three levels of displayed headings.

Abbreviations

Abbreviations should be defined at first mention and used consistently thereafter.

Footnotes

Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

Always use footnotes instead of endnotes.

Acknowledgments

Acknowledgments of people, grants, funds, etc. should be placed in a separate section on the title page. The names of funding organizations should be written in full.

Specific Remark: Footnotes

This journal does not allow the use of footnotes, except in reprinted papers.

Terminology

- Please always use internationally accepted signs and symbols for units (SI units).

TABLES

All tables are to be numbered using Arabic numerals.

Tables should always be cited in text in consecutive numerical order.

For each table, please supply a table caption (title) explaining the components of the table.

Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.

Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body.

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INTEGRITY OF RESEARCH AND REPORTING

Ethical standards

Manuscripts submitted for publication must contain a statement to the effect that all human and animal studies have been approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

It should also be stated clearly in the text that all persons gave their informed consent prior to their inclusion in the study. Details that might disclose the identity of the subjects under study should be omitted.

These statements should be added in a separate section before the reference list. If these statements are not applicable, authors should state: The manuscript does not contain clinical studies or patient data.

The editors reserve the right to reject manuscripts that do not comply with the above-mentioned requirements. The author will be held responsible for false statements or failure to fulfil the above-mentioned requirements

Appendix 1.2: Search Strategy
 PsycInfo via EbscoHost

| Search Number | Search Terms | Search Results |
|---------------|--|----------------|
| 1 | DE "Mindfulness" OR DE "Cognitive Processes" OR DE "Acceptance and Commitment Therapy" OR DE "Awareness" OR DE "Dialectical Behaviour Therapy" OR DE "Meditation" OR DE "Mindfulness-Based Interventions" OR DE "Psychotherapeutic Techniques" OR DE "Self-Compassion" | 121968 |
| 2 | DE "Mindfulness-Based Interventions" OR DE "Treatment" OR DE "Acceptance and Commitment Therapy" OR DE "Awareness" OR DE "Meditation" OR DE "Mindfulness" | 103507 |
| 3 | TI mindful* OR AB mindful* | 13602 |
| 4 | S1 OR S2 OR S3 | 196547 |
| 5 | DE "Students" OR DE "Elementary School Students" | 139613 |

| | | |
|---|--|---------|
| | OR DE "High School Students" OR DE "Junior High School Students" OR DE "Kindergarten Students" OR DE "Middle School Students" OR DE "Preschool Students" OR DE "Special Education Students" | |
| 6 | TI (chil* or kid* or adol* or student* or pupil* or young* or youth* or boy* or girl*) OR AB (chil* or kid* or adol* or student* or pupil* or young* or youth* or boy* or girl*) | 1348850 |
| 7 | S5 OR S6 | 1368449 |
| 8 | DE "Education" OR DE "Academic Settings" OR DE "Academic Specialization" OR DE "Adult Education" OR DE "Bilingual Education" OR DE "Client Education" OR DE "Coeducation" OR DE "Consumer Education" OR DE "Counsellor Education" OR DE "Curriculum" OR DE "Death Education" OR DE "Distance Education" OR DE "Education Policy" OR DE "Educational Degrees" OR DE "Educational Financial Assistance" OR DE "Educational Placement" OR DE "Educational Programs" OR DE "Educational Quality" OR DE "Educational Reform" OR DE "Educational Standards" OR DE "Elementary Education" OR DE "Environmental Education" OR DE "Family Life Education" OR DE "Grade Level" OR DE "High School Education" OR DE "Higher Education" OR DE "Homework" OR DE "Middle | 215339 |

| | | |
|----|--|--------|
| | School Education" OR DE "Multicultural Education" OR DE "Non-traditional Education" OR DE "Nursing Education" OR DE "Paraprofessional Education" OR DE "Personnel Training" OR DE "Preschool Education" OR DE "Private School Education" OR DE "Public School Education" OR DE "Religious Education" OR DE "Remedial Education" OR DE "STEM" OR DE "School Attendance" OR DE "School Enrolment" OR DE "School Graduation" OR DE "School Readiness" OR DE "School Retention" OR DE "School Transition" OR DE "Secondary Education" OR DE "Social Work Education" OR DE "Special Education" OR DE "Student Admission Criteria" OR DE "Student Records" OR DE "Teacher Education" | |
| 9 | DE "Classroom Environment" OR DE "Academic Environment" OR DE "Class Size" OR DE "Classroom Behaviour" OR DE "Classroom Management" OR DE "Classrooms" OR DE "Learning Environment" OR DE "School Environment" OR DE "School Violence" OR DE "Virtual Classrooms" | 53934 |
| 10 | TI (educat* or school* or class*) OR AB (educat* or school* or class*) | 936838 |
| 11 | S8 OR S9 OR S10 | 989594 |

| | | |
|----|--|--------|
| | | |
| 12 | DE "Clinical Trials" OR DE "Experimental Design" OR DE "Randomized Controlled Trials" OR DE "Drug Therapy" OR DE "Evidence Based Practice" OR DE "Treatment Effectiveness Evaluation" | 183232 |
| 13 | TI (control* or random* or RCT*) OR AB (control* or random* or RCT*) | 753550 |
| 14 | S12 OR S13 | 880924 |
| 15 | S4 + S7 + S11 + S13 | 2748 |

CINAHL via EBSCOhost

| Search Number | Search Terms | Search Results |
|---------------|--------------|----------------|
| | | |

| | | |
|----|--|---------|
| 1 | (MH "Mindfulness+") | 3580 |
| 2 | TI (mindful*) OR AB (mindful*) | 6291 |
| 3 | S1 OR S2 | 7250 |
| 4 | (MH "Child+") | 570,818 |
| 5 | (MH "Students+") | 116,600 |
| 6 | TI (chil* or kid* or adolesc* or pupil* or teen* or youth* or boy* or girl*) OR AB (chil* or kid* or adolesc* or pupil* or teen* or youth* or boy* or girl*) | 242700 |
| 7 | S4 OR S5 OR S6 | 761344 |
| 8 | (MH "EDUCATION+") | 786922 |
| 9 | (MH "LEARNING ENVIRONMENT+") | 10095 |
| 10 | TI (educat* or school* or) OR AB (educat* or school*) | 377504 |
| 11 | S8 OR S9 OR S10 | 959564 |
| 12 | (MH "CLINICAL TRIALS+") | 144701 |
| 13 | TI (control* or random* or RCT*) OR AB (control* or random* or RCT*) | 672120 |
| 14 | S12 or S13 | 757999 |
| 15 | S3 AND S7 AND S11 AND S14 | 241 |

MEDLINE via Ovid

| Search Number | Search Terms | Search Results |
|---------------|--|----------------|
| 1 | exp Mindfulness/ | 2412 |
| 2 | mindful* .ti,ab,kw. | 5819 |
| 3 | 1 or 2 | 6028 |
| 4 | exp Adolescent/ or exp Child/ or exp Child, preschool/ | 2875441 |
| 5 | (chil* or kid* or adoles* or student* or pupil* or young* or youth* or boy* or girl*) .ti,ab,kw. | 2330688 |
| 6 | Exp Students/ | 116892 |
| 7 | 4 or 5 or 6 | 3936111 |
| 8 | Exp Schools/ | 110369 |
| 9 | Exp Education/ | 768119 |
| 10 | (educat* or school*) .ti,ab,kw. | 1651990 |
| 11 | 8 or 9 or 10 | 1437334 |
| 12 | Exp Clinical Trial/ | 825462 |

| | | |
|----|---|---------|
| 13 | Exp Randomized Controlled Trial as Topic/ | 125742 |
| 14 | (control* or random* or RCT*) .ti,ab,kw. | 3578533 |
| 15 | 12 or 13 or 14 | 3972515 |
| 16 | 3 and 7 and 11 and 15 | 229 |

Cochrane Library

| Search Number | Search Terms | Search Results |
|---------------|--|----------------|
| 1 | MeSH descriptor: [Mindfulness] explode all tress | 615 |
| 2 | Mindful* ti, ab, kw | 144 |
| 3 | (#1 or #2) | 749 |
| 4 | MeSH descriptor: [Child] explode all tress | 1164 |
| 5 | MeSH descriptor: [Adolescent] explode all tress | 99461 |
| 6 | MeSH descriptor: [Students] explode all tress | 3934 |
| 7 | Chil* or kid* or adolesc* or student* or pupil* or teen* or young* or youth* or boy* or girl* ti, ab, kw | 330355 |

| | | |
|----|--|---------|
| 8 | (#4 or #5 or #6 or #7) | 330355 |
| 9 | MeSH descriptor: [Schools] explode all tress | 2678 |
| 10 | MeSH descriptor: [Education] explode all tress | 29922 |
| 11 | Educat* or school* ti, ab, kw | 82525 |
| 12 | (#9 or #10 or #11) | 89991 |
| 13 | MeSH descriptor: [Clinical Trial] explode all tress | 144 |
| 14 | MeSH descriptor: [Randomized Controlled Trial] explode all tress | 124 |
| 15 | Control* or random* or RCT* ti, ab, kw | 1547094 |
| 16 | (#13 or #14 or #15) | 1547094 |
| 17 | (#3 and #8 and #12 and #16) | 194 |

ERIC via EBSCOhost

| Search Number | Search Terms | Search Results |
|---------------|---|----------------|
| 1 | TI mindful* OR AB mindful* or KW mindful* | 1528 |
| 2 | TI (chil* or kid* or adolesc* or student* or pupil* or young* or youth* or boy* or girl*) OR AB (chil* or | 946671 |

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|---|---|--------|
| | kid* or adolesc* or student* or pupil* or young* or youth* or boy* or girl*) OR KW (chil* or kid* or adolesc* or student* or pupil* or young* or youth* or boy* or girl*) | |
| 3 | TI (school* or educat* or classroom*) OR AB (school* or educat* or classroom*) OR KW (school* or educat* or classroom*) | 396204 |
| 4 | TI (random* or control* or RCT*) OR AB (random* or control* or RCT*) OR KW (random* or control* or RCT*) | 121740 |
| 5 | S1 AND S2 AND S3 AND S4 | 143 |

Appendix 1.3: Cochrane Risk of Bias Tool Summary Tables

Cochrane Risk of Bias Tool Summary Table:

Atkinson & Wade (2015)

| Bias | Judgement | Support for Judgement |
|--|--------------|---|
| Random sequence generation (selection bias) | Low-risk. | Randomisation was carried out using a computer generated randomising sequence where classes were allocated to one of the three experimental conditions. |
| Allocation concealment (selection bias) | Unclear risk | No information reported on concealment of allocation. |
| Blinding of participants and personnel (performance bias) | High-risk. | It was reported that it was not possible to blind students or facilitators to their allocated condition. |
| Blinding of outcome assessment (detection bias) | High-risk. | Outcome measures relating to mental health and emotional wellbeing were self-report in nature and |

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| | | participants were not blinded to their treatment condition. |
| Incomplete outcome data addressed (attrition bias) | Low-risk. | <p>Missing outcome data was broadly balanced across intervention groups and in line with expected 10% absence rate of students participating.</p> <p>Additionally, analysis used linear mixed models to examine intervention effects. These are generally considered more robust in relation to missing follow up data.</p> |
| Selective reporting (reporting bias) | Low-risk. | Results were reported for all measures that were outlined in the study. |
| Other bias | High-risk. | Cluster randomised by school class. |

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Cochrane Risk of Bias Tool Summary Table 2:

Crescentini, Capurso, Furlan, & Fabbro (2016)

| Bias | Judgement | Support for Judgement |
|--|---------------|--|
| Random sequence generation (selection bias) | Unclear risk. | No information reported on random sequence generation. |
| Allocation concealment (selection bias) | Unclear risk | No information reported on concealment of allocation. |
| Blinding of participants and personnel (performance bias) | Low-risk | Students participating were blind to the study purpose and were not aware they were assigned to a specific group. Participants only knew their group would be working with facilitators on some 'exercises'. Teachers of participants were also blind to study purpose and differences between groups. |

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| Blinding of outcome assessment (detection bias) (patient-reported outcomes) | Low-risk | Measures of mental health and emotional wellbeing were self-report and teacher-report in nature. Both participants and their teachers were blinded to allocation. |
| Incomplete outcome data addressed (attrition bias) | Low-risk | Missing outcome data was minimal, less than the expected 10% absence rate of students participating, and broadly balanced across intervention groups. |
| Selective reporting (reporting bias) | Low-risk | Results were reported for all measures that were outlined in the study. |
| Other bias | High-risk. | Cluster randomised by school class. |

Cochrane Risk of Bias Tool Summary Table 3:

| Bias | Judgement | Support for Judgement |
|--|---------------|--|
| Random sequence generation (selection bias) | Unclear risk. | No information reported on random sequence generation. |
| Allocation concealment (selection bias) | Unclear risk | No information reported on concealment of allocation. |
| Blinding of participants and personnel (performance bias) | Unclear risk. | Little information reported on blinding. Only information reported states that participants were informed about the purpose of the study at the end of it. |
| Blinding of outcome assessment (detection bias) | Unclear risk. | Little information reported and how measure of State-Trait Anxiety Inventory outcome measure was administered and completed. Unclear if participants were blind to the group they had been allocated to. |

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| Incomplete outcome data addressed (attrition bias) | Unclear risk. | No information was reported regarding incomplete outcome data. |
| Selective reporting (reporting bias) | Low-risk | Results were reported for all measures that were outlined in the study. |
| Other bias | Low-risk. | Randomised by individual participant. |

Cochrane Risk of Bias Tool Summary Table 4:

Johnson, Burke, Brinkman & Wade (2017), Australia

| Bias | Judgement | Support for Judgement |
|--|-----------|--|
| Random sequence generation (selection bias) | Low-risk. | Random sequence generation function in excel used by principal investigator prior to contact with any participants or teachers at schools. |

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| Allocation concealment (selection bias) | Unclear risk | No information reported on concealment of allocation. |
| Blinding of participants and personnel (performance bias) | High-risk. | Blinding of participants and personnel to the treatment group reported to not be possible. |
| Blinding of outcome assessment (detection bias) | High-risk. | Self-report outcome measures were used to assess mental health and emotional wellbeing. Participants and personnel were not blinded to their treatment group. |
| Incomplete outcome data addressed (attrition bias) | Low-risk. | Missing outcome data was minimal, less than the expected 10% absence rate of students participating. Additionally, analysis accounted for missing data using maximum likelihood estimation. |

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| Selective reporting (reporting bias) | Low-risk. | Results were reported for all measures that were outlined in the study. |
| Other bias | High-risk. | Cluster randomised by school class. |

Cochrane Risk of Bias Tool Summary Table 5:

Mendelson, Greenberg, Dariotis, Gould, Rhoades, & Leaf (2010)

| Bias | Judgement | Support for Judgement |
|--|---------------|--|
| Random sequence generation (selection bias) | Unclear risk. | No information reported on random sequence generation. |
| Allocation concealment (selection bias) | Unclear risk | No information reported on concealment of allocation. |
| Blinding of participants and personnel (performance bias) | Unclear risk. | No information specifically reported on blinding. |

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| Blinding of outcome assessment (detection bias) | High-risk. | No information specifically reported on blinding of outcome measures however self-report measures used to assess mental health and emotional wellbeing were read aloud to participants by facilitators. |
| Incomplete outcome data addressed (attrition bias) | Low-risk | Small number of incomplete data, which was evenly distributed across groups, and in line with the expected absence rate of students. Additionally, accounted for missing data using a listwise deletion method. |
| Selective reporting (reporting bias) | Low-risk. | Results were reported for all measures that were outlined in the study. |
| Other bias | High-risk. | Cluster randomised by school. |

Cochrane Risk of Bias Tool Summary Table 6:

Napoli, Krech, & Holley (2005)

| Bias | Judgement | Support for Judgement |
|--|---------------|---|
| Random sequence generation (selection bias) | Unclear risk. | No information reported on random sequence generation. |
| Allocation concealment (selection bias) | Unclear risk | No information reported on concealment of allocation. |
| Blinding of participants and personnel (performance bias) | Unclear risk. | No information specifically reported on blinding. |
| Blinding of outcome assessment (detection bias) | Unclear risk. | No information specifically reported on blinding of outcome assessment. |

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| Incomplete outcome data addressed (attrition bias) | High-risk. | Only information given regarding incomplete outcome data is a footnote under Table 2 which illustrates differences between outcome measures at pre and post intervention. No information was reported about reasons for this missing data, how it was distributed across groups, and how it was accounted for. |
| Selective reporting (reporting bias) | Low-risk. | Results were reported for all measures that were outlined in the study. |
| Other bias | Low-risk. | Randomised by individual participant. |

Cochrane Risk of Bias Tool Summary Table 7:

Quach, Jastrowski, & Alexander (2016)

| Bias | Judgement | Support for Judgement |
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|--|---------------|--|
| Random sequence generation (selection bias) | Unclear risk. | No information reported on random sequence generation. |
| Allocation concealment (selection bias) | Unclear risk | No information reported on concealment of allocation. |
| Blinding of participants and personnel (performance bias) | Unclear risk. | No information specifically reported on blinding. |
| Blinding of outcome assessment (detection bias) (patient-reported outcomes) | Unclear risk. | No information specifically reported on blinding of outcome assessment. |
| Incomplete outcome data addressed (attrition bias) | Low-risk. | Good account of missing and excluded outcome data. Five percent of missing data on anxiety measure was examined using SPSS and determined to be missing at random. Data from participants who were judged to be demonstrating an invalid response pattern (i.e. selecting the same response to every item) was |

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| | | excluded from some analysis and compared to those without such response patterns. |
| Selective reporting (reporting bias) | Low-risk. | Results were reported for all measures that were outlined in the study. |
| Other bias | Low-risk. | Randomised by individual participant. |

Cochrane Risk of Bias Tool Summary Table 8:

Sibinga, Perry-Parrish, Chung, Johnson, Smith, & Ellen (2013)

| Bias | Judgement | Support for Judgement |
|--|-----------|---|
| Random sequence generation (selection bias) | Low-risk. | Random sequence generation reported to have been carried out via a computer-generated scheme. |

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| Allocation concealment (selection bias) | Low-risk. | Prior to assignment, all participants, school staff, and study personnel were blinded to program allocation. |
| Blinding of participants and personnel (performance bias) | Unclear risk. | No information specifically reported on blinding after assignment. |
| Blinding of outcome assessment (detection bias) (patient-reported outcomes) | Unclear risk. | No information specifically reported on blinding of outcome assessment. |
| Incomplete outcome data addressed (attrition bias) | Low-risk. | Good account of reasons for missing and excluded data and implications for analysis and conclusions that may be inferred from analysis. |
| Selective reporting (reporting bias) | Low-risk. | Follow up data were not reported as planned. However, reasons for this, including missing data and |

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| | | implications for power, are discussed. |
| Other bias | Low-risk. | Randomised by individual participant. |

Cochrane Risk of Bias Tool Summary Table 9:

Van der Weijer-Bergsma, Langenberg, Brandsma, Oort, & Bogels (2014)

| Bias | Judgement | Support for Judgement |
|--|---------------|--|
| Random sequence generation (selection bias) | Unclear risk. | No information reported on random sequence generation. |
| Allocation concealment (selection bias) | Unclear risk | No information reported on concealment of allocation. |
| Blinding of participants and personnel (performance bias) | Unclear risk. | No information specifically reported on blinding. |

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| Blinding of outcome assessment (detection bias) (patient-reported outcomes) | Unclear risk. | No information specifically reported on blinding of outcome assessment. |
| Incomplete outcome data addressed (attrition bias) | Low-risk. | Incomplete data are detailed and accounted for well – primarily in the context of expected absence rate for students. Additionally, incomplete data accounted for by use of multilevel model of analysis utilised. |
| Selective reporting (reporting bias) | Low-risk. | Results were reported for all measures that were outlined in the study. |
| Other bias | High-risk. | Cluster randomised by school class. |

Cochrane Risk of Bias Tool Summary Table 10:

| Bias | Judgement | Support for Judgement |
|--|---------------|---|
| Random sequence generation (selection bias) | Unclear risk. | No information reported on random sequence generation. |
| Allocation concealment (selection bias) | Unclear risk | No information reported on concealment of allocation. |
| Blinding of participants and personnel (performance bias) | Unclear risk. | No information specifically reported on blinding. |
| Blinding of outcome assessment (detection bias) (patient-reported outcomes) | High-risk. | No information specifically reported on blinding of outcome assessment other the measure regarding mental health and emotional wellbeing was read aloud by the ‘interventionist’. |
| Incomplete outcome data addressed (attrition bias) | Low-risk | Good detail around missing data and how this was managed including using means of relevant reported |

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| | | values and excluding participants with missing more than 40% of data for one scale. |
| Selective reporting (reporting bias) | Low-risk. | Results were reported for all measures that were outlined in the study. |
| Other bias | High-risk. | Cluster randomised by school. |

Appendix 1.4: Measures Used in Studies Included in Systematic Review

| Study | Measure Used | Description |
|--|---|---|
| Atkinson & Wade (2015) | Positive and Negative Affect Schedule (PANAS-X) (Watson & Clark, 1994) | Seventeen items from the Sadness, Guilt, and Fear/Anxiety subscales of the Positive and Negative Affect Schedule-Expanded (PANAS-X38) were used to assess negative affect. Participants reported feelings during the previous week using a five-point scale. Higher scores reflected greater negative affect. |
| | The Dutch Eating Behaviour Questionnaire—Restraint (DEBQ-R) (Van Strien, Frijters, Bergers, & Defares, 1986) | This measure consists of 10 items. Participants use a 5-point scale (never to always) to assess the frequency of dieting behaviours. A higher mean score reflects greater dietary restraint. |
| | Eating Disorder Examination—Questionnaire (EDE-Q) (Fairburn & Beglin, 1994) | Nine diagnostic items from the EDE-Q33 were used to assess the frequency of eating disorder symptoms present over the previous 28 days. A mean was calculated with higher scores representing greater symptoms of disordered eating. |
| | Socio-cultural Attitudes Towards Appearance Scale (SATAQ-3) (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004) | Two subscales of the Socio-cultural Attitudes Towards Appearance Scale (SATAQ-341) were used: Internalization and Pressures. Responses were rated on a 5-point scale where higher scores indicated a higher level of concern relating to appearance. |
| | The Clinical Impairment Assessment of Eating Disorders (CIA) (Bohn, Doll, Cooper, O’Connor, Palmer, & Fairburn, 2008) | This is a 16-item self-report measure of impairment related to eating disorder pathology. Items are rated on a four-point Likert scale relating to the extent to which eating habits, exercising, or feelings about eating, shape, or weight have had an impact on aspects of personal, social, and cognitive psychosocial functioning in the past 28 days. |
| Crescentini, Capurso, Furlan, & Fabbro (2016), | Child Behaviour Checklist-Teacher Report Form (CBCL-TRF) (Achenbach and Dumenci, 2001) | The CBCL-TRF consists of 113 problem behaviour items providing scores for eight specific problem scales: Anxiety/Depression, Withdrawal/Depression, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behaviour, and Aggressive Behavior. The CBCL-TRF also provides scores for the Total |

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| | | Problems Scale, the Internalizing Problems Scale, and the Externalizing Problems Scale. The teacher rated each child's behaviour on a 3-point scale (not true sometimes true, Very true/ often true). Scale scores were converted to T-scores using age and gender-based norms |
| | Conners Teachers Rating Scales – Revised (CTRS-R) (Conners, 1997) | The CTRS-R scale is a 59-item scale. The CTRS-R measures six types of problems/ behaviours: Oppositional, Cognitive Problems/ Inattention, Hyperactivity, Anxious/ Shy, Perfectionism, and Social Problems. Moreover, the scale has comprehensive symptom coverage for attention deficit/hyperactivity disorder (ADHD), a restless/impulsive scale, an emotional lability scale as well as a “DSM-IV: Inattention” score and a “DSM-IV: Hyperactivity” score. |
| | Short Mood and Feelings Questionnaire (SMFQ) (Angold, Costello, Messer., Pickles, & Winder, (1995) | The SMFQ is a 13-item scale. Questions are based on the DSM-III criteria for depression and it measures a unidimensional construct of depressive symptoms. Responses are Likert-type (0 = not true at all, 2 = very much true) and total score is obtained by summing each item, with a range from 0 to 26, with higher scores denoting higher depressive symptoms. |
| Franco, Manas, Cangas, & Gallego (2011) | State-Trait Anxiety Inventory (STAI) | This questionnaire is composed of two scales that measure two independent concepts of anxiety, state and trait. It is made up of 40 items (20 for each scale) in which the subjects must evaluate how they feel generally (trait anxiety), and at the moment (state anxiety) on a Likert scale |
| | Self-Concept Questionnaire- 36 (SCQ-36) | This 36-item self-report questionnaire measures four dimensions of self-concept (academic, social, emotional and family) and gives a total score. |
| | Academic Performance | To evaluate academic performance, participants grades in the subjects studied by all students in the first year of high school (i.e., Spanish language and literature, foreign language and philosophy) were added up, and this score was then divided among the number of subjects. This provided academic performance rates for each of the subjects as well as a total academic performance rate. |

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| Johnson, Burke, Brinkman & Wade (2017) | Depression Anxiety Stress Scale Short form (DASS-21) (Lovibond & Lovibond, 1995) | Two 7-item anxiety and depression factors. Each item is scored on a 4-point scale from 0“never” to 3“almost always”, with higher scores reflecting higher depression or anxiety over the past week. |
| | Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) (Tennant, Hiller, Fishwick, Platt, Joseph, Weich, & Stewart-Brown, 2007) | This 14-item scale surveys mental wellbeing over the last two weeks. Items are rated on a 5-point scale from 1 “none of the time” to 5 “all of the time” with higher scores interpreted as signifying higher wellbeing. |
| | Eating Disorder Examination-Questionnaire (EDE-Q) (Fairburn & Beglin, 1994) | Combined 12 items from subscales of the EDE-Q. These items use a 7-point rating scale ranging from 0 “not at all” to 6“markedly” relating to the last 28 days. Higher scores were interpreted as indicating greater concerns relating to weight and shape. |
| | Homework Practice | At three post intervention time points, questions surveyed amount of home practice. On completion students were asked “During the 9 week course, how often did you practice each of the following techniques outside of the lessons? Students were supplied with a list of techniques learnt during the course and asked to rate each as follows: 1 “never”, 2 “once or twice in total”, 3 “greater than twice in total but less than once a week”, 4 “once or twice each week” to 5 “three times or more each week”. At 6- and 12-month follow-up the question was reworded “Since the mindfulness course at school, how often have you used the following mindfulness techniques?”. |
| | Child and Adolescent Mindfulness Measure (CAMM) (Greco, Baer, & Smith, 2011) | The CAMM is a 25-item measure of mindfulness. It assesses the degree to which children and adolescents observe internal experiences, act with awareness, and accept internal experiences without judging them. |
| Mendelson, Greenberg, Dariotis, Gould, Rhoades, & Leaf (2010) | The Responses to Stress Questionnaire (RSQ) (Connor-Smith, Compas, Wadsworth, Tomsen, & Saltzman, 2000) | The RSQ was used to assess children’s involuntary responses to stress. This 57-item self-report checklist assesses voluntary and involuntary responses to sources of social stress in adolescence. Voluntary stress responses were asserted to reflect coping activities that are within an individuals’ conscious control, and involuntary stress responses were said to reflect more unconscious physiologic or temperamental reactions to stressors. |

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| | The Emotion Profile Inventory (EPI) (Benn 2003) | The EPI a 24-item self-report scale. This was used to assess children’s positive and negative emotions. Respondents were asked how often in the past couple of days, including the present day, they experienced different feelings on a 4-point scale ranging from “not much” to “most of the time.” Two additional items were included, “mad” and “annoyed,” in an attempt to better capture feelings of anger. |
| | Relationships with Peers and School People in My Life (PIML) (Murray and Greenberg 2000) | PIML is a self-report measure that assesses the relationships children have with their parents, friends, school, and neighbourhood. It was developed for easy comprehension by 10- to 12-year olds. Responses range from “almost never or never true” (1) to “almost always or always true” (4). To minimize participant burden, only the friends and school factors scales (brief versions) were administered. |
| Napoli, Krech, & Holley (2005) | Test Anxiety Scale (TAS) (Sarason, 1978) | This contains 14 items that measure general debilitating test anxiety. The TAS asks students to respond in a true-false format. The modified version used in this study asked students to respond to a 4-point Likert-type format, ranging from strongly disagree to strongly agree. |
| | ADD-H Comprehensive Teacher Rating Scale (ACTeRS) (Ullmann, Sleator, & Sprague, 1984) | The ACTeRS utilizes a teacher rating form with 24 items and 4 subscales: Attention, Hyperactivity, Social Skills, and Oppositional Behaviour. The chief goals of the ACTeRS are (1) assessment of classroom behaviours, (2) diagnosis of ADHD, and (3) evaluation of an individual student’s behaviour before and after an intervention. Here, the authors described using the ACT with goals 1 and 3 foremost in their mind. |
| | Test of Everyday Attention for Children (TEA-Ch) (Manly, Robertson, & Nimmo-Smith, 1999) | The TEA-Ch is used to assess the different attentional capacities in children and adolescents. In this study, only 2 of the 5 major subtests of the TEA-Ch were administered. These were the selective (visual) attention measures and the sustained attention measures. |
| Quach, Jastrowski, & Alexander (2016) | Screen for Child Anxiety and Related Emotional Disorders (SCARED) (Birmaher, Khertarpal, Brent, Cully, Balach, Kaufman, & Neer, 1997) | The SCARED is a 41-item self-report anxiety measure designed for children and young people aged 8- 18 years. Items presented in the SCARED are intended to represent the five types of anxiety disorders described in the DSM-IV: generalized anxiety, social phobia, separation anxiety, panic disorder, and school phobia. Respondents use a three- |

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| | | point Likert scale: 0 (not true), 1 (sometimes true), or 2 (often true) after reading statements such as “I worry about other people liking me”. Higher total scores are taken to indicate higher levels of anxiety and worry. |
| | The Perceived Stress Scale- 10 (PSS-10) (Cohen & Williamson, 1988) | The PSS-10 is a 10-item measure that examines perceived stressful situations that may occur in daily life. All questions are rated on a five-point Likert scale, ranging from 0 (never) to 4 (very often) to assess how respondents felt during the past month. Overall scores range from 0 to 40. Higher scores were interpreted as representing greater perceived stress. |
| | Automated Operation Span Task (AOSPAN) (Unsworth, Heitz, Schrock, & Engle, 2005) | AOSPAN is a computerized task used to measure WMC that comprises 15 sets of trials, each containing two simultaneous tasks: performing a memory task while answering math equations. In the memory section, participants were presented a series of letters appearing one at a time for 800 milliseconds. Participants were asked to recall letters in the same order they were presented by clicking the box next to the appropriate letters in correct order. In the math portion of the task, math equations were presented in sets of simple questions such as “(1 x 2) + 1?” After solving the problem, participants were then asked to click to the next screen where a potential answer, such as “3” was presented. Participants clicked on the “true” or “false” box. There were 75 letters to recall and 75 math equations to solve. |
| Sibinga, Perry-Parrish, Chung, Johnson, Smith, & Ellen (2013) | Children’s Depression Inventory – Short Form (CDI) (Kovacs, 2004) | The CDI is a 12-item scale that is self-rated and symptom-oriented. Participants rate themselves based on how they feel and think, with each item being responded to on a Likert scale. |
| | The Self-Assessment Perceived Global Distress Scale (PGDS) (Ivarsson, Lindström, Malm, & Norlander, 2011) | The PGDS is a visual analogue scale. Participants rate their experiences of mental health difficulties based on the question “How much have you been bothered by your problems during the last month?”. Participants draw a mark on a 100 mm long line, and a score is generated. A score of 1 implies extremely severe distress, whereas a score of 100 indicates that the patient does not experience any distress at all. |

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| | Multidimensional Anxiety Subscale for Children (MAS-C) (March, Parker, Sullivan, Stallings, & Conners, 1997) | The MAS-C is a 39-item self-report questionnaire of anxiety symptoms in children. Primary subfactors in the MAS-C include physical symptoms, harm avoidance, social anxiety, and separation anxiety. |
| | Differential Emotions Scale (DES) ((Izard, Dougherty, Bloxom, & Kotch, 1974) | The DES is a 21-item measure. Participants were asked to provide ratings for items measuring experiences of sadness, anger, fear, disgust, surprise, happiness, and interest. Participants were asked to indicate the degree of emotional intensity for each item on 100 mm visual analog scales that were labelled from ‘not at all’, ‘slightly’, ‘moderately’, ‘rather strong’, to ‘very strong’. |
| | The State-Trait Anger Expression Inventory (STAEI) (Spielberger, 1999) | The STAEI is a 57-item inventory that assesses how angry a person feels at a given moment, how frequently and intensely the person feels angry, and what the person does when feeling angry. Items are rated on a 4-point scale (1 = “not at all” to 4 = “almost always”). |
| | The Aggression Scale (TAS) (Orpinas & Frankowski, 2001) | The TAS consists of 11 items designed to measure self-reported aggressive behaviours among middle school students. Participants respond to items using a 4 point Likert scale. Higher scores are taken to be reflective of higher levels of anger and aggression. |
| | The COPE Inventory (COPE-I) (Carver, Scheier, & Weintraub, 1989) | The COPE-I is a 48-item multidimensional inventory used to assess the different ways in which people generally respond to stress. The COPE is made up of 14 subscales that describe different coping strategies: acceptance, active coping, behavioural disengagement, denial, emotional support, humour, instrumental support, planning, positive reframing, religion, self-blame, self-distraction, substance use, and venting. |
| Van der Weijer-Bergsma, Langenberg, Brandsma, Oort, & Bogels (2014) | Screen for Child Anxiety Related Emotional Disorders-71 (SCARED-71) (Bodden, Bögels, & Muris, 2009) | The SCARED-71 is a 72-item measure which assesses children’s anxiety symptoms. Parents indicate how frequently their child experiences each anxiety symptom on a Likert-type scale (0= never, 1= sometimes, 2= often). Higher scores are interpreted as reflective of more symptoms of anxiety. |
| | Sense of Coherence Questionnaire for Children (SOC-C) (Jellesma, Terwogt, & Rieffe, 2006) | The SOC-C is a 13-item measure which assesses the extent to which children feel that their life and the environment they encounter is comprehensible, manageable, and meaningful. Items are scored on a Likert-type scale (1= very often, 2= often, 3= sometimes, 4= seldom, 5= |

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| | | never). Example items are: “How often do you have the feeling that you are being treated unfairly?” and “How often do you have the feeling that the things you do every day are not really important?”. Two of the 13 items were positively formulated, for which a different five-point scale was used (1= like it a lot to 5= do not like it at all). Higher scores are interpreted as indicating a higher sense of coherence. |
| | Emotion Awareness Questionnaire Revised - 30 Item (EAQ-30) (Rieffe, Oosterveld, Miers, Meerum Terwogt, & Ly, 2008) | The EAQ-30 assesses six aspects of children’s emotional functioning: differentiating emotions, verbal sharing of emotions, not hiding emotions, bodily awareness, attending to others’ emotions, and analyses of emotions. The items are scored on a Likert-type scale (0= not true, 1= sometimes true, 2= often true). The 19 items with a negative wording were rescored. Higher scores on scales, except for bodily awareness, reflect better emotion awareness. |
| | Non-Productive Thoughts Questionnaire for Children (NPDK) (Jellesma, Terwogt, Reijntjes, Rieffe, & Stegge, 2005) | The NPDK assesses ruminative and repetitive thoughts. Items are scored on a Likert-type scale (0= not true, 1= sometimes true, 3= often true). Higher scores reflect more ruminative thoughts |
| | Sleep Disturbance Scale for Children (SDSC) (Bruni, Ottaviano, Guidetti, Romoli, Innocenzi, Cortesi, 1996) | The SDSC assesses disorders of initiating and maintaining sleep, disorders of arousal nightmares, sleep–wake transition disorders, and disorders of excessive somnolence. Items were scored on a Likert-type scale (1= never to 5= always), except for two items on sleep duration. Higher scores reflect more sleeping difficulties. |
| | Caring Community Profile-Revised (CCP-R) (Lickona and Davidson, 2003) | A ‘slight’ adaptation of the (CCP-R) was used to assess the social climate in the classroom: perceptions of student respect, perceptions of student friendship and belonging, and perceptions of students shaping of environment. Higher scores reflected a better social climate in the classroom. |
| White (2012), USA | The Feel Bad Scale (FBS) (Lewis, Seigel, & Lewis, 1984) | The FBS is a measure of perceived stress with school-age children consisting of three columns. The first column lists 20 stressors. The second column measures how badly the child would feel if the stressor occurred, or how badly he or she felt when the stressor did occur (appraisal of stress). The third column measures how frequently the |

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| | | <p>stressor actually occurred (frequency). Columns are scored on a 5-point Likert scale ranging from 1 (not bad) to 5 (terrible) for appraisal of stress (“badness”) and 1 (never) to 5 (all the time) for the frequency column. The appraisal value in column one and the frequency value in column two are multiplied for an item value. The total score is calculated by adding the item values. The possible range of scores is 20 to 500. The higher the score, the higher the perceived stress reported is interpreted to be.</p> |
| | <p>The Schoolagers’ Coping Strategies Inventory (SCSI) (Ryan-Wenger, 1990)</p> | <p>The SCSI is a frequently used and validated measure of coping. It consists of two 26-item subscales: coping frequency and coping effectiveness. The frequency subscale is scored on a 3-point Likert scale that ranges from 0 (never) to 3 (most of the time) added together for a possible score from 0 to 72.</p> |
| | <p>Mindful Thinking and Action Scale for Adolescents (MTAS-A), (West, 2008)</p> | <p>The MTAS-A is a scale to measure mindfulness in adolescents. This study focussed on the subscale measuring healthy self-regulation. This subscale consists of 12 items scored on a 6-point Likert scale from 1 (almost never) to 6 (almost always). The scale is computed by adding the individual item values for a possible score of 12 to 72. A higher score was interpreted as representing greater self-regulation.</p> |

Appendices: Major Research Project

Appendix 2.1: Schizophrenia Research – Author Guidelines Guide for Authors

Aims and scope:

Schizophrenia Research provides rapid publication of new international research that contributes to the understanding of schizophrenia and related disorders. The journal brings together previously separated biological, clinical and psychological research on this disorder, and stimulates the synthesis of clinical and research data into cohesive hypothesis.

Types of papers:

(1) Full-length papers: 4000 words (excluding tables, figures and references).(2) Short communications: 1000-1500 words (excluding tables, figures and references).(3) Letters to the Editors: 600-800 words, 10 references, 1 figure or table.(4) Special solicited research and/or reviews.(5) Invited comments or hypotheses.(6) Editorials.(7) Schizophrenia meeting reviews; solicited and/or submitted.(8) Book reviews.

Submission Checklist:

It is hoped that this list will be useful during the final checking of an article prior to sending it to the journal's editor for review. Please consult this Guide for Authors for further details of any item.

Ensure that the following items are present:

- One author designated as corresponding author
- E-mail address
- Full postal address
- Telephone and fax numbers
- All necessary files have been uploaded
- Keywords
- All figure captions
- All tables (including title, description, footnotes)

Further considerations

- Manuscript has been "spell checked"
- References are in the correct format for this journal
- All references mentioned in the Reference list are cited in the text, and vice versa

- Permission has been obtained for use of copyrighted material from other sources (including the Web)
- Colour figures are clearly marked as being intended for colour reproduction or to be reproduced in black-and-white

General

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, without the written consent of the Publisher.

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Following the **Funding body agreements and policies** text, authors are required to declare their individual contribution to the manuscript under a subheading **Contributors**.

E.g, Author X designed the study and wrote the protocol. Author Y managed the literature searches and analyses. Authors X and Z undertook the statistical analysis, and author W wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

The third aspect of the Journal's new policy concerns the **Conflict of Interest**. ALL authors are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations within three (3) years of beginning the work submitted that could inappropriately influence, or be perceived to influence, their work.

Examples of potential conflicts of interest which should be disclosed include employment, consultancies, stock ownership (except for personal investment purposes equal to the lesser of one percent (1%) or USD 5000), honoraria, paid expert testimony, patent applications, registrations, and grants. If there are no conflicts of interest, authors should state that there are none.

E.g. Author Y owns shares in pharma company A. Author X and Z have consulted for pharma company B. All other authors declare that they have no conflicts of interest.

Finally, before the references, the Journal will publish **Acknowledgements**, in a separate section, and not as a footnote on the title page.

E.g. We thank Mr A, who kindly provided the data necessary for our analysis, and Miss B, who assisted with the preparation and proof-reading of the manuscript.

NB. During the online submission process the author will be prompted to **upload these four mandatory author disclosures as separate items**. They will be automatically incorporated in the PDF builder of the online submission system. Please do not include in the main manuscripts.

References. See separate section, below.

Figure legends, tables, figures, schemes. Present these, in this order, at the end of the article. Figures and photographs of good quality should also be submitted online as a separate file.

Tables. Number tables consecutively in accordance with their appearance in the text. Place footnotes to tables below the table body and indicate them with superscript lowercase letters. Avoid vertical rules. Be sparing in the use of tables and ensure that the data presented in tables do not duplicate results described elsewhere in the article.

Nomenclature and units. Follow internationally accepted rules and conventions: use the international system of units (SI). If other quantities are mentioned, give their equivalent in SI.

DNA sequences and GenBank Accession numbers. Many Elsevier journals cite "gene accession numbers" in their running text and footnotes. Gene accession numbers refer to genes or DNA sequences about which further information can be found in the databases at the National Center for Biotechnical Information (NCBI) at the National Library of Medicine. Elsevier authors wishing to enable other scientists to use the accession numbers cited in their papers via links to these sources, should type this information in the following manner:

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Authors are encouraged to check accession numbers used very carefully. **An error in a letter or number can result in a dead link.** In the final version of the *printed article*, the accession number text will not appear bold or underlined. In the final version of the *electronic copy*, the accession number text will be linked to the appropriate source in the NCBI databases enabling readers to go directly to that source from the article.

Appendix 2.2: Plain English Summary

Title: Acceptance and Commitment Therapy for Depression after Psychosis: Autobiographical memory specificity and rumination as mechanisms of change

Background: Acceptance and Commitment Therapy (ACT) looks to reduce distress by decreasing unhelpful avoidance of distressing experiences and encouraging commitment to personal value-based behaviour. Research has suggested this is an effective intervention for depression after psychosis. However, there has been little research examining how ACT for depression after psychosis provides beneficial effects. Understanding how interventions work is a key step in the development of treatments. Such understanding allows those developing and using interventions to understand who may benefit from them and how these benefits can be maximised. It has been proposed that ACT may help those with depression after psychosis by reducing difficulties with autobiographical memory specificity and rumination. Autobiographical memory is the part of memory involved in the encoding, storage and recall of personally experienced events (Williams, 2007). Deficits in episodic memory may present as an overgeneral memory retrieval style. This is when an individual asked to recall a specific event avoids any spending much time trying to recall a memory as it could be a distressing experience. This will typically result in a very general description with no great detail. Overgeneral memory is recognised as a feature and possible maintaining factor in depressed mood. Rumination is the experience of repetitive, intrusive, and negative thoughts. Several theories and many studies have identified it as a key factor in maintaining depression.

Aims: The aim of the present study was examine whether improvements in autobiographical memory specificity and rumination may be two of the ways through which ACT has beneficial effects for those with depression after psychosis.

Participants: Participants who met criteria for depression after psychosis were randomly allocated to standard care or standard plus up to 5-months of ACT. Participants completed measures of depression, autobiographical memory specificity, and rumination at three time points: before intervention, post-intervention, and 5-months after the intervention. Depression was assessed using the Beck Depression Inventory (BDI) and the Calgary Depression Scale for Schizophrenia (CDSS). The BDI is a 21-

item self-report questionnaire. The CDSS is a 9-item observer rated questionnaire. The Autobiographical Memory Test (AMT) was used to measure autobiographical memory. For this, participants were asked to describe a specific personally experienced event in response to six positive and six negative cue words. Responses were coded as specific, overgeneral, or uninterpretable. The emotional tone of events recalled were recorded, as were response times. After all items were completed, participants were reminded of the events they recalled and asked to detail how they felt remembering these. The Ruminative Response Scale (RRS) was used to measure rumination. The RRS is a 10-item self-report questionnaire.

Results: Changes in depression were significantly associated with changes in both autobiographical memory specificity and rumination at post-intervention and follow-up. Cue word was found to significantly effect both the number of overgeneral memories recalled and the feeling evoked by memories recalled by all participants (regardless of group). Significantly, more overgeneral responses were recalled for negative than positive cue words. Similarly, significantly more negative feeling was evoked by negative than positive cue words. Further analysis found that for those in the ACT group, the negative feeling evoked by negative cue words was significantly reduced post-treatment.

Application: These findings suggest ACT may facilitate positive change for those experiencing depression after psychosis by reducing avoidance of distressing memories and improving ability to tolerate recollection and discussion of emotionally challenging events.

Key References:

Gumley, A., White, R., Briggs, A., Ford, I., Barry, S., Stewart, C., Beedie, S., Clarke, C., MacLeod, R., Lidstone, E., Nam, J., & McLeod, H.J. 2016. A parallel group randomised open blinded evaluation of Acceptance and Commitment Therapy for Depression After Psychosis: A Pilot Trial Protocol (ADAPT). *Psychosis*, 8(2), pp.143-155.

Hartley, S., Haddock, G., e Sa, D.V., Emsley, R. and Barrowclough, C., 2014. An experience sampling study of worry and rumination in psychosis. *Psychological Medicine*, 44(8), pp.1605-1614.

Warren, Z. and Haslam, C., 2007. Overgeneral memory for public and autobiographical events in depression and schizophrenia. *Cognitive Neuropsychiatry*, 12(4), pp.301-321.

Appendix 2.3: Major Research Project Proposal
Major Research Project Proposal

Matriculation Number: 2293000

Submission Date: 29/03/19

Word Count: 5186

Abstract

Background: There is a need to develop greater understanding of the mechanisms through which ACT interventions for depression in the context of psychosis may facilitate any potential positive effects. The importance of examining how interventions work has been highlighted as a key step in the development and evaluation of all complex interventions. Such research may provide crucial insight into issues relevant to optimising interventions and greater understanding the processes involved in the maintenance of depression in the context of psychosis. Decreased overgeneral autobiographical memory and rumination are candidate mechanisms of change.

Aims: The aim of the present study is to explore candidate mechanisms of therapeutic change in the context of a pilot trial of ACT for people with a diagnosis of schizophrenia who also meet diagnostic criteria for major depression. The study will examine relationships between acceptance, psychological flexibility, depression, overgeneral autobiographical memory, and rumination. Given that improvements in autobiographical memory functioning and rumination have been linked to recovery from depression, the study looked to examine the role of changes in these factors on outcome measures of depression across the course of an ACT intervention. Gumley, White, Briggs, Ford, Barry, Stewart, et al.,'s (2017) ACT for depression after psychosis (ADAPT) trial provides repeated measures data that allows such exploration of the change process in ACT for depression in the context of psychosis.

Method: Participants who met criteria for schizophrenia and major depression were randomly allocated to standard care or standard care plus up to 5 months of individual ACT. Primary outcomes administered on entry to the study (pre randomisation), at 5 months (post treatment), and at 10 month follow up included the Beck Depression Inventory, Calgary Depression Scale for Schizophrenia, the Kentucky Inventory of Mindfulness Skills, and the Acceptance and Action Questionnaire. Candidate mechanisms of change were assessed using Ruminative Response Scale and the Autobiographical Memory Test.

Application: This study will help provide insight into the role of candidate mechanisms of change in any beneficial effects of ACT for depression in the context of psychosis.

Such research may allow crucial insight into issues central to maximising intervention efficacy and greater understanding the processes involved in the development and maintenance of depression in the context of psychosis.

Depression has long been observed in psychosis (Barnes, Curson, Liddle, & Patel, 1989). This can occur before, during, and after an acute psychotic episode. It is debated whether depression in the context of psychosis reflect negative symptoms of schizophrenia or constitute a comorbid major depressive episode (Birchwood, Iqbal, Chadwick & Trower, 2000). An alternative line of thought is that depression may occur independently of symptoms of psychotic disorders and several months after recovery from an acute episode (e.g. Post-Psychotic Depression) (Birchwood et al., 2000).

Estimates of prevalence for depression in the context of psychosis have ranged from 33% to 75% (Upthegrove, 2009). Depression in the context of psychosis has been associated with poorer outcomes across numerous important areas including unemployment, treatment adherence, number of hospital admissions, and suicide (Sands & Harrow, 1999; Heiden, 2005; Upthegrove, 2009).

Several theories attempting to account for the onset of depression in the context of psychosis have been proposed. The 'intrinsic theory' suggests depression is a central feature of schizophrenia and should be evident during one or more stages of an acute psychotic episode (Hirsch & Jolly, 1989). Pharmacological theories have suggested that depression after psychosis may be related to antipsychotic drug-induced dysphoria (Cooper & Mullholland, 2000). Alternatively, it has been proposed that depression following an acute psychotic episode may be a psychological response to a seemingly uncontrollable life event and associated difficulties (Birchwood et al., 2000). Here, psychosis is a source of personal shame and represents an ominous threat to the social, interpersonal, and vocational prospects of those who have experienced it (Hacker, Stone, & MacBeth, 2015).

Psychological Interventions for Depression after Psychosis

Concerns have been expressed about the evidence base for psychological interventions for depression in the context of schizophrenia. There is considerable evidence for the use of cognitive-behavioural therapy (CBT) in the treatment of positive symptoms and

in reducing resistance to treatment in schizophrenia (Bighelli, Salanti, Huhn, Schneider-Thoma, Krause, Reitmeir, et al., 2018; Wykes, ., Reeder, Landau, Everitt, Knapp, Patel, & Romeo , 2007). However, concerns relating to a lack of randomised control trials and general methodological limitations in studies examined have also been highlighted (Hacker, Xia, Meaden, Irving, Zhao, et al., 2018; Jones, 2004). It has also been argued that the focus of research in this area has been on the efficacy of CBT without any great understanding of the mechanisms through which it may operate (Upthegrove, 2009). Additionally, CBT interventions specifically targeting depression in the context of schizophrenia have not been examined extensively (Birchwood et al., 2004; Upthegrove, 2009). For example, Birchwood et al.,'s (2004) review of cognitive approaches for depression and suicidal thinking in psychosis found no studies that included depression as a primary outcome measure This highlights an important point relating to the mechanisms of change through which interventions for depression in the context of psychosis may affect change. The measurement of depression as a distinct outcome in psychosis treatment trial studies is so rare that there is very little evidence about what mechanisms of change should be targeted in such approaches.

ACT for Depression after Psychosis

Acceptance and Commitment Therapy (ACT) has been proposed as a promising psychological intervention for depression after psychosis. ACT is a form of behavioural therapy that explicitly focuses on decreasing experiential avoidance. It aims to do this through the facilitation of strategies such as mindful acceptance and psychological flexibility, and by encouraging participants to engage in personal value-based behaviour (Bohlmeijer et al., 2011; Hayes, Strosahl, & Wilson, 1999). Several randomised control trials have provided support for ACT as an effective intervention for depression in non-psychotic populations (Hacker, Stone, MacBeth, 2015; Ost, 2008; Ruiz, 2012). Similarly, randomised control trials investigating ACT for psychosis in clinical populations have provided promising findings including improvements in affect and reductions in negative symptoms, distress associated with hallucinations, and rehospitalisation rates (Bach & Hayes, 2002; Guadiano & Herbert, 2006; White, Gumley, McTaggart, Rattrie, McConville, Cleare, & Mitchell, 2011). However, as with

CBT interventions, the mechanisms of change through which ACT interventions for depression, particularly in the context of psychosis, affect change are not fully understood.

ACT Mechanisms of Change

Although there has been support for the use of ACT to treat depression in the context of psychosis few studies have examined the potential mechanisms of change through which such interventions may have their effects. Examining potential mechanisms of change in treatments of depression in the context of psychosis is an important direction for future research. Indeed, the importance of examining how interventions work has been highlighted as a key step in the development and evaluation of all complex interventions (Craig, Dieppe, Macintyre, Michie, Nazareth, & Petticrew, 2008). Such analyses of the processes involved in the effects that interventions facilitate may allow crucial insight into issues central to maximising intervention efficacy – such as why an intervention is successful, unsuccessful, or has unintended consequences (Craig et al., 2008). Increasing emphasis is being placed on the need to develop causal models of psychological mechanisms implicated in mental health difficulties (Brown, Waite, & Freeman, 2019). It has been argued that repeated measures experimental designs where possible sources of change are manipulated, in order to examine their relationship with outcomes, are the gold standard. This is because they more effectively increase understanding of clinical phenomena and the interventions which target them by shedding light on mechanisms of change involved in this process (Brown et al., 2019). Gumley, White, Briggs, Ford, Barry, Stewart, et al.,'s (2017) ACT for depression after psychosis (ADAPT) trial provides repeated measures data that allows such exploration of the change process in ACT for depression in the context of psychosis.

ACT conceptualises psychological suffering as being largely caused by experiential avoidance, cognitive entanglement, and associated psychological rigidity (Bach & Hayes, 2002; Uptegrove, 2009). These difficulties are thought to impede ability to take behavioural steps consistent with personal values. ACT attempts to disrupt the unhelpful ways that people interact with their mind. These unhelpful ways may, for example, include treating memories and ideas as things to be fearful of and avoided, or persistently focussing on negative experiences and emotions (Bach & Hayes, 2002). It

has been posited that such a proclivity to avoid memories may in time become an over-learned maladaptive coping strategy that results in recognised phenomena such as an over-general autobiographical memory recall style (Sumner et al., 2010). Similarly, an increased tendency to focus thinking on negative experiences and emotions may be seen as characterising the phenomena of rumination. Both over-general autobiographical memory and rumination have been implicated in psychological distress (Querstret & Cropley, 2013; Sumner et al., 2010). As discussed above, there is evidence that ACT can help with psychological distress, including depression in the context of psychosis, however the mechanisms of change through beneficial effects are facilitated are not fully understood. Over-general autobiographical memory and rumination were selected as candidate mechanisms of change as they appear to have face validity, are currently under studied, and show some relationships with measures of ACT and depression (Querstret & Cropley, 2013; Sumner et al, 2010; van Vreeswijk & de Wilde, 2004; Williams, Barnhofer, Crane, Herman, Raes, Watkins, & Dalgleish, 2007).

Autobiographical Memory Specificity

Autobiographical memory is the part of memory involved in the recall of personally experienced past events (Williams, 2007). This includes personal semantic memory such as knowledge of personal facts (e.g. “the name of the secondary school I attended”) and episodic memory such as recall of a specific event (e.g. “my first day at secondary school”) (McLeod et al., 2007). Typically, semantic memory may be characterised as a portion of memory that is concerned with facts, ideas and concepts that are not necessarily drawn from personal experience. This contrasts with episodic memory where the memory trace will include information from personal experience such as the place, time, and people concerned (Williams, 2007).

Deficits in episodic memory may present as an overgeneral memory retrieval style. This is where an individual asked to recall an event with detail of a specific time and place instead gives an account of a non-discriminate extended event or a category of repeated events (McLeod et al., 2006; Warren & Haslam, 2007).

Overgeneral memory is recognised as a feature and possible maintaining factor in depressed mood. A number of different theories have been proposed for the overgeneral memory retrieval found in depressed individuals. Williams (1996), for example, proposed that the adverse emotional experience associated with recall of specific negative event-related information may result in a search being ended at the categorical descriptions level (Warren & Haslam, 2007). In this way, overgeneralised memory may constitute a form of emotional avoidance where a depressed individual avoids thinking about memories in great detail as this will often cause emotional distress. This would appear a maladaptive coping strategy as overgeneral memory has been significantly associated with difficulties implicated in the development and maintenance of depression, including poorer problem-solving and lessened ability to imagine future events (Evans, Williams, O’Loughlin, & Howells, 1992; Pollock & Williams, 2001; van Vreeswijk & de Wilde, 2004). It is possible that ACT may facilitate improvements in depression after psychosis by tackling factors implicated in its maintenance such as overgeneralised memory. ACT interventions may do this by allowing individuals with depression in the context of psychosis to develop the skills and experience necessary to access and tolerate unpleasant experiences including memories.

Although there is considerable evidence for overgeneral memory as a maintaining factor of depression there is still much to learn about how this process operates (Sumner et al., 2010). For example, it has been proposed that different types of episodic memory may be retrieved at different levels of specificity (Williams, 2007). Early research on the role of autobiographical memory in emotional disorder found support for memory retrieval performance being biased by current mood state – with individuals experiencing negative affect performing better when presented with negative cues (Clark & Teasdale, 1982; Lloyd & Lishman, 1975). It was commonly asserted that such a bias might contribute to the development and maintenance of depression (Williams, 2007). However, such research typically focussed on how quickly participants could recall positive or negative events rather than the specificity of accounts provided. Similarly, there is much to learn about how memory retrieval patterns change over time. Evidence suggests that individuals with depression, and schizophrenia, exhibit an overgeneral retrieval style for episodic memory but findings on the temporal gradient of this phenomena are inconsistent (McLeod et al., 2006; Williams, 2007). As early adulthood is usually the time of onset for psychotic

disorders, it has been asserted that difficulties with autobiographical memory may be reflective of disruption in the encoding and consolidation of memories during this time (Green et al., 2000; McLeod et al., 2006; Warren & Haslam, 2007; Schaefer, Giangrande, & Weinberger, 2013). However, some neurodevelopmental models of schizophrenia have suggested that cognitive impairments appear some time before the onset of symptoms (Harrison, 1997; Raedler, Knable, & Weinberger, 1998). In order to examine such points of contention, repeated measures data are needed - preferably in an experimental design where a possible source of change for memory retrieval style is being manipulated. In ACT, willingness to recall and tolerate unpleasant experiences including memories may be a key aspect of change. The ADAPT trial provides repeated measures data that allows exploration of the change process in light of the considerations above (Gumley et al., 2017).

Rumination

Rumination may also act as a mechanism of change in ACT interventions for depression after psychosis. Varying definitions of rumination centre around the conceptualisation of it as an experience of repetitive, intrusive, and negative cognitions (Querstet & Cropley, 2013). Several theories identify rumination as a key factor in the maintenance of depression. Nolen-Hoeksema (1985), for example, asserted that rumination contributes to the maintenance of depression by focussing individuals thinking on the causes and consequences of problems relating to their depressed state thus preventing problem solving. Several systematic and meta-analytic reviews have provided support for the positive association between rumination and depression (Morisson & O'Connor, 2008; Querstret & Cropley, 2013; Strauss et al., 2015).

More specifically, much research has identified rumination as a maintaining factor for depression (Lyubomirsky & Tkach, 2004; Morisson & O'Connor, 2008; Querstet & Cropley, 2013). It has also been positively associated with a number of other maintaining factors such as reduced problem solving and social withdrawal (Watkins & Moulds, 2005; Van Zalk & Tillfors, 2017). Furthermore, rumination has been related to increased persecutory delusions, the inception and persistence of paranoia, and

delusional ideation more generally, in individuals with psychotic disorders (Freeman & Garety, 1999; Freeman & Garety, 2003; Morrison & Wells, 2007; Startup, Freeman, & Garety, 2007).

Perhaps surprisingly, few studies have explicitly examined the role of rumination in relation to depression in the context of psychosis. However, Hartley, Haddock, Vasconcelos, Emsley, & Barrowclough (2014), found that rumination was significantly positively associated with the negative emotion elicited by delusional and hallucinatory experiences in a sample of 27 participants with a diagnosis of schizophrenia. It is therefore perhaps unsurprising it has been argued that interventions which look to reduce rumination may prove beneficial at reducing emotional distress related to psychosis (Jones & Fernyhough, 2009). In fact, it may be that this represents one of the key mechanisms through which any beneficial effects of ACT for individuals with depression in the context of psychosis are delivered. ACT may do this by allowing such individuals a greater capacity to observe and accept difficult experiences, including thoughts, without becoming too entangled in them as one may when ruminating. The ADAPT trial provides repeated measures data that allows exploration of such a potential change process (Gumley et al., 2016; Gumley et al., 2017).

In light of high estimates of prevalence and strong evidence for associated negative outcomes, it is clear that the development of effective interventions for depression in the context of psychosis are needed. With clear concerns around evidence supporting the pharmacological and psychological interventions most commonly used, it would seem ACT offers promising potential for research in this area. Indeed, preliminary evidence suggests ACT is acceptable to individuals experiencing depression in the context of psychosis and shows some promising findings in terms of treatment effectiveness. Larger scale studies are needed to examine this further however there is also a need to develop greater understanding of the mechanisms through which ACT interventions may facilitate any potential positive effects. Such research may allow crucial insight into issues central to maximising intervention efficacy and greater understanding the processes involved in the development and maintenance of depression in the context of psychosis. Overgeneral autobiographical memory and

rumination offer promise as candidate mechanisms of change. That they are currently under studied, appear to have face validity, and show some relationships with measures of ACT and depression, suggests they are appropriate potential mediators to examine.

Aims

The aim of the present study is to analyse the role of potential mechanisms of change (improvements in autobiographical memory specificity and decreased rumination) through which an ACT intervention for depression after psychosis may facilitate change. This will be examined through the analysis of an existing data set (Gumley et al., 2017).

The study will explore indications of possible trends in the relationship between mindful acceptance, psychological flexibility, overgeneral autobiographical memory, rumination, and depression. However, the primary aim of the study will be to explore any trends indicative of overgeneral autobiographical memory and or rumination acting as mechanisms of change for effects of the ACT intervention on depression after psychosis.

Plan of Investigation

Participants

Participants included inpatients or outpatients age 16 and over. Inclusion criteria include receiving anti-psychotic medication, psychiatric follow-up, and follow up from a secondary community-based mental health care service. Participants were also required to meet DSM-IV-TR criteria for schizophrenia and major depression. This was confirmed through use of the Structured Clinical Interview for DSM/ SCID-I and the Calgary Depression Scale for Schizophrenia (CDSS) (Addington, Addington, & Schissel, 1990).

Participants were assessed on all outcome measures on entry to the study (pre-randomisation), at 5 months (post-treatment), and 10 months (follow up).

Treatments

Acceptance and Commitment Therapy for depression after psychosis

Participants randomised to this treatment group received up to 5 months of individual ACT for depression after psychosis (ACTdp). ACTdp is based on the rationale that experience of psychosis can be a source of personal shame and represent an ominous threat to social, interpersonal, and vocational prospects (Gumley et al., 2016). The treatment can be split up into 3 phases. Phase 1 is used to facilitate engagement and formulation. Phase 2 primarily involves progressing with the ACT intervention. Phases 3 centres around looking to the future after the ACT intervention (Gumley et al., 2016).

Standard Care

The treatment received by all participants in the trial was examined to assess what constituted standard care (not including ACTdp) (Gumley et al., 2016).

Measures

Primary Outcomes

Depression

The Calgary Depression Scale for Schizophrenia (CDSS) (Addington, Addington, & Schissel, 1990). This 9-item measure assesses symptoms of depression. This measure helps address the potential for overlap between symptoms of depression, negative symptoms in schizophrenia, and extrapyramidal symptoms.

The Beck Depression Inventory (BDI-II) (Beck, Steer, & Brown, 1996) is a well-established 21-item measure of depression. It is considered to have strong levels of reliability and validity (Gumley et al., 2016).

ACT Skills

The Kentucky Inventory of Mindfulness Skills (KIMS) (Baer, Smith, Lykins, Button, Krietemeyer, Sauer, & Williams, 2004) and Acceptance and Action Questionnaire (AAQ-II) (Bond, Hayes, Carpenter, Guenole, Orcutt, & Zettle, 2011) was used to measure the key skills ACT therapy attempts to deliver – mindful acceptance and psychological flexibility, respectively.

The KIMS is a 39-item measure which looks to assesses four mindfulness skills: observing, describing, acting with awareness, and accepting without judgement. This has been shown to have good levels of consistency, reliability, and construct validity (Gumley et al., 2016).

The AAQ is a 7-item measure which looks to assess psychological flexibility. It has been shown to have satisfactory levels of reliability and validity (Gumley et al., 2016).

Candidate Mechanisms of Change

The Ruminative Response Scale (RRS) (Nolen et al., 1993) and Autobiographical Memory Test (AMT) (Williams & Broadbent, 1986) was used to assess rumination and autobiographical memory specificity, respectively.

The RRS is a 10-item measure of rumination. It has been identified as having good levels of reliability and internal consistency (Gumley et al., 2016).

The AMT is a measure of autobiographical memory including recall specificity. It has been identified as having good levels of reliability and construct validity (Ros, Romero, Ricarte, Serrano, Nieto, & Latorre, 2018).

Statistical Analysis

As a pilot study, analyses will be primarily descriptive and exploratory in nature. This will allow identification of any possible trends in the relationship between mindful scores for acceptance, psychological flexibility, overgeneral autobiographical memory, rumination, and depression.

Any potential mediation may then be explored using a multi-level mediation model. The study utilised a longitudinal design, where data collected pre randomisation, at 5 month follow up, and 10 month follow up were provided by the same participants in each group (ACT vs TAU). As the independence assumption should therefore be violated, conventional methods such as the ordinary least squares method, would not be appropriate for estimating the multilevel mediation model (Pan, Liu, Miao, & Yuan; 2018; Fritz & Mackinnon, 2007).

A distribution of products method would be utilised as these are generally considered to provide more power and require less computational load than other approaches used for longitudinal designs, such as bootstrapping or Sobel's method (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Pan et al., 2018).

Here, a multilevel mediation model would examine the extent to which candidate mechanisms of change (overgeneral autobiographical memory and rumination) mediate depression scores across all participants, in the lower level (i.e. measurement level). While examination of the higher level would focus on the extent to which candidate mechanisms of change (overgeneral autobiographical memory and rumination) and depression scores are affected by treatment group (ACT vs TAU). This would allow insight into whether the ACT intervention produces significantly better scores for overgeneralised autobiographical memory, rumination, and or depression outcomes than TAU – and crucially, for this study, whether mindfulness and psychological flexibility may act as mechanisms of change through which any beneficial effects for the ACT group were facilitated. Further advice around data analysis may be sought from the Robertson Centre for Biostatistics.

Ethical Issues

Ethical approval was granted by the West of Scotland Research Ethics Committee and NHS Greater Glasgow and Clyde (Gumley et al., 2016).

Financial Issues

As the study involves analysis of an existing data set, no financial costs are expected.

Timetable

March 2019: Major research project proposal draft to be submitted.

April 2019: Major research project proposal to be reviewed, amended, and submitted to academic reviewer.

May – June 2019: Data analysis and write up.

Practical Applications

Depression is one of the major contributors to poorer quality of life with psychosis and schizophrenia. It may not always be possible, or helpful, to remove the challenges presented by living with psychosis. However, helping individuals develop skills in managing difficult experiences and live in a way that is consistent with their personal values may help reduce distress and improve quality of life. Early evidence suggests ACT may offer such benefits to those experiencing depression in the context of psychosis. However, research in this area is in its infancy and would particularly benefit from a greater understanding of the mechanisms through which any positive effects of

ACT interventions are facilitated. Such research may allow crucial insight into issues central to maximising intervention efficacy and greater understanding the processes involved in the development and maintenance of depression in the context of psychosis.

References

- Addington, D., Addington, J. and Schissel, B., 1990. A depression rating scale for schizophrenics. *Schizophrenia Research*, 3(4), pp.247-251.
- Anderson, S.J. and Conway, M.A., 1993. Investigating the structure of autobiographical memories. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 19(5), p.1178.
- Bach, P. and Hayes, S.C., 2002. The use of acceptance and commitment therapy to prevent the rehospitalization of psychotic patients: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 70(5), p.1129.
- Baer, R.A., Smith, G.T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D. and Williams, J.M.G., 2008. Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment*, 15(3), pp.329-342.
- Baron, R.M. and Kenny, D.A., 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), p.1173.
- Beck, A.T., Steer, R.A. and Brown, G.K., 1996. Beck depression inventory-II. *San Antonio*, 78(2), pp.490-498.
- Bighelli, I., Salanti, G., Huhn, M., Schneider-Thoma, J., Krause, M., Reitmeir, C., Wallis, S., Schwermann, F., Pitschel-Walz, G., Barbui, C. & Furukawa, T. A. (2018). Psychological interventions to reduce positive symptoms in schizophrenia: systematic review and network meta-analysis. *World psychiatry*, 17(3), 316-329.

Birchwood, M., Iqbal, Z., Chadwick, P. and Trower, P., 2000. Cognitive approach to depression and suicidal thinking in psychosis: I. Ontogeny of post-psychotic depression. *The British Journal of Psychiatry*, 177(6), pp.516-521.

Bohlmeijer, E.T., Fledderus, M., Rokx, T.A.J.J. and Pieterse, M.E., 2011. Efficacy of an early intervention based on acceptance and commitment therapy for adults with depressive symptomatology: Evaluation in a randomized controlled trial. *Behaviour Research and Therapy*, 49(1), pp.62-67.

Bond, F.W., Hayes, S.C., Baer, R.A., Carpenter, K.M., Guenole, N., Orcutt, H.K., Waltz, T. and Zettle, R.D., 2011. Preliminary psychometric properties of the Acceptance and Action Questionnaire–II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy*, 42(4), pp.676-688.

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I. and Petticrew, M., 2008. Developing and evaluating complex interventions: the new Medical Research Council guidance. *British Medical Journal*, 337, p.a1655.

Evans, J., Williams, J.M.G., O'loughlin, S. and Howells, K., 1992. Autobiographical memory and problem-solving strategies of parasuicide patients. *Psychological medicine*, 22(2), pp.399-405.

Falloon, I.R., 2000. Problem solving as a core strategy in the prevention of schizophrenia and other mental disorders. *Australian and New Zealand Journal of Psychiatry*, 34(sup2), pp.S185-S190.

Freeman, D. and Garety, P.A., 1999. Worry, worry processes and dimensions of delusions: an exploratory investigation of a role for anxiety processes in the maintenance of delusional distress. *Behavioural and Cognitive Psychotherapy*, 27(1), pp.47-62.

Freeman, D. and Garety, P.A., 2003. Connecting neurosis and psychosis: the direct influence of emotion on delusions and hallucinations. *Behaviour Research and Therapy*, 41(8), pp.923-947.

- Fritz, M.S. and MacKinnon, D.P., 2007. Required sample size to detect the mediated effect. *Psychological science*, 18(3), pp.233-239.
- Gaudino, B.A. and Herbert, J.D., 2006. Acute treatment of inpatients with psychotic symptoms using acceptance and commitment therapy: Pilot results. *Behaviour Research and Therapy*, 44(3), pp.415-437.
- Green, M.F., Kern, R.S., Braff, D.L. and Mintz, J., 2000. Neurocognitive deficits and functional outcome in schizophrenia: are we measuring the “right stuff”? *Schizophrenia Bulletin*, 26(1), pp.119-136.
- Gumley, A., White, R., Briggs, A., Ford, I., Barry, S., Stewart, C., Beedie, S., Clarke, C., MacLeod, R., Lidstone, E., Nam, J., & McLeod, H.J. 2016. A parallel group randomised open blinded evaluation of Acceptance and Commitment Therapy for Depression After Psychosis: A Pilot Trial Protocol (ADAPT). *Psychosis*, 8(2), pp.143-155.
- Harrison, P.J., 1997. Schizophrenia: a disorder of neurodevelopment?. *Current opinion in neurobiology*, 7(2), pp.285-289.
- Häfner, H., Maurer, K., Trendler, G., an der Heiden, W. and Schmidt, M., 2005. The early course of schizophrenia and depression. *European Archives of Psychiatry and Clinical Neuroscience*, 255(3), pp.167-173.
- Hayes, S.C., Luoma, J.B., Bond, F.W., Masuda, A. and Lillis, J., 2006. Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, 44(1), pp.1-25.
- Hayes, S.C., Strosahl, K. and Wilson, K.G., 1999. Acceptance and commitment therapy: Understanding and treating human suffering. *New York: Guilford*.
- Jones, C., Hacker, D., Cormac, I., Meaden, A. and Irving, C.B., 2012. Cognitive behavioural therapy versus other psychosocial treatments for schizophrenia. *Cochrane Database of Systematic Reviews*, (4).

- Jones, S.R. and Fernyhough, C., 2009. Rumination, reflection, intrusive thoughts, and hallucination-proneness: towards a new model. *Behaviour Research and Therapy*, 47(1), pp.54-59.
- Kuyken, W. and Dalgleish, T., 1995. Autobiographical memory and depression. *British Journal of Clinical Psychology*, 34(1), pp.89-92.
- MacKinnon, D.P., Lockwood, C.M., Hoffman, J.M., West, S.G. and Sheets, V., 2002. A comparison of methods to test mediation and other intervening variable effects. *Psychological methods*, 7(1), p.83
- McLeod, H.J., Wood, N. and Brewin, C.R., 2006. Autobiographical memory deficits in schizophrenia. *Cognition and Emotion*, 20(3-4), pp.536-547.
- Morrison, R. and O'Connor, R.C., 2008. A systematic review of the relationship between rumination and suicidality. *Suicide and Life-Threatening Behavior*, 38(5), pp.523-538.
- Morrison, A.P. and Wells, A., 2007. Relationships between worry, psychotic experiences and emotional distress in patients with schizophrenia spectrum diagnoses and comparisons with anxious and non-patient groups. *Behaviour Research and Therapy*, 45(7), pp.1593-1600.
- Mulholland, C. and Cooper, S., 2000. The symptom of depression in schizophrenia and its management. *Advances in Psychiatric Treatment*, 6(3), pp.169-177.
- Nelson, K., 2003. Self and social functions: Individual autobiographical memory and collective narrative. *Memory*, 11(2), pp.125-136.
- Öst, L.G., 2008. Efficacy of the third wave of behavioral therapies: A systematic review and meta-analysis. *Behaviour Research and Therapy*, 46(3), pp.296-321.
- Pan, H., Liu, S., Miao, D. and Yuan, Y., 2018. Sample size determination for mediation analysis of longitudinal data. *BMC medical research methodology*, 18(1), p.32.

Pollock, L.R. and Williams, J.M.G., 2001. Effective problem solving in suicide attempters depends on specific autobiographical recall. *Suicide and Life-Threatening Behavior*, 31(4), pp.386-396.

Preacher, K.J. and Hayes, A.F., 2008. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), pp.879-891.

Querstret, D. and Cropley, M., 2013. Assessing treatments used to reduce rumination and/or worry: A systematic review. *Clinical Psychology Review*, 33(8), pp.996-1009.

Raedler, T.J., Knable, M.B. and Weinberger, D.R., 1998. Schizophrenia as a developmental disorder of the cerebral cortex. *Current opinion in neurobiology*, 8(1), pp.157-161

Ros, L., Romero, D., Ricarte, J.J., Serrano, J.P., Nieto, M. and Latorre, J.M., 2018. Measurement of overgeneral autobiographical memory: Psychometric properties of the autobiographical memory test in young and older populations. *PloS one*, 13(4), p.e0196073.

Sands, J.R. and Harrow, M., 1999. Depression during the longitudinal course of schizophrenia. *Schizophrenia Bulletin*, 25(1), pp.157-172.

Schaefer, J., Giangrande, E., Weinberger, D.R. and Dickinson, D., 2013. The global cognitive impairment in schizophrenia: consistent over decades and around the world. *Schizophrenia research*, 150(1), pp.42-50.

Staring, A.B.P., Van der Gaag, M., Van den Berge, M., Duivenvoorden, H.J. and Mulder, C.L., 2009. Stigma moderates the associations of insight with depressed mood, low self-esteem, and low quality of life in patients with schizophrenia spectrum disorders. *Schizophrenia Research*, 115(2-3), pp.363-369.

Startup, H., Freeman, D. and Garety, P.A., 2007. Persecutory delusions and catastrophic worry in psychosis: developing the understanding of delusion distress and persistence. *Behaviour Research and Therapy*, 45(3), pp.523-537.

Strauss, C., Thomas, N. and Hayward, M., 2015. Can we respond mindfully to distressing voices? A systematic review of evidence for engagement, acceptability, effectiveness and mechanisms of change for mindfulness-based interventions for people distressed by hearing voices. *Frontiers in Psychology*, 6, p.1154.

Sumner, J.A., Griffith, J.W. and Mineka, S., 2010. Overgeneral autobiographical memory as a predictor of the course of depression: a meta-analysis. *Behaviour Research and Therapy*, 48(7), pp.614-625.

Upthegrove, R., 2009. Depression in schizophrenia and early psychosis: implications for assessment and treatment. *Advances in Psychiatric Treatment*, 15(5), pp.372-379.

Van Putten, T. and May, P.R., 1978. 'Akinetic depression' in schizophrenia. *Archives of General Psychiatry*, 35(9), pp.1101-1107.

van Vreeswijk, M.F. and de Wilde, E.J., 2004. Autobiographical memory specificity, psychopathology, depressed mood and the use of the Autobiographical Memory Test: A meta-analysis. *Behaviour Research and Therapy*, 42(6), pp.731-743.

Van Zalk, N. and Tillfors, M., 2017. Co-rumination buffers the link between social anxiety and depressive symptoms in early adolescence. *Child and Adolescent Psychiatry and Mental Health*, 11(1), p.41

Warren, Z. and Haslam, C., 2007. Overgeneral memory for public and autobiographical events in depression and schizophrenia. *Cognitive Neuropsychiatry*, 12(4), pp.301-321.

Watkins, E.D. and Moulds, M., 2005. Distinct modes of ruminative self-focus: impact of abstract versus concrete rumination on problem solving in depression. *Emotion*, 5(3), p.319.

White, R., Gumley, A., McTaggart, J., Rattrie, L., McConville, D., Cleare, S. and Mitchell, G., 2011. A feasibility study of Acceptance and Commitment Therapy for emotional dysfunction following psychosis. *Behaviour Research and Therapy*, 49(12), pp.901-907.

White, R.G., Gumley, A.I., McTaggart, J., Rattrie, L., McConville, D., Cleare, S., McLeod, H.J. and Mitchell, G., 2015. Acceptance and Commitment Therapy for depression following psychosis: An examination of clinically significant change. *Journal of Contextual Behavioral Science*, 4(3), pp.203-209.

Whitehead, C., Moss, S., Cardno, A., Lewis, G. and Furtado, V.A., 2002. Antidepressants for people with both schizophrenia and depression. *Cochrane Database of Systematic Reviews*, (2).

Williams, J.M. and Broadbent, K., 1986. Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology*, 95(2), p.144.

Williams, J.M.G. and Scott, J., 1988. Autobiographical memory in depression. *Psychological Medicine*, 18(3), pp.689-695.

Williams, J.M.G., Barnhofer, T., Crane, C., Herman, D., Raes, F., Watkins, E. and Dalgleish, T., 2007. Autobiographical memory specificity and emotional disorder. *Psychological Bulletin*, 133(1), p.122.

Wykes, T., Reeder, C., Landau, S., Everitt, B., Knapp, M., Patel, A. and Romeo, R., 2007. Cognitive remediation therapy in schizophrenia: randomised controlled trial. *The British Journal of Psychiatry*, 190(5), pp.421-427.