Doctorate in Clinical Psychology

Psychosis and Savouring

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Introductory Chapter: Thesis Overview

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Thesis Overview

Background

This thesis examines savouring in people experiencing psychosis. Savouring involves the mental rehearsal of past, present and future positive experiences to intensify positive emotion (Bryant & Veroff, 2007; Addis, Wong & Schacter, 2007). The positive symptoms of psychosis, such as unusual perceptual experiences or beliefs, are often accompanied by negative symptoms that include reduced emotional expression and decreased motivated activity (Strauss, 2013). Attenuated positive and negative symptom traits, known as positive and negative schizotypy, are notable in the general population, and provide evidence that psychotic phenomena may exist on a continuum with ordinary human experiences, rather than separately within a 'discrete disease model' (Shevlin, McElroy, Bentall, Reininghaus & Murphy, 2017).

People experiencing negative symptoms and those rating highly on measures of negative schizotypy report that they savour positive events in the past, present and future less often than unaffected control participants, and this relationship has been associated with reduced goal-directed activity (Applegate, El-Deredy & Bentall, 2009; 2014; Cassar, Applegate & Bentall, 2013). These groups may savour less due to cognitive difficulties, (Gard, Kring, Gard, Horan, & Green, 2007; Strauss, 2013) or because, according to social defeat theory, it may not feel socially safe to express positive emotion (White, Laithewaite & Gilbert, 2013). This thesis therefore aims to address three research questions; 1) what is currently known about savouring in psychosis; 2) could fear of positive emotion and lack of social safeness underpin reduced savouring; and 3) how could psychological interventions for negative symptoms be enhanced if the current findings are replicated in a clinical sample.

Research rationale

Psychosis is estimated to affect 21 million people worldwide (World Health Organisation, WHO, 2018). A previous systematic review suggests that 15-20% of those experiencing psychosis will report negative symptoms (Buchanan, 2007). Thus, negative symptoms not only affect a vast number of people but they also represent a significant public health challenge, and a serious unmet health need for those who experience them because, as yet no fully effective treatment has been identified (Fusar-Poli et al., 2015). People experiencing psychosis, and their relatives, report that negative symptoms are particularly difficult to cope with, as changes to motivation, energy and functioning levels contrast starkly with prior capabilities (Rabinowitz, Berardo, Bugarski-Kirola & Marder, 2013; Mairs, 2017).

Whilst positive symptoms might cause more noticeable changes in behaviour initially, it is the negative symptoms that often prevent participation in fulfilling activities such as employment, education and relationships (Snyder, Gur & Wasmer-Andrews, 2007). Negative symptoms are more strongly associated with poorer quality of life and lower social and occupational functioning than positive symptoms (Rabinowitz et al., 2012). Negative symptoms may be further exacerbated by extrapyramidal side effects, substance misuse, social withdrawal (due to increasing suspiciousness), and reactive low mood (Carpenter, Heinrichs & Wagman, 1988).

A large scale, two-year follow-up study of people experiencing psychosis (N = 7678) found that identification of two or more negative symptoms at baseline was associated with increased likelihood of one or more readmissions, that lasted for an extended period of time (Patel et al, 2015). Whilst specialised psychosocial treatments for negative symptoms exist, and include cognitive-behavioural, activity-based and integrated interventions, (Mairs, 2017) all treatments have thus far proven to lack clinical effectiveness (Fusar-Poli et al., 2015).

A meta-analysis of 34 randomised controlled trials (RCTs) of Cognitive Behaviour Therapy for psychosis (CBTp) found a small effect size of CBTp on negative symptoms (.21) and only two interventions were specifically designed to target negative symptoms (Wykes, Steel, Everitt, & Tarrier, 2008). A more recent meta-analysis of 168 RCTs testing a wide range of pharmacological and psychosocial interventions for negative symptoms, found that whilst some trials reported statistically significant effects on symptoms, no treatments translated into clinically meaningful outcomes, such as improved quality of life or functioning (Fusar-Poli et al., 2015).

Therefore, better targeted, better evidenced and more clinically meaningful interventions are needed. The last major call for action to improve treatments for negative symptoms in the research community was led by the NIMH-MATRICS consensus group in 2006 (Kirkpatrick, Fenton, Carpenter & Marder, 2006). Thus it is necessary for renewed efforts to be made and it is hoped that this thesis will stimulate new research that enhances functioning, well-being and hope in people experiencing negative symptoms.

Theoretical stance

There is considerable disagreement about the aetiology of psychosis. The biomedical model remains dominant despite significant shortcomings relating to problems with conceptual reliability and validity (Read, Mosher & Bentall, 2004; Bentall et al., 2014). Furthermore, biomedical theories of psychosis fail to account for the psychological impact of social inequality, societal attitudes, early childhood adversity, attachment and trauma difficulties that may have led up to a person mistrusting others and socially withdrawing (Read, Bentall, & Fosse, 2009; Berry, Varese & Bucci, 2017; Kolbert, 2018).

The author conceptualises psychosis as an understandable human response following distress or trauma, in which unusual sensory experiences (for example hearing voices) and

unusual beliefs that provide meaning, may emerge (Beavan, Read & Cartwright, 2011; Bentall et al., 2014). The Hearing Voices Network (HVN, 2018) and Open Dialogue Movement (Seikkula & Olsen, 2003; Buus et al., 2017) acknowledge that psychotic experiences range from those that might cause distress and attract attention from mental health services (e.g. derogatory voice hearing) to those that might never cause distress or prompt service contact, (e.g. positive voice hearing or magical ideation), Romme & Escher, 1989.

The conceptualisation of psychosis matters as it affects public understanding and can drive stigma, which is known to increase distress and reduce the likelihood that a person will access treatment (Gronholm, Thornicroft, Laurens, & Evans-Lacko, 2017). Given the weight of evidence, the author views the continuum or spectrum approach to investigating individual symptoms of psychosis as more scientifically meaningful than categorical disease models or syndromes (Shevlin et al., 2017). As such, measures that attempt to delineate positive from negative symptoms may be applying a false dichotomy to what is unlikely to be conceptually clear-cut (Bentall et al., 2014).

In addition to issues with scientific validity, there are ethical ramifications of maintaining the pretence that a 'mythical', unambiguous, discrete disease taxonomy will emerge leading to enhanced treatment, as therapeutically helpful treatment options are potentially being delayed or overlooked (Bentall et al., 2014). The use of biomedical language may also be maintaining the professional and public view that psychosis is a 'mental illness' and may be proliferating the use of stigmatising labels, such as 'schizophrenia' and 'schizoaffective disorder' (Vass et al., 2015).

Despite these observations, much of the evidence presented in the current thesis has been attached to the theoretical notion that positive and negative symptoms are entirely

distinct, with the area most broadly associated with a lack of savouring being negative symptoms. This is acknowledged as a limitation of the current work. Where possible the author has strived to return to the psychological processes that underpin phenomenological experiences.

Non-biomedical theories of negative symptoms have highlighted the role of specific cognitive, affective, behavioural, and socio-environmental factors (Shevlin et al., 2017). Depleted social power, self-protective social withdrawal, internalised stigma, (Campellone, Caponigro & Kring, 2014), loss of hope, demoralisation (Lysaker, Vohs & Tsai, 2009), faulty beliefs about task performance (Rector, Beck & Stolar, 2005) and reduced anticipatory enjoyment (Gard et al., 2007) have emerged as strong potential vulnerability factors contributing to the development and maintenance of negative symptoms.

The two main psychological models of negative symptoms include the anticipatory pleasure model (Gard et al., 2007) and the cognitive model (Rector, Beck & Stolar, 2005). The cognitive model highlights the role of mediating defeatist beliefs on task initiation, performance and persistence (Grant & Beck, 2008). Low expectations of enjoyment, success, personal resources and acceptance by others are proposed to maintain negative symptoms (Grant et al., 2005; Grant, Huh, Perivoliotis, Stolar & Beck, 2012). The anticipatory pleasure model, (Gard et al., 2007) delineates poor remembered and predicted enjoyment from intact present moment pleasure, suggesting that negative symptoms emerge due to an inability to translate past positive experiences into future motivated action (Kring & Caponigro, 2010; Kring & Barch, 2014). The studies described in the current thesis complement these theories.

Chapter outline

Two chapters are presented. Chapter one presents a systematic review and narrative synthesis of available data regarding savouring in psychosis and high schizotypy populations.

It was written for publication in Frontiers in Psychology. The chapter is novel because, whilst systematic reviews of positive psychology interventions (PPIs) have previously been published (Schrank, 2014b), no systematic review to date has focused on savouring in psychosis. The study uses a prescribed and transparent methodology to address four study aims: to 1) examine the relationship between savouring and psychosis; 2. highlight hypothesised reasons for differences in savouring behaviour; 3. evaluate the feasibility, acceptability, safety and effectiveness of existing savouring interventions and; 4. assess the quality of prior research. The study found consistent negative associations between savouring and psychosis, speculating that this could be due to reduced anticipatory pleasure, poor affective-cognitive control and a psychological preference not to broaden-and-build positive emotion through 'functional avoidance' of savouring.

Chapters one and two are connected because chapter two tests a 'functional avoidance' route to reduced savouring in people rating highly in negative schizotypy that was outlined in chapter one. Chapter two presents an online, cross-sectional self-report empirical study that tested relationships between negative schizotypy, social safeness, fear of positive emotion, preference for type of positive affect, and use of savouring, dampening and other emotion regulation strategies. The chapter was written for publication in the Journal of Abnormal Psychology. The chapter highlights two factors that could be maintaining negative symptoms and preventing other psychosocial interventions from being effective, if replicated in a clinical sample, which include fear of positive emotion and social safeness. The chapter progresses to suggest that these vulnerabilities may be alleviated through use of a social safeness or compassionate mind intervention prior to enhancing savouring skills. If these findings are replicated in a clinical sample, then the current study provides important implications for clinical treatment.

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Chapter One: Systematic Review

Psychosis and savouring:

A systematic review of the literature[1]

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[1] Article prepared in British English for submission to Frontiers in Psychology journal for peer review. Please see Appendix A for a copy of the journal guidelines for authors.

Abstract

Savouring interventions could increase positive emotion and motivated activity in people experiencing psychosis. This systematic review and narrative synthesis aimed to: 1. examine the relationship between savouring and psychosis; 2. highlight hypothesised reasons for differences in savouring behaviour; 3. evaluate the feasibility, acceptability, safety and effectiveness of existing savouring interventions and; 4. assess the quality of prior research. A systematic search conducted in October 2017, using the search terms savo* AND schizo* OR psycho*, identified 2179 eligible records from 12 databases (Google Scholar, Science Direct, PUBMED, PsychInfo, CINNAHL, MEDLINE, Scopus, Web of Science, Ethos, Proquest, OATD and the Cochrane Library Electronic database). Thirty data sources meeting inclusion criteria were appraised using the Quality Assessment Tool for reviewing Studies with Diverse Designs (QATSDD) and reported according to PRISMA-P guidelines.

Findings indicated: 1. consistent negative associations between savouring and psychosis, although experimental control varied between studies; 2. the hypothesised reasons for decreased savouring included reduced anticipatory pleasure, poor affective-cognitive control and a psychological preference not to broaden-and-build positive emotion; 3. participants safely engaged in a variety of savouring interventions that differed in effectiveness, but it was difficult to isolate the effects of savouring alone, because exercises were frequently combined with other positive psychology interventions; 4. there were considerable limitations to the current research and a greater number of controlled trials are needed before reliable conclusions can be drawn.

Keywords: Psychosis, Schizotypy, Savouring, Positive Psychology, Systematic Review

Introduction

People experiencing psychosis typically report positive and negative symptoms accompanied by changes in mood and thinking skills (British Psychological Society, 2017). Negative symptoms include reduced enjoyment, motivation, energy and social drive, and restricted emotional experience (Mairs, 2017). Positive symptoms consist of unusual perceptual experiences, for example hearing voices, seeing visions, smelling or tasting unusual things, or feeling tactile or gustatory sensations, (known psychiatrically as 'hallucinations'), and, unusual beliefs, ('delusions') such as suspicious, persecutory or grandiose thoughts (Best & Bowie, 2017). The lifetime likelihood of experiencing psychosis is approximately 1-2% (Perälä et al., 2007) but 5-8% of the general population report psychosis-like experiences, (PLEs) so it is probable that psychosis exists on a continuum (van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009) of which sub-clinical, attenuated positive and negative signs, known as negative or positive schizotypy, are less severe expressions of a broader spectrum of experiences (Carrigan & Barkus, 2017).

People experiencing negative symptoms and those rating highly on measures of negative schizotypy report that they savour positive events in the past, present and future less often than unaffected control participants and this relationship is associated with reduced goal-directed behaviour (Applegate, El-Deredy & Bentall, 2009; 2014; Cassar, Applegate & Bentall, 2013). Savouring involves the mental rehearsal of positive experiences through the use of memory processes to generate mental imagery (Bryant & Veroff, 2007; Addis, Wong & Schacter, 2007). Savouring is understood to: improve recall of past positive events; develop ability to envision future positive events; enhance the emotional salience of prospective events and help embed a framework for translating previous experiences into motivated action, thus enhancing goal-pursuit (Bryant & Veroff, 2007).

Consequently, people experiencing psychosis find it difficult to imagine future positive events coherently (Raffard, Esposito, Boulenger & Van der Linden, 2013) and use fewer words to describe positive experiences in the past, present and future (Applegate, 2011; Applegate et al., 2014) relative to unaffected control participants. Previous interventions influencing positive and negative mental imagery have successfully improved functioning and resilience, and reduced distress and negative cognitions in people experiencing low mood (Pictet, Coughtrey, Mathews & Holmes, 2011). Thus people experiencing psychosis may benefit from a guided imagery intervention that promotes savouring.

There is a strong need to develop new psychological interventions for negative symptoms due to the lack of current effective treatments. Negative symptoms are associated with poorer quality of life and prognosis than positive symptoms (Ventura, Wood & Hellemann, 2013) and greater carer distress (Stahl & Buckley, 2007). There are no pharmacological treatments currently licensed to treat negative symptoms (Sarkar, Hillner & Velligan, 2015) and whilst specialised psychological interventions exist, treatment effect sizes are modest (Fusar-Poli et al., 2015; Remington et al., 2016). A large proportion of people discontinue treatment due to medication side effects or therapy inaccessibility (Dixon, Holoshitz & Nossel, 2016).

In terms of aetiological understanding, overreliance on the biomedical model of psychosis has diminished attention from investigating psychosocial factors (Read, van Os, Morrison & Ross, 2005). The rate of trauma and adversity in populations reporting psychosis is high (up to 85%; Holowka, King, Saheb, Pukall & Brunet, 2003) and trauma may be a more powerful predictor of psychosis than genetic transmission alone (Varese et al., 2012). Trauma and psychosis are consistently associated, there is a dose-dependent relationship and different types of trauma associate with specific symptoms (Hardy, 2017). Harrison and

Fowler (2004) reported that people experiencing psychosis who avoided traumatic psychosis-related memories had more negative symptoms and retrieved fewer specific autobiographical memories, than other participants experiencing psychosis in the same sample. They proposed that negative symptoms might emerge as a reaction to traumatic events.

If trauma does play a causal role in the development of both positive and negative symptoms, then repetitive exposure to prior threatening experiences might well alter cognitive appraisals of positive (as well as negative) events and expression of positive emotion. It was initially thought that people experiencing negative symptoms felt less positive emotion in reaction to ordinarily positive emotional stimuli, although now it is understood that this group experience comparable, or more emotion, than control groups but do not display this emotion externally (Cohen & Minor, 2010). In relation to negative symptoms, people may display less emotion and savour less to avoid promoting further experiences involving positive emotion.

The cognitive behavioural model of negative symptoms (Rector, Beck & Stolar, 2005) highlights reduced expectancies of pleasure as a significant factor in the development and maintenance of negative symptoms; although, research so far has tended to focus on barriers to motivated activity, e.g. defeatist beliefs, rather than ways to reinforce motivated activity through experiential enhancement. A small number of studies have measured savouring or trialled savouring interventions in populations experiencing psychosis, but several pertinent clinical questions remain, such as, what is known about the nature of the relationship between savouring and psychosis; what might cause changes in savouring behaviour in this population; are current savouring interventions safe, feasible, acceptable and effective; and, based on the evidence so far, which areas of understanding require further investigation.

Other systematic reviews have summarised the impact of Positive Psychology Interventions (PPIs) on psychosis (e.g. Schrank, 2014b) but no systematic review to date has specifically focussed on savouring. One study found that people experiencing psychosis view savouring exercises as more enjoyable and engaging than other types of PPIs (Brownell, Schrank, Jakaite, Larkin & Slade, 2015). Hence, there are several reasons why it might be important to conduct a systematic review in this area. This systematic review has four aims: to 1. examine the relationship between savouring and psychosis; 2. highlight hypothesised reasons for differences in savouring behaviour; 3. evaluate the feasibility, acceptability, safety and effectiveness of existing savouring interventions and; 4. assess the quality of prior research.

Method

A systematic search was conducted in October 2017. Findings were reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P; Moher et al., 2015). The review followed an a priori critical evaluation plan that was registered on PROSPERO (registration number: CRD42017079309) and EA kept a search log. The review was implemented in three stages: 1) scoping searches to refine key search terms; 2) database searches and extraction and; 3) quality appraisal.

Studies were included if they: 1) described an intervention involving the act of mentally rehearsing positive experiences in the past, present or future (savouring) with the purpose of inducing positive mood, increasing activity, improving positive psychology outcomes (e.g. well-being, empowerment, or hope) or decreasing symptoms, or; 2) measured savouring using a valid instrument or; 3) described a theoretical model of savouring within a population of whom at least 70% reported psychosis or schizotypy. All quantitative (prospective, retrospective, cross-sectional and case-control) and qualitative studies were

included. Studies of people under age 18 or diagnosed with 'bipolar disorder' were excluded. Bipolar disorder was viewed as conceptually different. Government reports, policy statements, non-peer reviewed research reports, magazines, newsletters, bulletins, presentations and fact sheets were excluded.

Search term selection

'Savouring' was defined as the use of cognitive and behavioural strategies intended to increase the frequency, intensity, duration and appreciation of positive experiences and emotions (Bryant & Veroff, 2007). 'Psychosis' population was defined as any group reporting positive or negative symptoms or schizotypy, to capture a broad spectrum of experiences. Key search terms were identified by examining controlled vocabulary lists in databases, (e.g. MeSH terms https://meshb.nlm.nih.gov/search). Truncated search terms capturing multiple diagnoses or symptoms, and non-UK spellings of search terms were considered (see Appendix B).

Test searches showed that individual symptom or symptom cluster search terms, (e.g. 'anhedonia' or 'negative symptoms') decreased search sensitivity by capturing depression and dementia data, and yielded no additional relevant data sources beyond those identified using 'psychosis' and 'schizophrenia'. Alternative search terms for savouring, were deliberated but excluded because they identified study interventions that did not consistently aim to upregulate mood (see Appendix B). Whilst some authors have likened savouring the present moment to being mindful, others disagree. Niemiec, (2014; Niemiec & Lissing, 2016) suggests that these practices differ because, whilst they both require the user to attend to sensory information, mindfulness promotes non-judgmental receptiveness whereas savouring promotes a more restrictive focus on internal and external experiences relating to positive affect only (Bryant & Veroff, 2007). Thus, savouring was viewed as a narrower concept than

mindfulness, and mindfulness was excluded as a search term. After completing all scoping searches the final search terms were: (Savo*) AND (Psycho* OR Schizo*).

Search strategy

All scoping, database and hand searches were carried out by EA. The same search strategy was used for each database with minor technical alterations made to accommodate database interface. Due to the anticipated sparsity of available literature, it was decided that data from multiple sources would be included. Peer-reviewed journal articles, books, ebooks, chapters, published abstracts, reviews, conference materials and theses were admissible. Publication period was broad (1900 to 16/10/17). Sources written in non-English language were excluded due to a lack of access to reliable translation facilities.

Database selection

Early searches demonstrated that the following nine databases yielded the greatest number of results: Google Scholar, Science Direct, PUBMED, PsychInfo, Cumulative Index of Nursing and Allied Health Literature (CINAHL Plus), Medical Literature Analysis and Retrieval System Online (MEDLINE / PubMed), Scopus, Web of Science and the Cochrane Library Electronic database. Attempts to identify grey literature were made by including searches for unpublished dissertations on the British Library's Electronic Thesis Online Service (Ethos), ProQuest, Open Access Thesis and Dissertations (OATD). Supplementary hand searches and reference list checks were carried out after initial data extraction. Authors of selected articles were contacted to seek information about unpublished works and additional returned material (n=1) was added to the review.

Data extraction

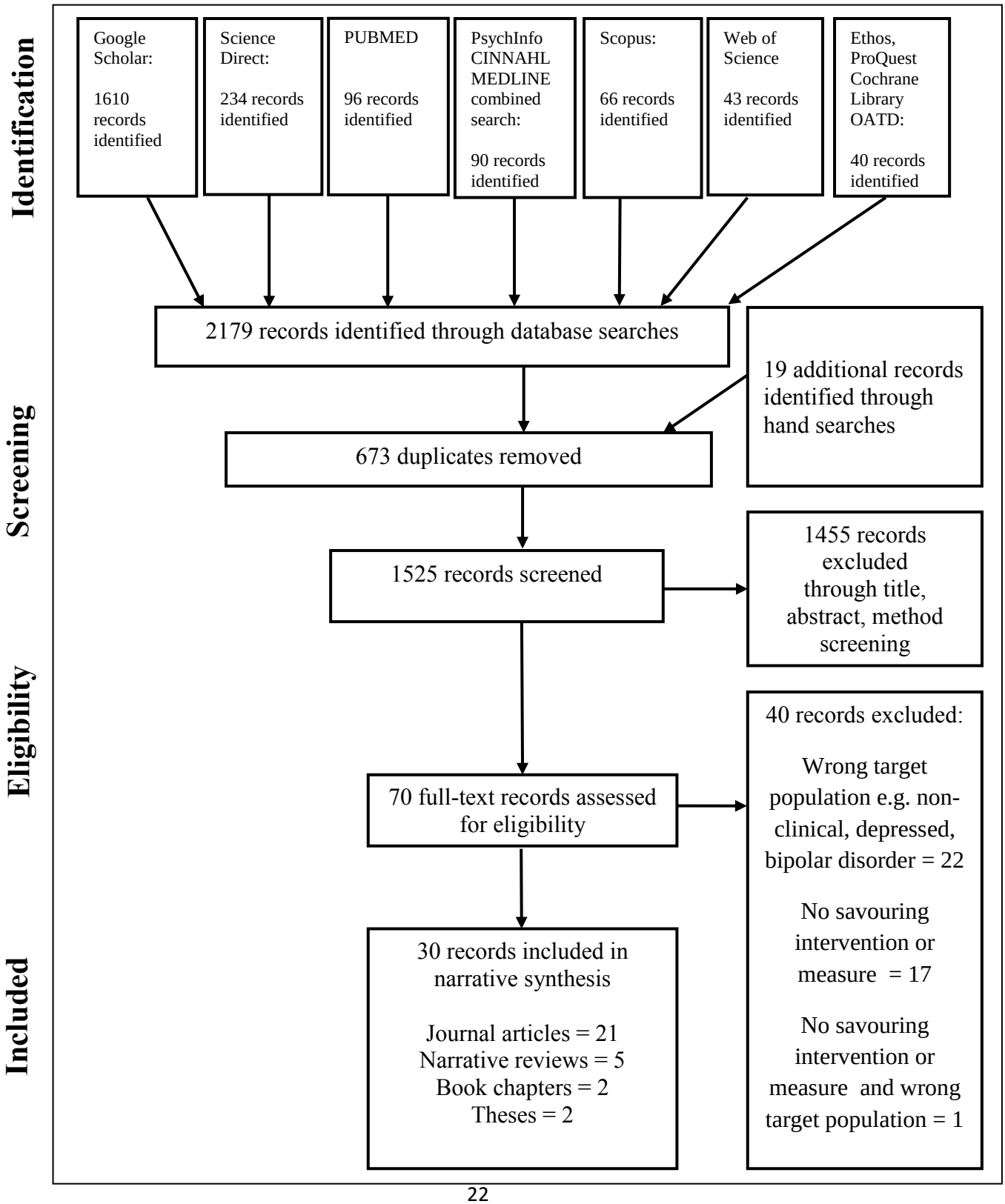
The process of data identification and extraction is outlined in the PRISMA flow chart in Figure 1. Data extraction was undertaken by EA as there was no opportunity for independent extraction to take place. All references were exported to Endnote X8 (N = 2179). Duplicates were electronically and manually excluded (N = 673). EA screened the titles, abstracts and method sections of the remaining studies for eligibility against the inclusion and exclusion criteria (N = 1525). Full-texts of the remaining references (N = 70) were reviewed and a further 39 data sources were excluded (see Appendix C for data exclusion reasons). The reference sections of the final papers (N = 30) were hand searched for additional relevant publications but none were found.

Quality appraisal

The final data sources (N = 30) were critically appraised by EA using the Quality Assessment Tool for reviewing Studies with Diverse Designs (QATSDD, Sirreyeh, Lawton, Gardner & Armitage, 2012; Appendix D). The QATSDD was selected because of its demonstrated reliability and validity and as the selected studies used qualitative, quantitative and mixed method designs. Each data source was rated on sixteen factors from 0 (‘not at all’) to 3 (‘complete’). Three of the selected papers had been co-authored by EA so in order to minimise bias, a second researcher, with six years of research experience, independently screened, data extracted and quality appraised anonymised copies of the three studies, plus a random sample of 10% of the finally selected papers, (total n = 6). The second rater was unaware that the first rater had co-authored some of the studies. Any discrepancies in QATSDD ratings were agreed through discussion with a third researcher. Sums of scores and percentages are reported in Table 1. Rater agreement was high, (kappa = .84). Participant

population, intervention and outcome characteristics differed greatly between studies so meta-analytic methods were excluded and narrative synthesis was chosen to present data.

Figure 1 PRISMA flowchart of included and excluded studies



Results

The results are presented according to the aims of the study. Risk of selection, detection, performance, reporting and attrition biases were evaluated (Moher et al., 2015).

Study characteristics

Study characteristics are displayed in Table 1. Research interest in savouring in psychosis appeared relatively new. The systematic review included 30 data sources reporting outcomes for 24 studies taking place during the last nine years. Most publications emerged from the USA, (k=9), or UK, (k=9), but studies from Switzerland, (k=5), Spain, (k=2), Italy, (k=1), Malta, (k=1), Australia, k=1, Canada, k=1, and China, k=1 were also identified. Studies used an array of research designs including: single case studies, (k=2), case series, (k=2), cross-sectional studies, (k=3), uncontrolled pre-post trials, (k=5), narrative reviews, (k=5), and controlled interventions (k=4) with qualitative follow-up (k=3).

Three studies trialled savouring interventions in isolation (Ricarte, Hernández-Viadel, Latorre & Ros, 2012; Johnson, Gooding, Wood, Fair & Tarrier 2013; Ricarte, Hernández, Latorre, Danion, & Berna, 2014) but most studied savouring combined with other PPIs, making it difficult to isolate the impact of savouring alone. Four studies delivered individual interventions including: Adapted-Metacognitive Interpersonal Therapy (A-MIT; Salvatore, Popolo, Lysaker et al., 2014); Anticipatory Pleasure Skills Training (APST; Favrod, Giuliani, Ernst & Bonsack, 2010; Favrod, Rexhaj, Nguyen, Cungi & Bonsack, 2014); Broad-Minded Affective Coping (BMAC; Johnson et al., 2013); and goal-orientated CBT (Perivoliotis & Cather, 2009). All other studies delivered group interventions including: an uncontrolled trial, (Positive Living; Meyer, Johnson, Parks, Iwanski, & Penn, 2012; Meyer, 2014); and a controlled trial of PPIs (WELLFOCUS PPI; Schrank, Riches, Coggins, Rashid, Tylee & Slade, 2014a; Schrank, 2014b; Schrank et al., 2016); a case series and uncontrolled trial of

Table 1. Study characteristics, data extraction and quality assessment

Study	Location	Research design	Target population and sampling	Intervention, comparison and dosage	Outcome measures and schedule	Key findings	QATSDD score (range 0 - 42, or 0 - 44 if mixed methods used)
Seeman, 2017	Canada	Narrative review of positive event memories in people experiencing psychosis	Selective sampling	N/A	N/A	No evidence that promoting positive affect by savouring positive life experiences reduces psychotic symptoms, but some evidence that positive emotions increase.	26 (62%)
Applegate et al., 2009	UK	Cross-sectional observational study Online self-report questionnaire	High negative schizotypy N = 516 Stratified sample	N/A	Savouring (SBI) behavioural activation and inhibition (BIS/BAS)	Negative schizotypy was associated with a poor capacity to savour in the past, present and future and reduced behavioural activation.	31 (74%)
Applegate et al., 2014	UK	Cross-sectional observational study Validation of a measure of behavioural savouring	High negative schizotypy N = 67 Stratified sample	N/A	Savouring (VFTEE and SBI)	Negative schizotypy was associated with using fewer words to savour fewer positive experiences in the future. Self-reported savouring did not correlate with savouring behaviour, so people may be poor at reporting their own savouring behaviour.	31 (74%)
Brownell et al., 2015	UK	Qualitative semi structured interview and focus group after WELLFOCUS PPI RCT for psychosis	Psychosis: schizophrenia, bipolar disorder, psychosis, or psychotic depression N = 37 Purposive sample	N/A	N/A	Savouring was one of the most enjoyed exercises - participants found it useful and wanted to try different types of exercise. The intervention moved participants' focus to positive life experiences, rather than ruminating on negative experiences.	37 (88%)

Study	Location	Research design	Target population and sampling	Intervention, comparison and dosage	Outcome measures and schedule	Key findings	QATSDD score (range 0 - 42, or 0 - 44 if mixed methods used)
Meyer et al., 2012 and book chapter Meyer, 2014	USA	Uncontrolled feasibility trial of positive living group therapy for psychosis Pre–post design	Schizophrenia Schizoaffective disorder N = 16 Convenience sample	Group positive living intervention Savouring: planning and implementing enjoyable experiences, emotion focus, telling others, avoiding "killjoy thinking" No control 10 sessions 90 minutes	Well-being (SPWB) savouring (SBI) hope (DHS) self-esteem (SERS-SF) recovery (RAS) psychotic symptoms, low mood (BSI) Baseline and post-intervention	The positive living intervention was associated with significant increases in well-being, hope and savouring ability, and significant decreases in paranoid, psychotic, and depressive symptoms post-intervention and at 3 month follow up. The intervention was feasible (dropout rate was less than 20% and the attendance rate was 77%). The intervention may have reduced psychotic symptoms and low mood by improving coping strategies, increasing happiness and well-being, and promoting the process of recovery.	25 (60%)
Schrank et al., 2014a	UK	Published protocol: Non-blinded, randomised controlled feasibility pilot trial of group WELLFOCUS PPI in psychosis	Psychosis N = 94 Purposive sample	WELLFOCUS PPT + TAU versus TAU Savouring: in sensory modalities: eating, listening to music, reminiscing and planning a positive activity 11 sessions	Well-being (WEM-WB) savouring (SBI, PPTI) symptom relief (BPRS, DHS, CORE10) connectedness (PPTI) hope (IHS) self-worth (RSES) empowerment (RES) life meaning (PPTI) Baseline and post-intervention	No results reported	39 (93%)

Study	Location	Research design	Target population and sampling	Intervention, comparison and dosage	Outcome measures and schedule	Key findings	QATSDD score (range 0 - 42, or 0 - 44 if mixed methods used)
Schrank 2014c	UK	Thesis: Qualitative study - semi-structured interviews to conceptually define well-being. Grounded theory used (associated with WELLFOCUS PPI intervention)	Psychosis SUs = 23 MH staff = 14 Purposive sample	N/A	N/A	Savouring and other PPIs shifted attention, memory, and expectations away from negative emotions and catastrophic thoughts towards positive emotions and hopefulness. Therapy was personal, experiential, and interactive. Therapy goals were specific, attainable, and personally meaningful. Generating positive feelings aided relaxation and enlivened daily structure.	37 (88%)
Schrank et al., 2016	UK	WELLFOCUS PPI pilot randomised controlled trial for people experiencing psychosis	Schizophrenia Schizoaffective disorder Delusional disorder N = 94 Stratified sample	WELLFOCUS PPT group intervention + TAU versus TAU Savouring: in sensory modalities e.g. eating, listening to music, reminiscence and planning a positive activity 11 sessions	Well-being (WEM-WB) savouring (SBI, PPTI) symptoms (BPRS, SDHS, CORE10) connectedness (PPTI) hope (IHS) self-worth (RSES) empowerment (RES) personal meaning (PPTI) Baseline and post-intervention	Intention-to-treat analysis showed a non-significant result for increase in well-being, savouring, empowerment and hope but BPRS, SDHS depression and PPTI (personal meaning) showed significant improvements as compared to TAU at moderate effect sizes, i.e. the intervention reduced symptoms but did not improve outcomes associated with well-being (savouring, hope, empowerment).	37 (88%)

Study	Location	Research design	Target population and sampling	Intervention, comparison and dosage	Outcome measures and schedule	Key findings	QATSDD score (range 0 - 42, or 0 - 44 if mixed methods used)
Riches et al., 2016	UK	WELLFOCUS PPI manual development Qualitative study Expert consultation Manualization Stakeholder review	Schizophrenia SU = 23 MH staff = 14 Convenience sample	N/A	N/A	No key findings reported but a new group psychotherapy protocol with savouring was developed through a qualitative study, expert consultation, manualization, and stake-holder review.	29 (69%)
Salvatore et al., 2014	Italy	Single case study illustrating an individual A-MIT intervention	Schizophrenia N = 1 No description of sampling method	A-MIT Savouring: healthy, adaptive, schema-discrepant experiences to change self-defining memories. No control 104+ sessions	Outcome not formally measured	The participant was able to savour healthy, adaptive, and schema-discrepant experiences causing increase in positive emotional arousal and improvement in ability to recall self-defining memories.	8 (19%)
Favrod et al., 2015	Switzerland	Uncontrolled pilot feasibility study of PEPS Open pre-post comparison, within subject design	Schizophrenia Schizoaffective disorder N = 37 Purposive sample	PEPS group intervention Savouring: a moment, a picture, an eating experience through imagining and sharing the experience with someone else No control 8 sessions	Negative symptoms (SANS) depression (CDSS) savouring (SBI) Baseline and post-intervention	PEPS participation was associated with significant reductions in SANS Avolition-Apathy and Anhedonia-Asociality scores (moderate effect sizes) and significant reductions in depression on the CDSS, (large effect size). PEPS was acceptable and feasible. 84% (31/37) of the sample completed the intervention.	28 (67%)

Study	Location	Research design	Target population and sampling	Intervention, comparison and dosage	Outcome measures and schedule	Key findings	QATSDD score (range 0 - 42, or 0 - 44 if mixed methods used)
Nguyen et al., 2016	Switzerland	PEPS intervention development paper Literature review and beta testing	Healthcare professionals N = 92 Convenience sample	PEPS group intervention Savouring: a moment, a picture, food through imagining the experience and telling others No control 8 sessions	Anticipatory / consummatory pleasure (TEPS) interpersonal enjoyment (ACIPS) savouring (SBI) Baseline and post-intervention	The PEPS was an acceptable and feasible intervention, associated with reduction in anhedonia and apathy when beta tested on a large sample of healthcare professionals in preparation for a study with people experiencing psychosis.	23 (55%)
Garland et al., 2010	USA	Narrative review presenting affective neuroscience data supporting Fredrickson's broaden-and-build theory	Focus was on people experiencing psychosis Selective sampling	N/A	N/A	Positive emotions broaden attentional focus. If people with psychosis are encouraged through savouring to intentionally begin to partake in more meaningful, pleasurable and interesting life experiences they will increase their positivity ratio (the proportion of positive affect that they will experience). In doing so, they will learn to self-generate upward spirals of positive emotion.	18 (43)%
Ricarte et al., 2014	Spain	RCT examining effect of LRTspev on positive autobiographical memory recall and depression in psychosis	Schizophrenia N = 32 Randomised sample	LRTspev + TAU versus TAU Savouring: current emotional state, sending loving kindness to self and others 4 sessions	Depression (BDI) brooding (RRS-B) symptoms (BPRS) cognition (WMS) Baseline and post-intervention	It was possible for people experiencing psychosis to improve autobiographical memory retrieval using a 4 week training. Those in the LRTspev group recalled a greater number of more specific memories following training. Improving memory alone was not enough to improve mood as no changes were observed in depression or negative repetitive thinking. It may be important to select the appropriate kind and sequence of memories in order to enhance mood.	33 (79%)

Study	Location	Research design	Target population and sampling	Intervention, comparison and dosage	Outcome measures and schedule	Key findings	QATSDD score (range 0 - 42, or 0 - 44 if mixed methods used)
Johnson et al., 2009a	USA	Case series study trialling LKM intervention for negative symptoms in psychosis	Schizophrenia N = 3 Convenience sample	LKM Savouring current emotional state Sending loving-kindness to self and others No control 6 sessions	Not available	Case one reported anecdotal improvements in positive emotion generation and motivation. Case two reported increased ability to relax through mindfulness, enjoy meaningful activity and problem solve. Case three reported no impact on mood or negative symptoms but improved coping with voice hearing.	12 (29%)
Johnson et al., 2011 and Johnson, 2009b (thesis)	USA	Uncontrolled group feasibility pilot study of LKM for negative symptoms in psychosis	Schizophrenia Schizoaffective disorder Psychosis-NOS Schizophreniform disorder with significant negative symptoms (CAINS rated) N = 18 Purposive sample	Group LKM Savouring: current emotional state, sending loving kindness to self and others No control 10 sessions, one booster session at 3 month follow-up	Negative symptoms (CAINS) recall (DRM)emotions (mDES) anticipatory / consummatory pleasure (TEPS) savouring (SBI) well-being (SPWB) life satisfaction (SWLS) hope (THS) Baseline, post-intervention and 3 month follow-up	People with negative symptoms reported increased frequency and intensity of positive emotion at post-test and 3-month follow-up. There was an 84% attendance rate for the intent-to-treat sample. LKM demonstrated a large effect size in reducing negative symptoms and anhedonia, and a medium effect size in reducing asociality at post-treatment and 3-month follow-up. Savouring, environmental mastery, self-acceptance, and life satisfaction all increased, with large effect sizes, at post-treatment, and medium to large effect sizes at 3-month follow-up. LKM may be a promising intervention for people experiencing persistent negative symptoms.	26 (62%)
Kring & Caponigro, 2010	USA	Narrative review of positive emotion in psychosis	N/A	N/A	N/A	Few studies have examined the relationship between memory and anticipation in people with psychosis. The linkage between envisioning positive emotional events in the future and remembering past events requires further investigation.	18 (43%)

Study	Location	Research design	Target population and sampling	Intervention, comparison and dosage	Outcome measures and schedule	Key findings	QATSDD score (range 0 - 42, or 0 - 44 if mixed methods used)
Kring & Ellis, 2013	USA	Narrative review of emotional experience in psychosis	Focuses on emotional processing in psychosis populations Selective sampling	N/A	N/A	People experiencing psychosis have difficulty anticipating, savouring and maintaining in memory emotional events, as evidenced by behavioural, psychophysiological and brain imaging studies. They struggle to integrate emotional perception with context and report on feelings that are differently valenced than the presented emotional stimuli. Brain activation differences correspond with areas associated with cognitive control.	20 (48%)
Lim & Gleeson, 2014	Australia	Opinion article on social connectedness in psychosis.	Focuses on loneliness in psychosis	N/A	N/A	Savouring may decrease loneliness in people who have experienced psychosis. Capitalising (telling others about positive experiences) might help people with psychosis to build social bonds.	29 (12%)
Caponigro et al., 2014	USA	Uncontrolled group feasibility pilot study of ACES intervention for psychosis Mixed methods	Schizophrenia Schizoaffective disorder N = 11 Convenience sample	ACES Savouring: noticing daily positives and sharing with others, writing a journal or re-remembering No control 6 sessions	CEQ 3 month follow up using qualitative interview	ACES was feasible and acceptable. Group members reported that the skills were moderately to highly helpful. Participants were motivated to attend group sessions and expressed positive feedback during the groups and at 3-month follow up. Levels of practice outside of sessions varied.	22(46%) Mixed qualitative and quantitative methods

Study	Location	Research design	Target population and sampling	Intervention, comparison and dosage	Outcome measures and schedule	Key findings	QATSDD score (range 0 - 42, or 0 - 44 if mixed methods used)
Ng et al., 2015	China	Uncontrolled prospective cohort study piloting five ways to well-being group in an acute psychiatric setting	Schizophrenia psychosis delusional disorder N = 252 Opportunity sample	Five Ways to well-being versus illness management Savouring: noticing positive events and savouring the moment 1-7 sessions	Well-being (CSWEMWBS) Hope (CVHS) Baseline and post-intervention	The Five Ways to Wellbeing program provided a sense of agency, and access to life skills such as learning, connecting, appreciating, participating and giving. Participation in the intervention was associated with increases in hope and well-being.	22 (50%)
Cassar et al., 2013	Malta / UK	Cross-sectional cohort study of savouring and self-efficacy in people experiencing psychosis	Schizophrenia N = 50 Stratified sample	N = 100 Matched controls: half employed (N = 50) and half unemployed (N = 50)	Schizotypy (OLIFE) savouring (SBI) self-efficacy (MTQ) IQ (QT) emotion (PANAS)	People experiencing psychosis reportedly savoured the past, present and future less often than matched employed and unemployed comparison groups, when controlling for IQ and mood state. They endorsed defeatist beliefs about task difficulty and reported poorer self-efficacy.	29 (69%)
Favrod et al., 2010 and book chapter Favrod et al., 2014	Switzerland	Case series of cognitive sensory intervention involving anticipatory pleasure skills training	Schizophrenia N = 5 (3 individual, 2 group intervention) Convenience sample	Anticipatory Skills Training Savouring: pleasant activities list, viewing pictures, remembering past positive experiences and imagining them in the future No control 10-25 hours of training	Negative symptoms SANS Anticipatory / consummatory pleasure (TEPS) time budgeting (TBM) depression (CDSS) Baseline and post-intervention	Participants reported higher scores on the anticipatory subscale of the Temporal Experience of Pleasure Scale and daily activities also increased for three of five participants post-intervention.	26 (62%)

Study	Location	Research design	Target population and sampling	Intervention, comparison and dosage	Outcome measures and schedule	Key findings	QATSDD score (range 0 - 42, or 0 - 44 if mixed methods used)
Freeman et al., 2014	UK	RCT of CBT and Five ways to well-being for people experiencing psychosis with persecutory beliefs	Schizophrenia, Schizoaffective disorder Delusional disorder with persecutory beliefs N = 30 Randomised sample	CBT and Five ways to well-being plus TAU Versus TAU Savouring: notice beautiful or unusual things in everyday life, savour the moment, reflect on emotion and appreciate 6 sessions	Negative self beliefs (BCSS) paranoia (GPTS) persecutory beliefs (PSYRATS) well-being (WEMWBS) social comparison (SCS) self-esteem (RSES) anxiety (BAI) depression (BDI-II) Baseline, post-intervention and 4 week follow up	The intervention was feasible and acceptable. It was associated with a small effect size reduction in negative beliefs about the self and a moderate effect size of reduction in paranoia, neither of which was statistically significant. There were significant improvements in psychological well-being, positive beliefs about the self, self-esteem, social comparison and depression.	28 (67%)
Johnson et al., 2013	UK	RCT of BMAC thought exercise intervention in people experiencing psychosis	Schizophrenia, Schizoaffective disorder, Psychosis NOS N =50 Randomised sample	BMAC versus control (instrumental music) Savouring: recall of positive autobiographical memories and emotions 1 session	Depression (BDI-II) Suicidal behaviour (SBQ-R) Happiness Hopefulness (VASs)	The BMAC group reported significantly greater increases in self-reported happiness and hopefulness compared to those listening to music in the control condition, suggesting that the BMAC boosted mood more effectively than music. The BMAC may help to provide in-the-moment boosts of positive emotion that lead to longer term improvements in mood.	26 (62%)

Study	Location	Research design	Target population and sampling	Intervention, comparison and dosage	Outcome measures and schedule	Key findings	QATSDD score (range 0 - 42, or 0 - 44 if mixed methods used)
Perivoliotis & Cather, 2009	USA	Case study of goal-orientated recovery approach	Schizophrenia N = 1 Convenience sample	Goal-orientated recovery approach Savouring: performance tracking diary for introduction of pleasant experiences 52 sessions	Negative symptoms (SANS) defeatist beliefs (DAS) social anhedonia (RSAS) functioning (GAF)	The client made considerable gains in functioning. The maintaining factors were the client's dysfunctional beliefs established through neurocognitive setbacks, avoidance and withdrawal.	17 (41%)
Ricarte et al., 2012	Spain	RCT of positive event group-based training to enhance autobiographical memory retrieval, and low mood in people experiencing psychosis	Schizophrenia N = 50 Intervention = 24 Control = 26 Random sample	Event group-based training programme enhancing autobiographical memory versus active social skills and occupational therapy control group 10 sessions	Autobiographical memory and executive function (AME) emotional appraisal (EAS) low mood (BDI) psychosis (BPRS, PANSS)	Event-specific autobiographical memory training improved autobiographical memory retrieval and was associated with decreased depression ratings post-intervention.	28 (67%)

Note: A-MIT = adapted-metacognitive interpersonal therapy; ACIPS = Anticipatory and Consummatory Interpersonal Enjoyment Scale; ACES = Awareness and Coping with Emotion in Schizophrenia; AME = Autobiographical Memory Enquiry; BAI = Beck Anxiety Inventory; BDI / BDI-II Beck Depression Inventory (versions one and two); BIS/BAS = Behavioural Inhibition Scale and Behavioural Activation and Scale; BCSS = Brief Core Schema Scale; BPRS = British Psychiatric Rating Scale; BSI = Brief Symptom Inventory; CDSS = Calgary Depression Scale for Schizophrenia; CAINS = Clinical Assessment Interview for Negative Symptoms; C-SWEMWBS = Chinese Short Warwick Edinburgh Mental Wellbeing Scale; CVHS = Chinese Validated Hope Scale; CEQ = Credibility/Expectancy Questionnaire; DRM = Day Reconstruction Method; DHS = Dispositional Hope Scale; DAS = Dysfunctional Attitudes Scale; EAS = Emotional Assessment Scale; GAF = Global Assessment of Functioning; GPTS = Green et al. Paranoid Thoughts Scale; IHS = Integrative Hope Scale; IQ = Intelligence Quotient; LRTspev = Life Review Therapy based on Specific Positive Events; LKM = Loving-Kindness Meditation; MTQ = MacCarthy Task Questionnaire; MH = mental health; mDES = Modified Differential Emotions Scale; NOS = Not Otherwise Specified; OLIFE-SF = Oxford-Liverpool Inventory of Feelings and Experiences-Short Form; PANAS = Positive and Negative Affect Scale; PEPS = Positive Emotions Program in Schizophrenia; PANSS = Positive And Negative Syndrome Scale; PPT = Positive Psychotherapy; PPTI = Positive Psychotherapy Inventory; PSYRATS = Psychotic Symptom Rating Scales; QT = Quick Test; RCT = Randomised Controlled Trial; RAS = Recovery Assessment Scale; RSES = Revised Social; Anhedonia Scale RES = Rogers Empowerment Scale; RSES = Rosenberg's Self-Esteem Scale; RRS-B = Ruminative Response Scale-Brooding; SBI = Savouring Beliefs Inventory; SANS = Scale for the Assessment of Negative Symptoms; SPWB = Scales of Psychological Wellbeing; SERS-SF = Self-Esteem Rating Scale-Short Form; SDHS = Short Depression-Happiness Scale; SCS = Sense of Coherence Scale; SU = Service user; SBQ-R = Suicidal Behaviours Questionnaire-Revised; TAU = Treatment As Usual; TEPS = Temporal Experience of Pleasure Scale; TBM = Time Budget Measure; THS = Trait Hope Scale; VASs = Visual Analogue Scales; VFTEE = Verbal Fluency Test of Enjoyable Experiences; WEMWB = Warwick-Edinburgh Mental Well-Being Scale; WMS = Wechsler Memory Scale.

Loving-Kindness Meditation (LKM; Johnson, Penn, Fredrickson & Meyer, 2009a; Johnson, 2009b; Johnson et al., 2011); a case series (Favrod et al., 2010; 2014) and uncontrolled trial of the Positive Emotions Program for Schizophrenia, (PEPS; Favrod et al., 2015; Nguyen et al., 2016); two controlled trials of group 'five ways to well-being' (FWWB) interventions with either cognitive behavioural therapy (CBT; Freeman et al., 2014) or recovery work (Ng et al., 2015); and, two RCTs delivering group autobiographical memory training called 'Life review therapy based on positive events' (LRTspev; Ricarte et al., 2012; 2014).

The relationship between savouring and psychosis

Three cross-sectional and four intervention studies examined the relationship between savouring and psychosis. Two cross-sectional, self-report studies found significant negative correlations (ranging from -.58** to -.61**) between savouring ability, as measured by the Savouring Beliefs Inventory (SBI; Bryant, 2003) and negative symptoms (Cassar et al., 2013) or negative schizotypy (Applegate, El-Deredy & Bentall, 2009). Cassar et al., (2013) reported that people with psychosis were significantly more likely to report poor anticipatory, ($F[2,144]=4.27$, $p>0.05$, partial $\eta2=0.056$), present moment, ($F[2,144]=26.49$, $p<0.001$, partial $\eta2=0.27$) and past savouring ($F[2,144]=17.16$, $p<0.001$, partial $\eta2=0.19$) than employed and unemployed control groups, with savouring being the most significant predictor of negative schizotypy ($\beta=0.33$, $t=3.99$, $p<0.001$). Whilst both studies presented interesting preliminary findings, their conclusions were reliant on self-report and were therefore susceptible to social desirability bias.

Additionally, a third study suggested that people rating highly in negative schizotypy may be poor at evaluating their own savouring behaviour (Applegate et al., 2014). In this study, participants were asked to recall or predict as many positive experiences as they could from the near and far past, and the near and far future, as a behavioural measure of savouring,

with verbal fluency acting as a proxy for available thought content. Consistent negative associations were observed between savouring behaviour and negative schizotypy, correlations ranged from -.38** to -.46**, but not between self-reported SBI savouring and negative schizotypy, or SBI savouring and behavioural savouring. As behavioural savouring was a stronger predictor of negative schizotypy, it was deduced that people may be poor at reporting their own ability to savour.

In relation to whether savouring behaviour is responsive to existing savouring interventions, four studies measured changes in self-reported savouring ability following PPI interventions. All studies, (Meyer et al., 2012; Johnson et al., 2011; 2009b; Favrod et al., 2015) bar one (Schrank et al., 2016) found increases in self-reported savouring ability post-intervention and two studies stated that these gains persisted at three-month follow up (Johnson et al., 2011; 2009b; Meyer et al., 2012) suggesting that gains were retained. Two studies identified increases in savouring in conjunction with increases in hope and well-being (Meyer et al., 2012; Favrod et al., 2015).

Together, these results suggest that savouring is consistently negatively associated with negative symptoms and negative schizotypy. Savouring interventions appear to increase self-reported savouring behaviour in people experiencing psychotic symptoms, although behavioural measures of savouring may be more reliable indices of change, as they do not rely upon introspection. Changes in savouring may be accompanied by increases in reported well-being and hope.

Hypothesised reasons for differences in savouring

Five narrative reviews (Garland et al., 2010; Kring & Caponigro, 2010; Kring & Elis, 2013; Lim & Gleeson, 2014; Seeman, 2017) presented three main explanatory models of reduced savouring in people experiencing psychosis. These included anticipatory pleasure

difficulties (underpinned by pleasure disconnection and emotional paradox hypotheses), affective cognitive control difficulties (including problems with emotional mismatch and contextual binding) and a desire not to broaden-and-build positive emotion due to the impact of early trauma on threat, drive and soothe affect regulatory systems. Each theory remains speculative given the current state of evidence.

Anticipatory pleasure difficulties

Four studies (Applegate et al., 2009; 2014; Favrod et al., 2010; Cassar et al., 2013) attributed reduced savouring to a disconnection between anticipatory and consummatory pleasure known as the, 'pleasure disconnection hypothesis' (Gard, Kring, Gard, Horan, & Green, 2007). The pleasure disconnection hypothesis purports that anticipation difficulties stem from an inability to translate past and present moment positive experiences into future action (Kring & Caponigro, 2010; Kring & Barch, 2014). Strauss (2013) referred to this as an 'emotional paradox'.

Low expectancies of pleasure may arise from poor prediction of future positive emotion (Rector, Beck & Stolar, 2005). Thus, interventions that help people to appraise the difference between the level of enjoyment that they *predict* they will experience, versus the level of enjoyment that they *actually* experience may be helpful (Raffard et al., 2013). In order to facilitate reappraisal, previous interventions have roleplayed future events, (Grant, Huh, Perivoliotis, Stolar, & Beck, 2012) broadened present-moment emotion into a vision of the future, (Johnson et al., 2011) and created positive imagery through guided meditation (Favrod et al., 2010). Savouring may help to address anticipatory difficulties because it draws purposeful attention to physical sensations, emotions, thoughts and behaviours associated with remembered past, enjoyed present or anticipated future positive events, as a form of 'cognitive scaffolding' that renders an implicit process explicit (Oorschot et al., 2013).

Cognitive control theory

The LRTspev (Ricarte et al., 2012; 2014) and ACES (Caponigro, Moran, Kring & Moskowitz, 2014) trials accounted for poor anticipatory savouring through cognitive control theory. Cognitive control theory hypothesises that emotional information is not being stored correctly with contextual information in autobiographical memory at the time of initial encoding, due to impaired 'affective cognitive control capacity'. Affective cognitive control capacity refers to the ability to regulate emotions, or manipulate emotional material, in the service of a goal. The skill is thought to rely upon working memory, which is known to be affected in people experiencing psychosis (Schweizer, Grahn, Hampshire, Mobbs, & Dalgleish, 2013). It is the process of integrated encoding that would ordinarily drive reward learning and goal-driven behaviour (Kring & Caponigro, 2010; Kring & Ellis, 2013; Caponigro et al., 2014).

Several studies provide support for affective cognitive control theory. People experiencing psychosis report stimulus-incongruent emotions, (emotions that an event would not typically elicit) for example, feeling negative emotion in response to neutral or positive stimuli (Cohen & Minor 2010; Trémeau et al. 2009, Ursu et al. 2011). This mismatch between reported emotion and stimulus valence could be explained by a delay in cognitive control, causing the person to maintain an emotion in memory for longer than was intended, even when the stimulus has changed or is no longer present. Alternatively, a mismatch in emotional valence may reflect problems with re-accessing episodic memory, such that the in-the-moment memory representation of the emotion is encoded correctly, but becomes degraded or inaccessible over time (Strauss & Gold, 2012). Interventions, such as the BMAC or LRTspev, may work by enhancing autobiographical memory specificity, improving positive emotion identification, and increasing affective cognitive control capacity.

Broaden-and-build theory

Authors of the positive living (Meyer et al., 2012; Meyer, 2014) and LKM (Johnson, 2009a; 2009b; 2012) trials accounted for improved outcomes including increased savouring, by highlighting features of the broaden-and-build theory of positive emotion (Fredrickson, 2001). The theory proposes that, just as negative emotions narrow attentional focus, positive emotions broaden attentional focus, thereby increasing opportunities to engage in meaningful life experiences that, in turn, increase the chance of creating self-perpetuating upward spirals of positive emotion (Garland et al., 2010; Seeman, 2017). Over time, the ratio of positive to negative emotional experiences (positivity ratio) may grow and continue to broaden cognition by creating situations that build social openness and interpersonal trust (Burns et al., 2008).

Positivity ratio gains can be sustained by re-triggering mental imagery from positive memories and by biasing attention towards positive experiences, i.e. by savouring (Garland et al., 2010). These types of experiences might counter emotional distress, social withdrawal and depressed or anxious thinking styles by facilitating attentional disengagement from negative stimuli (Cohn, Fredrickson, Brown, Mikels & Conway, 2009). Consistent with this theory, Lim & Gleeson, (2014) suggest that savouring may decrease loneliness in people reporting psychosis because capitalising on positive experiences (sharing them with others) can rebuild social bonds. Meyer et al., (2012) suggested that the positive living intervention was effective due to shifting attentional focus away from symptoms towards positive emotion, and by increasing participant belief that social relationships were safe and possible.

Therefore, if people experiencing psychosis are supported to increase savouring behaviour, this might broaden thought-behaviour-action repertoires, thereby allowing individuals to learn that social experiences can be safe and enjoyable. As people experiencing psychosis often report trauma histories, it could be that negative symptoms are an active

attempt to downregulate all emotion (both positive and negative) when emotion has become overwhelming or people seem untrustworthy. People experiencing psychosis do recall over-general memories that are less specific and less interconnected, than people who are not experiencing psychosis (Holmes, Lang, Moulds, & Steele, 2008; Ricarte et al., 2012) but it may be that memories have become over-general due to an established pattern of functional avoidance stemming from early trauma, (Danion, Rizzo & Bruant, 1999), rather than as a consequence of neurocognitive problems relating to affective cognitive control. In this sense, reduced savouring might represent a preference not to broaden-and-build positive emotion, because all emotion, whether positive or negative is perceived as dangerous. Early traumatic affiliative experiences may create a later desire to avoid social contact, which has been referred to elsewhere as 'sealing over' (Garland et al., 2010).

The social defeat model of negative symptoms (White, Laithewaite & Gilbert, 2013) appears compatible with this theory, because it suggests that early experiences, lacking secure attachment and social safety, contribute to the over-development of threat affect-regulatory systems and underdevelopment of soothe (social safeness) systems in people experiencing negative symptoms. Help to develop the soothe system during Compassion Focussed Therapy (CFT; Gumley, Braehler, Laithwaite, Macbeth, & Gilbert) might support direct opportunities for emotional sharing and self-compassion, which in turn could increase positivity ratios and upward spirals of positive emotion, although this observation is theoretical.

Acceptability, feasibility, safety and effectiveness of savouring interventions

Acceptability

Nine studies reported qualitative, (Johnson, 2009b; Johnson et al., 2011; Meyer et al., 2012; Meyer, 2014; Freeman et al., 2014; Favrod et al., 2015; Brownell et al., 2015; Schrank et al., 2016), or quantitative, (Caponigro et al., 2014) participant data on the acceptability of

interventions. Several studies reported that savouring interventions were 'acceptable,' 'positive,' and 'helpful'. One PPI study reported that savouring was one of the most frequently used intervention techniques outside of sessions (ACES; Caponigro et al., 2014) and participants from another PPI study said that savouring was one of the most enjoyed exercises. Participants wanted to try other different types of savouring exercises (WELLFOCUS; Schrank et al., 2016).

Despite this positive feedback, amount of skill practice outside of sessions, and attrition (FWWB; Freeman et al., 2014; 0%; LKM; Johnson et al., 2011; 16%; PEPS: Favrod et al., 2015; 16%; Positive living; Meyer et al., 2012; Meyer, 2014: 'below 20%'; Schrank et al., 2016; 45%) and attendance rates (54.20%; WELLFOCUS; Schrank et al., 2016; to 90.91%; ACES; Caponigro et al., 2014) varied greatly between studies, suggesting that some interventions may have been more acceptable and accessible than others. Commonly cited barriers to participation in savouring interventions were physical health problems, transport costs, alternative commitments, family needs, forgetting to attend, low mood and motivation and anxiety about group participation.

Feasibility

All studies reported that it had been feasible to carry out savouring interventions but a number of participants highlighted areas where feasibility could be improved by addressing barriers to participation. Typical barriers included participant cognitive and motivation difficulties, defeatist beliefs undermining efforts to persist and institutionalisation. Perivoliotis & Cather, (2009) reported a 52-session case study in which the participant made gains overall but the authors conveyed that defeatist beliefs, relating to cognitive problems, interfered with the participant's ability to savour and increasing the likelihood that he would avoid sessions. In a case series that trialled APST, Favrod et al., (2010; 2014) found that

activity levels did not increase in participants who had the most ritualised behaviour, so institutionalisation may be a barrier to imagining or practicing alternative behaviours.

The positive living (Meyer et al., 2012; Meyer, 2014), ACES (Caponigro et al., 2014) and WELLFOCUS (Schrank et al., 2016) studies reported that cognitive difficulties were a barrier to participation. Meyer et al., (2012; Meyer, 2014) reported that some participants had difficulties accessing session content, and understanding and retaining information between sessions. Caponigro et al., (2014) reported that memory difficulties impacted on ability to participate in sessions and to remember to practice savouring skills outside of sessions. Some participants required additional time to retrieve a memory that they could savour.

Brownell et al., (2015), reported that some participants from the WELLFOCUS trial experienced concentration difficulties and found it difficult a recall a memory that could be savoured. Some found it difficult to accept positive emotions and felt 'frightened of feeling good'. Others reported defeatist beliefs, such as 'enjoyment cannot be learned'. Those who expressed doubts that the intervention would be pleasant, reported surprise when it was enjoyable, so enhancing initial willingness to try savouring interventions may be helpful.

Safety

A number of intervention studies did not report data on adverse events (Johnson et al., 2011; Meyer et al., 2012; Ricarte et al., 2012; 2014; Johnson et al 2013; Ng et al., 2015). Of those that did, all studies (FWWB; Freeman et al., 2014; PEPS; Favrod et al., 2015; WELLFOCUS; Schrank et al., 2016) bar one (ACES; Caponigro et al., 2014) stated that participation in a savouring intervention had been safe. Caponigro et al., (2014) reported that one person experienced a psychotic relapse whilst participating in the study. This may have been precipitated by involvement in an emotion-focussed intervention, but could also have been due to the participant's medication free status. Other participants with the same

diagnosis taking medication did not relapse, so it may be that savouring interventions are more suited to participants who are clinically stable.

Effectiveness

All intervention studies, bar one (Johnson et al., 2013), were conducted within clinical settings, maximising evaluation of 'real world' effectiveness. Evidence for effectiveness of savouring interventions is presented in ascending order of quality (Popay et al., 2006). Single case studies, case series and uncontrolled studies are included as their findings complement more robust effectiveness data derived from Randomised Controlled Trials, RCTs, (Kunz, Vist & Oxman, 2007; Möller, 2011). Studies defined primary outcome in terms of illness-focussed (e.g. psychotic or mood symptoms), wellness-focussed (e.g. positive psychology outcomes such as hope, quality of life, efficacy, empowerment) or function-focussed (changes in activity or memory levels) outcomes.

Salvatore et al., (2014) taught a female participant to savour healthy, schema discrepant experiences during 104 sessions of Autobiographical-Memory Interpersonal Therapy. Evidence of effectiveness was particularly weak because outcome was not formally assessed, although it was reported that A-MIT helped the participant to develop positive emotions and generate positive self-defining memories. Two case series provided APST (Favrod et al., 2010; 2014) or LKM (Johnson et al., 2009a; 2009b). Favrod et al., (2010; 2014) recruited five participants diagnosed with 'schizophrenia' delivering 15 to 25 hours of APST training. Johnson et al., (2009a; 2009b) recruited three participants with predominant 'negative symptoms' and delivered six meditation sessions.

Both studies aimed to increase present moment and anticipatory savouring, positive emotions and activity levels, but APST used more traditional cognitive-behavioural methods to achieve this (such as pleasant activity scheduling, relaxation and cognitive-sensory

interventions) whereas LKM used meditation, guided imagery and affirmations. Favrod et al., (2010; 2014) reported increased anticipatory pleasure in all five cases (Reliable Change Index, RCI > 1.96) but activity levels only improved in three of five cases. Johnson et al., (2009a; 2009b) reported increases in positive emotion, relaxed-state experiences and motivated activity, and improvements in problem solving and social relationships in two of three cases, and better coping with voice hearing in the third case. However a significant limitation of this study was that no formal outcome measures were included, and both study sample sizes were small, so the results cannot be generalised beyond the tested population.

Four uncontrolled feasibility studies piloted LKM (Johnson, 2009b; Johnson et al., 2011), 'positive living' (Meyer et al., 2012; Meyer, 2014), Awareness and Coping with Emotion in Schizophrenia (ACES; Caponigro et al., 2014) and Positive Emotions Program in Schizophrenia (PEPS; Favrod et al., 2015; Nguyen et al., 2016) interventions. Johnson, et al., (2009b; 2011) delivered LKM to eighteen people experiencing 'persistent negative symptoms' during ten group sessions and a six month booster session. Whilst LKM demonstrated a large effect size for decreasing negative symptoms post-treatment (d= 1.68, $p<0.01$) and at 3-month follow up (d= 1.54, $p<0.01$) negative symptoms were evaluated using a non-validated, beta-version of a semi-structured interview administered by a researcher who was not blind to the study hypotheses. Thus, intervention effects may have been considerably over-estimated (Tarrier & Wykes, 2004). The small sample was of higher than average IQ and educational attainment affecting the external validity and generalisability of results.

Additionally, whilst anticipatory savouring, self-acceptance, environmental mastery and life satisfaction increased, with large effect sizes at post-treatment and medium or large effect sizes at 3-month follow-up, (SBI anticipatory savouring post-intervention: d= 0.75, $p<0.01$; 3-month follow up: d= 0.77, $p<0.01$), these findings were reported without consideration of experimental power, inflating the likelihood that a type I error could have

been made. Increases in the frequency and intensity of felt positive emotion at post-test and 3-month follow-up were associated with reduction in negative symptoms (correlations ranged from -.58 to -.79), but the amount of time participants spent using LKM outside of sessions was not significantly associated with emotion changes, so a dose-response relationship was not observed, and these findings should be interpreted with caution.

The second uncontrolled feasibility trial of a group 'positive living' intervention was delivered to sixteen people diagnosed with schizophrenia-spectrum conditions during eleven weekly sessions (Meyer, et al., 2012; 2014). Participants planned and implemented meaningful positive goals relating to a personal strength, then later learned to savour these experiences through absorption, self-congratulation and capitalizing techniques. Participants practiced attending to pleasant sensations in the present moment and avoiding 'killjoy thinking,' i.e. thoughts that downregulated positive emotion.

The intervention was associated with significant increases in self-reported savouring behaviour, ($F[1,15]=5.31$, $p>0.01$), well-being, and hope, and significant decreases in self-reported psychotic symptoms post-intervention. Savouring gains were maintained at 3-month follow up (Savouring: $F[1,15]=6.54$, $p>0.01$). However, all outcomes were self-reported so may have been affected by demand or social desirability biases (Larsen & Fredrickson, 1999). Some participants reported difficulties understanding the intervention content, so they may have been present but been unable to access all aspects of the intervention content.

The third uncontrolled group feasibility trial of Awareness and Coping with Emotion in Schizophrenia (ACES) was delivered to eleven participants diagnosed with 'schizophrenia' or 'schizoaffective disorder,' during six group sessions (Caponigro et al., 2014). Participants practiced noticing and savouring daily positives, sharing them with others (capitalizing), writing a journal to re-remember positive experiences, expressing gratitude, carrying out

altruistic acts, practicing present moment mindful awareness, positively re-appraising negative events, and identifying personal strengths and translating these into attainable goals.

Outcome was evaluated using mixed qualitative interview and quantitative questionnaire methods, a strength of this particular study, with primary outcome measured as participant perception of intervention credibility. Participants found the skills 'moderately' to 'highly' helpful and remained 'interested' and 'motivated' to continue to use them. Savouring was one of the most frequently used intervention techniques during home practice. Whilst psychiatric symptom and well-being data was collected, it was not reported and could not be obtained on request, thus it was difficult to fully evaluate study outcomes.

A fourth uncontrolled feasibility trial examined the effect of the Positive Emotions Program in Schizophrenia (PEPS; Favrod et al., 2015; Nguyen et al., 2016) on negative symptoms, such as apathy and anhedonia. Thirty-seven participants diagnosed with 'schizophrenia' or 'schizoaffective disorder' attended eight group sessions that taught: savouring a present or past enjoyable experience, accentuating behavioural expression of emotion, capitalizing, challenging defeatist beliefs and increasing anticipation of pleasant moments. PEPS participation was associated with moderate effect size reductions in negative symptoms scores, (avolition-apathy: d= 0.57, $p<0.01$ and anhedonia-asociality: d= 0.50, $p<0.01$), and large effect size reductions in low mood scores, (d= 0.91, $p<0.01$), but the assessor was not blind to study hypotheses.

When data from the uncontrolled trials was examined altogether, participation in the savouring interventions, (along with other PPIs) was associated with increases in self-reported activity levels, positive emotion, savouring ability, well-being, hope, self-acceptance, environmental mastery and life satisfaction. Participation was consistently associated with reduced clinician and self-reported low mood, negative and positive

symptoms. However, without inclusion of a control group, it is not known whether these effects could be a product of other factors, such as group participation or increased social contact, rather than exposure to the savouring, or other PPI, interventions.

Four RCTs (Ricarte et al., 2012; 2014; Johnson et al., 2013; Freeman et al., 2014) and two controlled trials (Schrank et al., 2014a; 2016; Schrank, 2014b; Ng et al., 2015) reported effectiveness data. Freeman et al., (2014) conducted an RCT of six sessions of Cognitive Behavioural Therapy (CBT) plus 'Five Ways to Wellbeing' (FWWB) techniques (including savouring) versus Treatment As Usual (TAU) in thirty people experiencing psychosis and expressing persecutory beliefs. The FWWB intervention taught participants to be active, savour the present moment, attend to emotion, learn, connect and give to others. Randomisation, blinding and allocation concealment procedures were adequately described and carried out. Participation in the active arm was associated with significant improvements in depression, (Cohen's d = 0.68; P<0.01), well-being, (d = 1.16; P<0.01), negative social comparison, (d = 0.88; P<0.01), positive self-belief, (d = 1.00; P<0.01), and self-esteem, (d = 0.62; P<0.01) post intervention, but these improvements did not persist at 4-week follow-up. The intervention was brief, which could explain why the reported gains were short-lived.

A second prospective-controlled cohort study (Ng et al, 2015) recruited a large, inpatient sample, of whom 70.6% had schizophrenia-spectrum diagnoses, (N = 252). All participants completed two recovery sessions, then chose to attend either five FWWB sessions or five further recovery sessions as an active control. Intervention content was similar to that used by Freeman et al., (2014). Participants experiencing psychosis in the FWWB arm reported significant increases in well-being and hope post-intervention, whereas control group participants reported significant increases in well-being only. FWWB arm participants were significantly less likely to attend the outpatient clinic for further treatment

(F=8.22, p>0.01, partial η2= 0.917) or be re-admitted in the six months following discharge (F=7.22, p>0.01, partial η2= 0.907) than control participants.

The WELLFOCUS RCT randomised 94 people with schizophrenia-spectrum diagnoses to attend eleven sessions of PPI or continue TAU (Schrank et al., 2014a; 2014c; Schrank et al., 2016; Brownell et al., 2015; Riches, Schrank, Rashid & Slade, 2016). Participants practiced slowing down, reminiscing, savouring the present moment, developing awareness of positive features and emotions associated with experiences, and keeping gratitude diaries. An intention-to-treat analysis found no significant effect of intervention on the primary outcome of well-being compared to TAU, but psychotic symptoms (p = 0.006, ES = 0.42) and depression (p = 0.03, ES = 0.38) showed significant improvements at moderate effect sizes. Intervention participation was not significantly associated with increases in self-reported savouring, empowerment or hope. Outcome raters were not blind to allocation, so improved outcomes may have been overestimated, and attendance rate was very low (54.2%) so there may have been problems with intervention acceptability.

Johnson et al., (2013) conducted a single exposure RCT of the Broad-Minded Affective Coping (BMAC) technique, a thought exercise designed to evoke mental imagery from past autobiographical memories, promote savouring and trigger associated positive emotions. Fifty participants with schizophrenia-spectrum diagnoses were randomly assigned to either BMAC or instrumental music control conditions. The BMAC group reported significant increases in happiness and hope compared to the control group, suggesting that the BMAC boosted mood more effectively than music, although the study was narrowly underpowered, so results should be interpreted with caution.

Ricarte et al., (2012) randomly assigned fifty people diagnosed with ‘schizophrenia’ to ten sessions of group ‘Life review therapy based on positive events’ training (LRTspev) or

an active social skills and occupational therapy control group. Event-specific autobiographical memory training involved structured interviews exploring positive past events from childhood, adolescence, adulthood, and the last year. LRTspev participation was associated with improved autobiographical memory retrieval ($F[1,48] = 8.23$, $p<0.01$) and specificity, ($F[1,23] = 42.23$, $p<0.01$), and decreased depression ratings, ($F[1,22] = 41.92$, $p< 0.01$), post-intervention, compared to the control group. Changes in memory specificity persisted even when depression was controlled for within the model.

A second RCT provided four sessions of LRTspev versus TAU to 32 people diagnosed with 'schizophrenia' finding that autobiographical memory detail retrieval ($F [1, 15] = 31.86$, $p<0.01$, partial $g2 = 0.680$) and specificity improved significantly ($F[1,15] = 14.56$, $p<0.01$; partial $g2 = 0.49$) following LRTspev training versus TAU, but mood and repetitive negative thinking (brooding) did not. The study may not have replicated the findings of the 2012 study, due to briefer intervention exposure or smaller sample size.

Collectively, these results suggest that savouring interventions are safe, feasible, acceptable and may be effective when delivered alone or in conjunction with other PPI interventions. Intervention participation was associated with clinician and self-rated reductions in psychotic and mood symptoms, and reduced need for further treatment or re-admission. Individual studies reported increases in positive emotion, empowerment, self-acceptance, environmental mastery and life satisfaction. Some studies found that reported activity, savouring, well-being, and hope ratings improved, whereas others did not, so more robust studies are needed before strong conclusions can be drawn.

Research quality

Despite collectively reporting a number of interesting findings, there were several significant methodological shortcomings to the included studies. Thus, all conclusions,

particularly those regarding effectiveness, should be tentatively drawn. Specific problems were noted regarding the use of dissimilar sampling methods across studies and subsequent population heterogeneity, differences in the intensity and delivery of the intervention, and lack of attempts to control for confounding factors.

Most studies included participants diagnosed with 'schizophrenia' or 'schizoaffective disorder' but some also included those diagnosed with 'psychosis-not otherwise specified,' (Johnson et al., 2013), 'schizophreniform disorder' (Johnson et al., 2011) or 'delusional disorder' (Freeman et al., 2014; Ng et al., 2015; Schrank et al., 2016). Some studies selected populations with specific symptom profiles, e.g. persecutory beliefs (Freeman et al., 2014) or negative symptoms (Favrod et al., 2015; Johnson et al., 2011), ensuring that some samples were more or less cohesive than others. Two studies did not verify diagnosis (Cassar et al., 2013; Freeman et al., 2014). Some studies excluded participants on the basis of organic injury or intellectual disability (Favrod et al., 2010; 2015; Caponigro et al., 2014; Ng et al., 2015; Schrank et al., 2016) but others did not. Some studies attempted to recruit participants during a period of clinical stability, (Caponigro et al., 2014; Favrod et al., 2015; Schrank et al., 2016) whereas others did not.

Most studies delivered interventions in outpatient settings but one study recruited an inpatient sample (Ng et al., 2015) and another recruited a mixed inpatient and outpatient sample (Ricarte et al., 2012). Not all studies reported number of hospitalisations or duration of illness (Johnson et al., 2011; Caponigro et al., 2014; Freeman et al., 2014) so it was sometimes difficult to gauge population chronicity. Population chronicity did vary. Favrod et al., (2015) recruited participants with a mean age of 41.84 and mean duration of illness of 19 years from a nursing home, whereas Johnson et al., (2011) recruited an outpatient sample with a mean age of 29.4 years.

A major shortcoming of included studies was that a number did not incorporate a control group (Favrod et al., 2010; 2015; Johnson et al., 2011; Meyer et al., 2012; Caponigro et al., 2014). Of those that did, most chose to offer Treatment-As-Usual (TAU) as the control condition, however two studies offered seemingly more active comparators: recovery (Ng et al., 2015) or social skills and occupational therapy sessions (Ricarte et al., 2012) finding savouring interventions increased hope and reduce likelihood of further treatment need and re-admission. It was not possible to adequately assess randomisation and blinding procedures for one trial due to lack of reported information, (Johnson et al., 2013) but all other studies using single, double or triple blinding protocols provided adequate confirmation of allocation concealment. One controlled trial used an assessor-rated scale as the primary outcome measure and did not blind the assessor to intervention status (Schrank et al., 2016) so observer-expectancy effects may have influenced outcome ratings.

Not all studies attempted to control for the potentially confounding effects of low mood, positive symptoms, substance misuse, access to other therapies, medication and side effects. Only one study excluded participants who were currently receiving alternative forms of psychological therapy (Freeman et al., 2014). No studies administered measures of medication side effects and only one study measured medication and converted to chlorpromazine equivalents (Freeman et al., 2014). Two studies did not measure positive symptoms, instead relying on clinician report only (Johnson et al., 2011; Ng et al., 2013).

Four studies did not state how substance misuse was managed (LKM; Johnson et al., 2011; Cassar et al., 2013; ACES; Caponigro et al., 2014; PEPS; Favrod et al., 2015). Five studies did account for substance misuse by excluding participants with dependency diagnoses (Meyer et al., 2012; Ricarte et al., 2012; 2014; Freeman et al., 2014; Johnson et al., 2013; Schrank et al., 2016). However, given the high incidence of substance misuse in psychosis populations, their samples may not have been representative of those seen in

routine clinical practice (Möller, 2011). A more ecologically valid strategy might have been to measure and model substance misuse as a covariate.

As anhedonia is a central feature of both low mood and negative symptoms it was surprising that some studies did not measure low mood (Johnson et al., 2011; Caponigro et al., 2014; Ng et al., 2015; Cassar et al., 2013). One study that did measure low mood found that the intervention was more helpful to participants reporting both psychotic and mood symptoms, compared to psychotic symptoms alone, (Favrod et al., 2015) raising questions about whether savouring interventions specifically target anticipatory pleasure difficulties in psychosis or whether they are more broadly helpful to anyone experiencing emotion regulation difficulties.

A further major limitation is that the majority of studies did not trial savouring as a standalone intervention and those three studies that did (Ricarte et al., 2012; 2014; Johnson et al., 2013) all had relatively short exposure period (1-4 sessions) compared to other PPI interventions. Level and intensity of exposure varied greatly, with some studies providing up to 104 hours of individual therapy and other studies only offering four hours of group training. Most studies did not justify why the number of sessions and session lengths were chosen. One study with largely non-significant findings, (Schrank et al., 2016) had a low attendance rate (54.2%) and high attrition rate, so a number of participants may not have received the intended 'therapeutic dose' of the intervention. Trial therapists training attendance on this trial was inconsistent, so fidelity to the model may also have been poor.

Many participants savoured in multiple time frames (including past; Ricarte et al., 2012; 2014; present moment; Meyer et al., 2012; present moment and future; Favrod et al., 2010; Johnson et al., 2011; Freeman et al., 2014; Ng et al., 2015; Schrank et al., 2016; past and present moment; Johnson et al., 2013; and all three time frames; Caponigro et al., 2014;

Favrod et al., 2015), but studies did not comment on whether one sort of savouring had a greater impact than another. Studies used a variety of different stimuli to initiate savouring, e.g. objects, pictures, presentation slides, music, smelling or eating food, but few studies identified whether one type of stimuli may be more or less effective for people with a particular symptom profile.

A number of studies did not report how sample size was derived (Applegate et al., 2009; 2014; Johnson et al., 2011; Meyer et al., 2012; Ricarte et al., 2012; 2014; Cassar et al., 2013; Caponigro et al., 2014; Favrod et al., 2015; Ng et al., 2015) making it difficult to assess whether experimental power was adequate, and one study was reportedly underpowered (Johnson et al., 2013). Six studies did not report how missing data was handled (Ricarte et al., 2012; Cassar et al., 2013; Johnson et al., 2013; Ricarte et al., 2014; Favrod et al., 2015; Ng et al., 2015) but all others followed intention-to-treat principles. Only five studies collected follow-up data (Johnson, et al., 2011; Meyer, et al., 2012; Caponigro et al., 2014; Freeman, et al., 2014; Ng et al., 2015) but time period of follow-up was relatively short, (one to six months) so it is not known whether any beneficial effects persisted beyond six months. In summary, studies varied in quality and more controlled trials are needed in order to strengthen preliminary findings.

Discussion

Findings indicated: 1. consistent negative associations between savouring and psychosis, although experimental control varied between studies; 2. the hypothesised reasons for decreased savouring included reduced anticipatory pleasure, poor affective-cognitive control and a psychological preference not to broaden-and-build positive emotion; 3. participants safely engaged in a variety of savouring interventions that differed in effectiveness, but it was difficult to isolate the effects of savouring alone, because exercises

were frequently combined with other positive psychology interventions; 4. there were considerable limitations to the current research and a greater number of controlled trials are needed before reliable conclusions can be drawn.

When savouring interventions were delivered alone, one study found that self-reported levels of hope and happiness increased post-intervention (Johnson et al., 2013). Two studies found that intervention training was associated with improved retrieval and specificity of positive autobiographical memories (Ricarte et al., 2014) and alleviation of low mood (Ricarte et al., 2012). Thus, standalone savouring interventions appear to have beneficial effects on positive emotion, mood and autobiographical memory specificity in people experiencing psychosis. When delivered as part of a broader group PPI or FWWB intervention, savouring was associated with improved levels of hope and well-being in two of three studies, with one of these studies associating gains with reduced need for further outpatient treatment and reduced likelihood of re-admission in the six months following discharge (Ng et al., 2015).

Reduced savouring was identified in inpatient, outpatient and analogue high-risk psychosis populations. The review highlighted a number of hypothesised reasons for poor savouring in these groups that included anticipatory pleasure disconnection, affective-cognitive control, contextual binding and broaden-and-build theories. People experiencing psychosis may savour less: 1) due to difficulties translating immediate emotional experience into anticipatory enjoyment; 2) due to the impact of poor affective-cognitive control capacity on contextual binding, or; 3) due to a preference not to broaden-and-build positive emotion because of early trauma. More robust evidence is needed before these theories might be considered causal mechanisms.

One study related poor savouring to a second predictor; poor self-efficacy belief. Cassar et al., (2013) stated that those with psychosis reporting poor savouring also endorsed perceptions of increased task difficulty, indicating that defeatist beliefs could be undermining their attempts to persist to achieve goals. Both defeatist beliefs and reduced expectancies of pleasure are highlighted as maintaining factors in the cognitive model of negative symptoms (Rector et al., 2005). Therefore, future studies might consider investigating whether defeatist beliefs mediate or moderate the relationship between savouring and psychosis.

Collectively, these studies suggest that savouring interventions are acceptable, feasible and safe, and can be delivered in both inpatient and outpatient settings. No data was available on cost effectiveness. Significant barriers to participation were institutionalisation defeatist beliefs and cognitive difficulties so future studies should take these factors into account when designing interventions. Some participants struggled to access savouring technique content due to problems with understanding, concentration and recall, so telephone and diary reminders and written session records may improve intervention effectiveness.

Outcome was measured in numerous ways including: symptom response; increased savouring ability, positive emotion, and activity levels; and improved positive psychology outcomes, such as hope and wellbeing. Thus, it was not possible to present meta-analytic data in the current systematic review due to population and outcome measurement heterogeneity. Future studies may benefit from inclusion of an active control condition, ensuring all assessors are blind to intervention status, and adopting a more consistent approach to evaluating outcomes.

Limitations

Many of the reported studies recruited subtly different groups, had small sample sizes, and did not include a control condition. These factors hindered the review process. The

search strategy did not identify any standalone qualitative studies dedicated to examining savouring in people experiencing psychosis, again limiting the remit of this review to reporting largely on quantitative data. No experts-by-experience were consulted in the planning stages of the reported savouring research studies, so it was not possible to ascertain whether savouring was an area of concern for people experiencing psychosis, or whether it was simply an area of interest to researchers. Finally, three of the included systematic review papers were authored by EA. This was addressed by recruiting a second rater who was blind to authorship. Inter-rater reliability was good, suggesting that quality appraisal ratings were unlikely to have been affected by bias but the second reviewer could only commit to reviewing a random sample of 10% of papers. The study may have been enhanced if the second rater could have reviewed 100% of identified studies.

Future directions

Future research should attempt to address some of the described methodological flaws by conducting more robust, larger scale controlled trials. Studies could investigate whether one type of savouring intervention is more effective than others, and whether improvement is specific to certain symptoms, symptom clusters, psychosis as a whole entity, or whether savouring is a transdiagnostic process that aids emotion regulation difficulties in general. It may be important to first ascertain whether people with psychosis can accurately report their own savouring behaviour, by examining whether their estimates converge with behavioural measures of savouring. This would greatly enhance the reliability and validity of future research. Future studies could use experience sampling methods to capture more detailed, real-time, longitudinal data, such as emotional response to, and cognitive appraisal of, positive events as they occur, beliefs about the same event following a delay, motivated acts following the event and predictions about the likelihood the event will recur in the future.

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Chapter Two: Empirical Paper

Fear of positive affect, social safeness and emotion regulation differences in negative schizotypy[1]

Word count minus references: 7657

[1] Article prepared for submission to the Journal of Abnormal Psychology. Please see Appendix F for author guidelines for the journal.

Abstract

People experiencing the negative symptoms of psychosis, or reporting attenuated, sub-clinical negative signs, known as negative schizotypy, savour positive events in the past, present and future less often than non-negative symptom and non-negative schizotypy control participants do. This may occur due to difficulties recollecting the emotions associated with past positive experiences and consequential poor prediction of future enjoyment. Alternatively, it may be that fear of positive emotion, caused by a lack of social safeness, prevents enjoyment of positive emotion and drives functional avoidance of savouring. This study was the first to investigate whether a 'functional avoidance' pathway to poor savouring was evident in high raters on a measure of negative schizotypy. Three hundred and twenty participants (76% female; *M*age= 38) completed seven online self-report measures of schizotypy, low mood, fear of positive and negative emotion, social safeness, type of positive affect and emotion regulation strategy use.

Negative schizotypy was associated with fear of positive, but not negative, emotion and decreased savouring, but not increased dampening, emotion regulation strategy use. These relationships became non-significant when social safeness was entered into a hierarchical regression model. Further analysis established that social safeness partially mediated the relationship between fear of positive emotion and negative schizotypy. People rating highly in negative schizotypy might savour less because positive emotion is perceived as unsafe. If these findings are replicated in a clinical sample, then psychosocial interventions for negative symptoms should increase social safeness prior to introducing savouring techniques to heighten anticipatory pleasure and improve goal-directed activity.

Keywords: Negative Schizotypy, Negative Symptoms, Social Safeness, Savouring, Dampening, Emotion Regulation

General Scientific Summary: "This study suggests that people rating highly in negative schizotypy are less likely to experience positive emotions as safe, and consequently are less likely to use emotion regulation strategies, such as savouring, to upregulate mood."

Language: This study is written in British English language.

Introduction

Psychosis is a collective term used to describe a cluster of experiences known diagnostically as positive, negative, cognitive and affective symptoms (British Psychological Society, 2017). The lifetime likelihood of developing psychosis is 0.7% (Van Os, Kenis, & Rutten, 2010) and it is one of the top fifteen causes of functioning difficulties worldwide (Murray et al., 2010). Those experiencing positive symptoms ('hallucinations' and 'delusions') may perceive or interpret things differently from others, possibly due to reality monitoring problems (Garrison et al., 2017). Whereas those experiencing negative symptoms may: display less emotion outwardly through reduced facial, vocal and bodily expressivity; report reduced motivation and enjoyment; and display fewer goal-directed and social behaviours (Grantholm, Holden & Worley, 2017).

The identification of negative symptoms early on in the course of psychosis is problematic because negative symptoms are thought to have an accruing deleterious effect on psychological well-being, social functioning (Hunter & Barry, 2012) and long-term course and outcome (Rabinowitz et al., 2012). Poorer quality of life (Strauss, Sandt, Catalano, Allen, 2012) and greater carer distress and burden (Rabinowitz, Berardo, Bugarski-Kirola, Marder, 2013) are more strongly associated with negative symptoms than positive symptoms. Whilst those experiencing psychosis may report a mixture of positive, negative, cognitive and affective symptoms, negative symptoms are highly prevalent in routine clinical samples (23-58%; Bobes, Arango, Garcia-Garcia, & Rejas, 2010) and current understanding of the factors that precipitate and maintain them is poor (Strauss & Cohen, 2017). Psychosocial and pharmacological interventions have so far demonstrated limited effectiveness (Fusar-Poli et al., 2015; Velthorst et al., 2016). Hence, there is a pressing need to develop new psychological models of, and effective treatments for, negative symptoms (Grantholm & Harvey, 2018).

There is strong evidence to suggest that negative and positive symptoms exist on a continuum, as attenuated negative and positive psychotic signs, known as negative and positive schizotypy, are consistently identified in the general population at a point prevalence rate of 7% (Van Os et al., 2009; van Os & Reininghaus, 2016). Negative and positive symptoms and schizotypy appear phenomenologically and structurally similar, as schizotypy subdivides into two distinct dimensions resembling positive and negative symptomatology when self-report data is factor analysed and, negative schizotypy, like negative symptoms, also parses into expressive and volitional components (Piskulic et al., 2012). Thus negative and positive schizotypal signs are identifiable, and are likely to be phenomenologically and structurally similar.

Whilst many people rating highly on measures of negative and positive schizotypy do not go on to develop psychosis, (80%; van Os & Reininghaus, 2016) and do not seek help from clinical services, their participation in non-clinical analogue studies, provides opportunities to test hypotheses about negative signs in large groups that are typically easier to reach and unlikely to be in receipt of antipsychotic medication, known to confound predictive models of psychosis (Peters et al., 2016). Conversely, populations with predominant negative symptoms tend to be harder to reach due to low motivation and social withdrawal (Jørgensen et al., 2014). Therefore it is feasible to make predictions about negative symptoms based on data from non-clinical analogue samples.

People rating highly on measures of psychotic symptoms, (Cassar, Applegate & Bentall, 2014) negative symptoms, (Applegate, 2011) and negative schizotypy, (Applegate, El-Deredy & Bentall, 2009) self-report that they savour positive events in the past, present and future less often than non-negative symptom or non-schizotypal control groups. This finding is of interest because in non-clinical samples increased savouring has been associated with increases in positive emotion, resilience, coping, well-being and life satisfaction

(Bryant, Chadwick & Kluwe, 2011; Smith & Hanni, 2017) and decreased savouring has been associated with increases in low mood and anxiety (Taylor, Lyubomirsky & Stein, 2017).

Savouring requires purposeful mental engagement with remembered past, experienced present or imagined future positive experiences, with the intention of generating, intensifying or prolonging (upregulating) positive emotion (Bryant et al., 2011). Conversely, positive affect can be downregulated using dampening strategies such as suppression, fault finding and distraction (Wood, Heimpel, & Michela, 2003). People engage in savouring by directing attention towards pleasant sensations, perceptions, thoughts, behaviours and emotions using cognitive reflection, experiential absorption, behavioural expression and mental time travel techniques (Quoidbach, Berry, Hansenne & Mikolajczak, 2010).

When savouring behaviour was examined in groups rating highly in negative symptoms (Applegate, 2011) and negative schizotypy (Applegate, El-Deredy & Bentall, 2014) both groups tended to recall fewer, less elaborate past positive memories and used fewer words to describe fewer future positive experiences than IQ, gender and age matched control participants or analogue participants rating low on the same measure of schizotypy. Simultaneously, the same groups report difficulties initiating action and engaging in goal-directed behaviour (Rinaldi & Lefebvre, 2016) particularly when tasks require a high perceived level of effort (Gold, Waltz & Frank, 2015).

It is not known why savouring is decreased in these groups, but one predominant theory suggests that poor affective cognitive control capacity (that is the ability to support active maintenance of emotional information in memory for the purpose of achieving a task or goal; Schweizer, Grahn, Hampshire, Mobbs & Dalgleish, 2013) may compromise ability to recall the emotion associated with positive autobiographical experiences after a delay. Later lack of access to the memory of the emotion is believed to decrease predicted future

anticipatory enjoyment and goal-seeking behaviour (Heerey & Gold, 2007; Gard, Kring, Gard, Horan & Green, 2007; Strauss, Kappenman, Culbreth, Catalano, Lee, & Gold, 2013).

The mismatch between remembered, present moment and anticipated future enjoyment represents an 'emotional paradox' (Strauss, 2013) that has been referred to as the 'pleasure disconnection hypothesis' (Gard et al., 2007). Evidence to support this theory comes from a systematic review (Kring & Moran, 2008) and clinical meta-analysis (Cohen & Minor, 2010; updated by Kring & Elis, 2013) of over thirty studies which found that those rating highly on measures of negative schizotypy or negative symptoms experienced equivalent present moment enjoyment when presented with pleasant stimuli (measured using self-report, behavioural and psychophysical indices) but participants did not display these emotions outwardly, and they reported less remembered and anticipated future enjoyment than unaffected control participants.

Electrophysiological studies of emotion also support theories relating to decreased affective cognitive control capacity. These studies have shown that people experiencing psychosis display a delayed ability to downregulate electrophysiological (saccadic eye movement) responding to positive stimuli, relative to control participants (Strauss, et al., 2013). Participants continue to respond physiologically even when the positive stimuli is no longer present. This delay in downregulation may cause the emotion associated with the original positive stimuli to be encoded along with contextual information from subsequent events that could be negative or neutral, again impacting reward learning and how future motivated activity is guided (Strauss, et al., 2013).

There is some evidence to suggest that mood (Ricarte, Hernández-Viadel , Latorre & Ros, 2012) and affective cognitive control capacity (Ricarte, Hernández-Viadel , Latorre, Ros, & Serrano, 2014) in people experiencing psychosis can be improved using regular,

deliberate savouring exercises within a guided mental imagery framework. As people rating highly in negative schizotypy exhibit similar cognitive differences to those experiencing negative symptoms (such as executive functioning, working memory, sustained attention and set shifting problems; Karagiannopoulou et al., 2016) they too may benefit from interventions that improve affective cognitive control capacity (Van der Gaag et al., 2012).

Founded on observations from the broaden-and-build theory of positive emotion (Fredrickson, 2001; 20013) and the social defeat theory of negative symptoms (White, Laithwaite & Gilbert, 2013), one alternative explanation to the affective cognitive control hypothesis, might be that people experiencing negative symptoms or negative schizotypy savour less due to a dispositional preference to downregulate positive emotion, which inadvertently results in more global reductions in motivation. Whilst this hypothesis is not established in the literature, it could be conceptualised as a 'functional avoidance' pathway to reduced savouring in negative symptoms or negative schizotypy.

The broaden-and-build theory of positive emotion speculates that savouring emotion regulation strategies create upward spirals of positive emotion whereas dampening strategies, such as suppression, distraction and fault-finding, create downward spirals of positive emotion (Fredrickson, 2001; 2013; Quoidbach et al., 2010). Laboratory-based research in non-clinical populations has identified individual differences in the way that people upregulate or downregulate positive and negative emotional experiences, (Wood et al., 2003) and there is preliminary evidence to suggest that people experiencing psychosis (Moran, Culbreth & Barch, 2017) or schizotypy (Lincoln, Sundag, Schlier & Karow, 2017) use emotion regulation strategies to downregulate positive affect. In a recent ecological momentary assessment study of thirty people experiencing psychosis, use of suppression was common and was associated with greater negative and less positive emotion (Moran et al., 2017). Reduced awareness of positive emotion and emotion suppression have also been

identified in samples of people 'at risk' of developing psychosis (Kimhy et al., 2016; Lincoln et al., 2017) so there is evidence to suggest that emotion regulation strategy use differs in both 'at risk' and clinical samples and this may relate to preference to downregulate positive affect.

The social defeat model of negative symptoms (White, Laithwaite & Gilbert, 2013) derived from social mentality theory (Gilbert, 1989; 1995; 2005; 2015) may also provide support for a 'functional avoidance' explanation of reduced savouring. Gilbert (2010) has proposed that three affect-regulatory systems evolved to detect and react to danger by increasing vigilance and anxiety, (the 'threat' system), to notice and respond to reward cues by expression of activating positive emotion, (the 'drive' system) and to increase sense of social safety through feelings of social connectedness and soothing (the 'social safeness' or 'soothing' system). An imbalance of these three affect-regulatory systems is hypothesised to cause a number of emotional and behavioural differences, such as increases in suspicious thinking and changes to emotion perception and regulation (White et al., 2013).

Emotional safety is typically thought to emerge following repeated exposure to social experiences in which positive and negative emotions have been safely expressed. However, the social defeat model conceptualises negative symptoms as a reaction to early affiliative experiences in which positive emotion has instead been chronically associated with threat and defeat, rather than safe and soothing experiences (White et al., 2013). Over time repetitive negative interpersonal experiences involving social threats, such as rejection, neglect, blame, shame and self/other stigmatisation, are hypothesised to over-develop 'threat' and under-develop 'soothing' systems. Later adult experiences involving positive emotion, particularly affiliation, are hypothesised to trigger emotionally opponent processes causing positive emotions to feel threatening and unsafe.

If people experiencing negative symptoms or negative schizotypy do perceive positive emotions as threatening or unsafe, then reduced savouring or increased dampening might represent a deliberate cognitive attempt to reduce the intensity of felt positive affect. A number of studies have identified that people who fear positive affect use downregulating emotion regulation strategies, such as suppression to inhibit outward signs of internal positive feelings (Hayes & Feldman, 2004; Beblo et al., 2012; Kelly, Zuroff, Leybman & Gilbert, 2012; Gilbert, McEwan, Catarino & Baião 2014; Holden, Kelly, Welford & Taylor, 2017) and differences in social safeness have been detected in people rating highly on measures of negative schizotypy (Riehle & Lincoln, 2017).

A prior study found both decreased facial expressivity and reduced social safeness in participants scoring highly on schizotypy measures, relative to non-schizotypal control participants. When schizotypal participants were matched to non-schizotypal control participants, control participants reported that they were less willing to engage in future social interactions with schizotypal participants due to feelings of unease associated with the participant's reduced facial expressivity (Riehle & Lincoln, 2017). Hence, sense of social safeness may have intra and inter-personal consequences in both clinical and non-clinical groups (Riehle & Lincoln, 2017) in which people with negative symptoms or negative schizotypy encounter ongoing experiences that are socially rejecting and isolating. The relationship between social safeness and fear of positive emotion may be self-reinforcing because lack of social safeness reduces the likelihood of motivated activity, which in turn decreases the likelihood of experiencing corrective social encounters that feel safe. Theoretically, it may be that the relationship between fear of positive emotion and negative schizotypy is mediated by sense of social safeness. If sense of social safeness is increased, fear of positive emotion may diminish, and negative schizotypy may reduce.

In terms of feasible interventions, Gilbert's (2009) compassionate mind theory suggests that in order to begin to feel socially safe, the soothe system needs to be activated to reduce sense of threat and enhance emotion regulation, and this can be achieved through Compassion Focussed Therapy, CFT (Gumley et al., 2010). Prior studies delivering CFT versus treatment-as-usual (TAU) to small samples of people experiencing psychosis, have found that CFT had beneficial effects on global clinical impression, (Braehler et al., 2013) negative symptoms, and cognitive disorganisation (Gumley & MacBeth, 2014) compared to TAU. Symptom improvements were attributed to reduced recipient attention to threat, increased sense of social safeness and positive affect, and broadening of thought-action repertoires so that recipients could react more flexibly to social opportunities (Gumley & MacBeth, 2014).

In summary, those rating highly in negative schizotypy and negative symptoms may savour less for two reasons. Firstly, due to the impact of poor affective cognitive control capacity on reduced access to accurately remembered positive emotion, or secondly due to a dispositional preference to downregulate or functionally avoid positive affect, underpinned by fear of positive emotion and lack of social safeness. As there is already available data addressing the first hypothesis this study will examine the second 'functional avoidance' hypothesis by measuring self-reported fear of positive emotion, social safeness, preference for type of positive affect (active, relaxed, safe) and use of emotion regulation strategies, such as savouring or dampening, in those rating highly on a measure of negative schizotypy. Based on the existing literature it is hypothesised that:

1. Negative schizotypy will be significantly positively associated with fear of positive emotion, and significantly negatively associated with social safeness.
2. Negative schizotypy will be significantly positively associated with dampening and significantly negatively associated with savouring, and other upregulating emotion

regulation strategies including activating, avoiding, channelling, connectedness, gratitude, helping, and stimulating.

3. Fear of positive (but not negative) emotion, increased dampening, reduced savouring and decreased social safeness will predict negative schizotypy.
4. The relationship between fear of positive emotion and negative schizotypy will be mediated by social safeness.

Methods

Participants

Three hundred and twenty participants aged 18 and over completed an online survey in August, 2017. A further eighty-four people (20.8%) provided incomplete data so were excluded from the analysis (see Figure 1 for study flow).

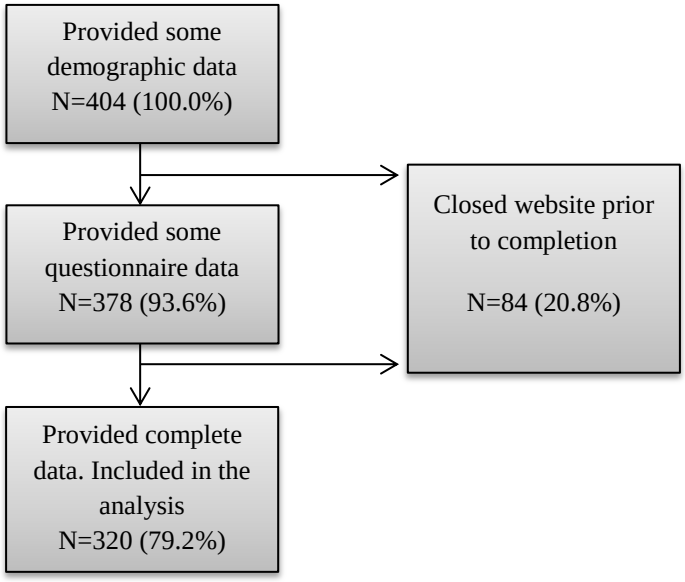

Figure 1. Participant study flow

Completers were not significantly different to non-completers in age, gender, ethnicity, education, employment, student, relationship or mental health status (see Appendix G). As can be seen in Table 1, participants remaining in the analysis were primarily female,

(n = 244; 76.3%), White British (n = 298; 93.1%) with a mean age of 38, (*SD* = 10.63, range 18-76).

Table 1. Means (*M*) and standard deviations (*SD*) for demographic variables

Demographic Variables		*n* (%) unless otherwise stated
Age (years)	Listed	313 (97.8)
		M 37.68, *SD* 10.63, range 18-76
	Not listed	7 (2.2)
Gender	Male	74 (23.1)
	Female	244 (76.3)
	Other/not listed	2 (.6)
Ethnicity	White British/Irish	298 (93.1)
	Other/not listed	22 (6.9)
Relationship status	In a relationship	239 (74.7)
	Not in a relationship	75 (23.4)
	Other/not listed	6 (1.9)
Highest level of Education	No qualifications	6(1.9)
	School, college, work qualifications	74 (23.1)
	University qualifications	240 (75)
Employment status	Employed*	258(80.6)
	Not Employed	52 (16.3)
	Other/not listed	10 (3.1)
Student status	Student†	58 (18.2)
	Non-student	259 (80.9)
	Other/not listed	3 (.9)
Mental health status	Previous mental health difficulties	78 (24.4)
	Current mental health difficulties	25(7.8)
	Previous and current mental health difficulties	61 (19.1)
	Never had mental health difficulties	150 (4.9)
	Not listed	6 (1.9)
Schizotypy	Negative schizotypy	*M* 8.23, *SD* 5.38, range 0-25
	Positive schizotypy	*M* 9.95, *SD* 6.94, range 0-30
Low mood	All sample	*M* 7.46, *SD* 5.97, range 0-27
	Meeting caseness (>9)	88 (27.5)
		M 15.53, *SD* 4.64, range 10-27
	Not meeting caseness (<10)	232 (72.5)
		M 4.40, *SD* 2.61, range 0-9
Alcohol misuse±	Listed	306 (95.6)
		M 24.48, *SD* 54.13, range 0-365
	Not listed	14 (4.4)
Drug misuse≠	Listed	310 (96.9)
		M 9.85, *SD* 48.41, range 0-365
	Not listed	10 (3.1)

Note: *M* = mean; *SD* = standard deviation; *Employed refers to full-time and part time employment; † student refers to both full-time and part-time students; ± alcohol misuse was defined as the number of days per year that

a person drank above government recommended daily alcohol unit allowance for their gender; ≠ drug misuse was defined as the number of days per year that any psychoactive substance was misused.

Most participants were either in full-time (n = 185; 57.8%) or part-time (n = 73; 22.8%) employment but a small proportion were enrolled in full-time education (n = 38; 11.9%). Around one quarter (n = 81; 26.1%) of participants had used an illicit drug at least once in the previous 12 months; although, daily use per annum varied greatly (range 0-365). A small proportion said they were currently experiencing mental health problems (n = 25, 7.8%)

Measures

Oxford Liverpool Inventory of Feelings and Experience (OLIFE; Mason, Claridge & Jackson, 1995). The short-form OLIFE (OLIFE-SF) is a multi-dimensional self-report measure of schizotypal traits Participants responded 'yes' or 'no' to 27 items measuring negative schizotypy and 30 items measuring positive schizotypy. The OLIFE-SF has previously been used to reliably identify an analogue sample (Applegate, El-Deredy & Bentall, 2009). Internal consistency for both subscales remained high in the current study (negative schizotypy Cronbach's α = .87; positive schizotypy Cronbach's α = .90).

Physical Health Questionnaire-version 9 (PHQ-9; Kroenke, Spitzer & Williams, 2001). The PHQ-9 is a widely used, nine-item self-report measure of low mood over the previous two weeks. Participants selected one response option from a 4-point Likert scale ranging from 0 ('not at all') to 3 ('nearly every day'). The PHQ-9 demonstrated high levels of sensitivity and specificity when validated in primary care (Cameron, Crawford, Lawton & Reid, 2008) and internal consistency remained high in the present study (Cronbach's α = .89)

Social Safeness and Pleasure Scale (SSPS; Gilbert, et al., 2009). The SSPS is an 11-item, self-report measure of feelings of safeness, warmth and social connection. Participants

rated the frequency that they experienced these feelings on a 1 (‘almost never’) to 5 (‘almost all the time’) point Likert scale. The SSPS has previously demonstrated good construct and discriminant validity, internal consistency and reliability (Kelly, Zuroff, Leybman & Gilbert, 2012) and demonstrated excellent internal consistency in the current study (Cronbach’s α = .95).

Fear of Happiness Scale (FHS; Gilbert et al., 2012). The FHS is a 9-item, self-report measure of fear of positive emotion. Participants rated items such as ‘I worry that if I feel good, something bad could happen,’ from 0 (‘not at all like me’) to 5 (‘extremely like me’). The FHS has shown good validity and reliability in UK populations (Gilbert et al., 2012) and demonstrated excellent internal consistency in the current study (Cronbach’s α = .91).

Three Types of Positive Affect Scale (TPAS; Gilbert et al., 2008). The TPAS is an 18-item, self-report measure examining experience of three different types of positive emotion: active, relaxed and safe emotions. Participants rated 18 ‘feeling’ words on a 5-point Likert scale ranging from 0 (‘not characteristic of me’) to 4 (‘very characteristic of me’). The TPAS has demonstrated good psychometric properties (Relojo, 2015) and internal consistency remained very good in the current study (active Cronbach’s α = .89; relaxed Cronbach’s α = .90; safe Cronbach’s α = .83).

Fear of Negative Emotions Scale (FNES; Gilbert, McEwan, Catarino & Baião, 2014). The 6-item, self-report FNES measures fear and avoidance of anger, anxiety and sadness using items such as ‘I go out of my way to avoid feeling anxious’. Participants rated each question on a 5-point Likert scale ranging from ‘0’ (‘not at all like me’) to 4 (‘extremely like me’). The measure has been used in several online studies (Gilbert et al., 2014) and showed good internal consistency in the current study (Cronbach’s α = .84).

Inventory of Responses to Positive Affective States (IRPAS; Wright & Armstrong, 2016). The IRPAS is a 59-item, self-report measure of response to positive affect. Participants were asked to recall a particular time when they felt good (calm, happy, enthusiastic or active) and rate 59 statements on a 4-point Likert scale ranging from 0 ('almost never') to '4' ('almost always') to indicate whether they were likely to use any of eleven affect regulation strategies in response to their good mood. Internal reliability remained acceptable for all affect regulation strategy subscales (see Appendix H). The IRPAS has previously demonstrated good convergent and divergent validity and test-retest reliability (Wright & Armstrong, 2016). All measures are reproduced in Appendix I.

Design, sample size and ethical approval

An online, cross-sectional, self-report design was employed in order to maximise sample size and heterogeneity for the purpose of theory testing. Service users from the Liverpool Experts by Experience (LExE) group provided feedback on the study design, judging it to be worthwhile, feasible and ethical. A priori power analysis using G*Power 3 (Faul, Erdfelder, Bucher & Lang, 2009) suggested a minimum of 158 participants would provide 95% power to identify an effect size of 0.15 with eight predictors at the $p<0.01$ significance level, when a Bonferroni correction had been applied (see Appendix J). To account for expected incomplete data in 20% of cases, the initial proposed sample size was increased to 190. Given the final sample size (n = 320) the study was adequately powered. Ethical approval was granted by the University of Liverpool Research Ethics Committee (RETH001791, 04/07/17; see Appendix K).

Procedure

A survey was created and hosted using the Qualtrics (2017) software platform. Forced response options were chosen to ensure data completeness. A link to the study website was

placed on a university intranet announcements page and posted on social media and research recruitment websites. Participants were directed to participant information and consent pages, advising them of their right to anonymity, confidentiality and withdrawal. Participants were required to provide informed consent and declare that they were aged 18 years and over and fluent in English language (see Appendix L and M for participant information and consent forms). Demographic data was collected prior to completion of the study measures. Participation took around 20 minutes. Once all sections were completed a debrief page was displayed which signposted participants to mental health charities and offered to enter them into a prize draw for one of thirteen gift vouchers.

Results

Data preparation

Statistical analysis was conducted using Statistical Package for the Social sciences (SPSS) version 24 (IBM Corp., 2016). All hypotheses regarding the dependent variable, negative schizotypy and predictor variables, fear of positive emotion, fear of negative emotion, savouring, dampening and social safeness were theory-driven and formulated a priori (Kerlinger, 1964). Pearson's product-moment correlation coefficients were examined to test hypotheses one and two. Hypothesis three was investigated by running a four-stage hierarchical multiple regression model and mediational analysis.

Missing data was observed between measures, but not within measures, due to the Qualtrics progression restriction settings used. All estimated means were uncorrelated and Little's MCAR test was non-significant, demonstrating that data was missing completely at random ($X^2 = 223.37$, df = 214, p = 0.32; Little & Rubin, 1987). Listwise deletion was used throughout subsequent analyses. Kolmogorov-Smirnov test statistics and visual inspection of Q-Q plots and histograms revealed that data for all subscales, with the exception of TPA-

Relaxed (D (320) = .88, p < .01), was non-normally distributed, so violated the parametric assumptions of normality, sphericity, skewness and kurtosis (Tabachnich & Fidell, 2013).

TPA-relaxed, and alcohol and drug misuse variables were not transformed, as these were thought to reflect the expected distributions in the general population (Dacre-Pool & Qualter, 2013). OLIFE-SF, PHQ-9, FNE, FHS, SSPS, TPA and IRPAS subscales were successfully re-expressed using square root transformation. Post-transformation histograms showed that subscales had become normally distributed and could be used in parametric analyses.

Confounding variables, such as low mood, positive schizotypy, drug and alcohol misuse, were managed using initial exploratory correlational analysis, modelling them as co-variates where possible, and applying a PHQ-9 caseness filter so that Pearson's correlation coefficients could be examined both with and without depressed participants. A caseness cut off of 10 was chosen based on sensitivity and specificity findings reported within a recent systematic review (Mitchell, Yadegarfar, Gill & Stubbs, 2016). Given anticipated problems with multicollinearity between social safeness and TPAS subscales, TPAS subscales were not included in the final regression model. Model fit, multicollinearity, homoscedasticity, outliers and independence errors were evaluated by examining plots of residuals, correlation matrices, and variation inflation factors (Field, 2013).

Exploratory analysis

Independent sample t-tests and correlational analysis were used to examine the relationships between negative schizotypy and demographic or clinically relevant variables. Prior to applying the low mood filter, negative schizotypy was significantly positively correlated with low mood, (r = .40, p < .01), positive schizotypy, (r = .20, p <.01), and drug misuse (r = .26, p < .01) but not age and alcohol misuse. After the PHQ-9 caseness filter was

applied a smaller, but still significant, relationship remained between low mood and negative schizotypy (r = .15, p < .05) and negative schizotypy was no longer significantly correlated with positive schizotypy or substance misuse.

Mean negative schizotypy score did not differ significantly by gender, ethnicity, employment or student status, but did differ by relationship and mental health status. Participants who were not in a relationship had significantly higher mean negative schizotypy scores than those who were in a relationship (M = 8.65, SD = 4.77 and M = 6.48, SD = 4.64 respectively, t(209) = 2.73, p < .01). Participants who reported mental health difficulties at any time (either current or past) reported significantly higher mean negative schizotypy scores than those who had reportedly never experienced mental health difficulties (M = 8.31, SD = 5.55 and M = 6.11, SD = 4.06 respectively, t(207) = -3.29, p < .01).

Hypothesis testing

In agreement with hypothesis one, negative schizotypy and fear of positive emotion were significantly positively correlated both before (r = .49, p < .01) and after (r = .38, p < .01) the low mood filter was applied (see Table 2). Fear of negative emotion was significantly positively correlated with negative schizotypy, (r = .27, p < .01), but this relationship was no longer significant when the low mood filter was applied. Negative schizotypy was significantly negatively correlated with social safeness pre (r = -.66, p < .01) and post filter (r = -.62, p < .01). Applying the filter did not greatly change the magnitude of these associations. Negative schizotypy was significantly negative correlated with increased active, relaxed and safe positive affect pre-filter (active, r = -.59, p < .01; relaxed, r = -.18, p < .01; safe r = -.47, p < .01) but post-filter, only relationships between negative schizotypy and active (r = -.57, p < .01) and safe (r = -.32, p < .01) affect remained significant.

Table 2. Descriptive and bivariate statistics for criterion and predictor variables

Variable	M (SD), range	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
1. OLIFE-SF: Negative Schizotypy†	8.25 (5.36), 0-25	1	.20**	.40**	.49**	.27**	-.66**	-.59**	-.18**	-.47**	-.37**	.24**	-.18**	.04	.02	-.04	-.20**	-.35**	-.27**	-.10	.09
2. OLIFE-SF: Positive Schizotypy†	10.10 (6.95), 0-30	.09	1	.47**	.43**	.49**	-.29**	-.13*	-.17**	-.26**	-.05	.30**	-.02	.30**	.12*	.06	.08	.06	.17**	.26**	.23**
3. PHQ-9: Low Mood†	7.63 (6.12), 0-27	.15*	.35**	1	.57**	.56**	-.48**	-.43**	-.39**	-.48**	-.33**	.50**	-.16*	.26**	.19**	.03	-.15**	-.23**	.04	.04	.30**
4. FHS: Fear of Positive Emotion†	9.47 (8.37), 0-36	.38**	.35**	.40**	1	.51**	-.62**	-.43**	-.38**	-.55**	-.35**	.44**	-.12*	.23**	.19**	-.01	-.14*	-.28**	-.09	.05	.23**
5. FNES: Fear of Negative Emotion†	8.94 (6.07), 0-24	.12	.41**	.38**	.43**	1	-.34**	-.18**	-.30**	-.34**	-.15**	.44**	.05	.32**	.31**	.22**	.02	-.04	.14*	.21**	.33**
6. SSPS: Social Safeness†	35.89 (11.45), 11-5	-.62**	-.19**	-.27**	-.57**	-.22**	1	.55**	.38**	.71**	.44**	-.30**	.13*	-.08	-.09	.12*	.25**	.41**	.27**	.08	-.19**
7. TPA: Active†	15.49 (7.00), 0-31	-.57**	-.04	-.28**	-.34**	-.04**	.52**	1	.34**	.56**	.48**	-.19**	.45**	.02	.01	.16**	.44**	.42**	**.31	.24**	-.08
8. TPA: Relaxed	10.79 (5.60), 0-24	-.08	-.07	-.27**	-.30**	-.19**	.33**	.25**	1	.58**	.37**	-.24**	.14*	-.15**	-.03	.22**	.15**	.22**	.16**	.14**	-.18**
9. TPA Safe†	8.91 (3.91), 0-16	-.32**	-.15*	-.26**	-.47**	-.17*	.65**	.46**	.52**	1	.44**	-.30**	.18**	-.12*	-.13*	.15*	.29**	.41**	.25**	.08	-.23**
10. IRPAS: Savouring†	19.31 (4.84), 7-28	-.31**	.00	-.21**	-.32**	-.07	.37**	.46**	.31**	.33**	1	-.45**	.36**	.02	.15**	.37**	.53**	.64**	.35**	.46**	-.16**
11. IRPAS: Dampening†	11.73 (4.39), 7-26	.10	.15*	.30**	.37**	.34**	-.18**	-.16*	-.15**	-.14*	-.37**	1	-.03	.38**	.23**	.16**	-.09	-.20**	-.20**	.06	.45**
12. IRPAS: Activating†	5.86 (2.17), 3-12	-.19**	-.02	-.01	-.14**	.16*	-.14**	.46**	.10	.16 *	.34**	.04	1	.10	.16**	.27**	.41**	.34**	.23**	.35**	.04
13. IRPAS: Analysing†	10.19 (3.54), 5-20	-.01	.24**	.18**	.20**	.30**	-.04	-.01	-.10	-.09	.04	.32**	.12	1	.24**	.28**	.30**	.14**	.28**	.39**	.23**
14. IRPAS: Avoiding†	9.98 (2.85), 4-16	-.04	.04	.19**	.16**	.27**	-.02	.08	.03	-.07	.23**	.21**	.27**	.21**	1	.53**	.16**	.17**	.31**	.20**	.23**
15. IRPAS: Calming†	14.31 (3.52), 6-24	-.04	-.02	.06	-.02	.24**	.14	.13	.21**	.13	.37**	.20**	.30**	.28**	.53**	1	.35**	.28**	.44**	.44**	.18**
16. IRPAS: Channelling†	17.49 (4.29), 7-28	-.15*	.11	-.04	-.11	.09	.18**	.40**	.11	.26**	.46**	.06	.40**	.35**	.25**	.37**	1	.54**	.44**	.42**	.01
17. IRPAS: Gratitude†	13.72 (3.97), 5-20	-.30**	.11	-.09	-.22**	.05	.37**	.37**	.16*	.34**	.61**	-.15*	.35**	.17**	.20**	.28**	.55**	1	.47**	.45**	-.04
18. IRPAS: Helping†	11.14 (2.77), 4-16	-.24**	.15*	.13	-.08	.16*	.27**	.25**	.13*	.24**	.30**	.26**	.23**	.28**	.31**	.45**	.42**	.43**	1	.42**	.12*
19. IRPAS: Higher Connectedness†	16.35 (4.69), 7-28	-.10	.25**	.08	.06	.25**	.04	.20**	.11	.01	.43**	.07	.36**	.42**	.22**	.44**	.45**	.46**	.42**	1	.16**
20. IRPAS: Stimulating†	6.22 (2.60), 4-16	.00	.13	.12	.12	.24*	-.13	-.03	-.06	-.15*	-.09	.38**	.09	.16*	.18**	.22**	.09	.01	.07	.16*	1

Note: N = 320; Pearson's product-moment correlation coefficients; * = significant at $p<.05$; ** = significant at $p<.01$; shaded cells report correlations when PHQ-9 caseness filter has been applied; † = square root transformed values used but non-standardised means (M), Standard Deviation (SD) and range values reported ; OLIFE-SF = Oxford-Liverpool Inventory of Feelings and Experiences-Short-Form; PHQ-9 = Physical Health Questionnaire-Version 9; FHS = Fear of Happiness Scale; FNES = Fear of Negative Emotions Scale; SSPS = Social Safeness and Pleasure Scale; TPA = Three Types of Positive Affect Scale; IRPAS = Inventory of Responses to Positive Affective States

Regarding hypothesis two, negative schizotypy was significantly positively correlated with dampening before the low mood filter was applied (r = .26, p < .01) but not afterwards. Negative schizotypy was significantly negatively correlated with savouring before (r = -.37, p < .01) and after (r = -.31, p < .01) the low mood filter was applied and a similar pattern of associations emerged with other upregulating emotion regulation strategies. Pre-filter, activating, (r = -.18, p < .01), channelling, (r = -.20, p < .01) and gratitude (r = -.35, p < .01) and helping (r = -.27, p < .01) strategies were significantly negatively correlated with negative schizotypy. After the low mood filter was applied all associations remained significant (activating, r = -.19, p < .01; channelling, r = -.15, p < .05; gratitude, r = -.30, p < .01; helping, r = -.24, p < .01). Analysing, avoiding, calming and stimulating emotion regulation strategies were not significantly associated with negative schizotypy.

The low mood caseness filter was removed and a four-stage hierarchical multiple regression model was run using the 'enter' method in order to evaluate hypothesis three. All predictor variables were correlated with negative schizotypy and scatterplots showed a clear, linear relationship between them. In relation to model fit, plots of residuals appeared normally distributed, indicating multivariate normality with no signs of homoscedasticity (see Appendix N). All tolerance values were at an acceptable level and Variance Inflation Factor (VIF) values for all predictors were low, indicating no problems with multicollinearity.

All four stages of the model were significant with the final model explaining 44.8% of the variance in negative schizotypy (see Table 3). Stage one control variables predicted a significant proportion (16.8%) of the variance in negative schizotypy (adjusted R^2 = .16, F (2,317) = 30.85 p =<.01). Inclusion of fear of emotion variables in stage two accounted for a further 10.3% of the variance in negative schizotypy (adjusted R^2 = .26, F (2,315) = 22.13) with fear of positive (but not negative) emotion (β = .41, p<.01) and low mood (β = .22, p<.01) significantly improving the model at this stage.

Adding emotion regulation strategies in stage three predicted a further 4.2% of the variance in negative schizotypy with fear of positive emotion, (β = .36, p<.01), savouring (β = -.24, p<.01) and low mood (β = .18, p<.01) making significant contributions. Dampening narrowly missed significance. Adding social safeness increased the predictive value of the model by 15.2%, (adjusted R^2 = .45, F (2,312) = 88.12) with the final model accounting for 45% of the variance in negative schizotypy. With social safeness (β = -.53, p<.01) entering the model, all other variables were no longer significant predictors of negative schizotypy, although savouring (β = -.09, p<.07) and fear of positive emotion (β = .11, p<.09) narrowly missing significance.

Table 3. Hierarchical regression analysis displaying control, fear of emotion, affect regulation strategy and social safeness variables as predictors of negative schizotypy

Variable	Cumulative		Simultaneous	
	Adjusted R^2	*F* change	*β*	*p*
Stage 1	.16	*F*(2, 317)=30.85**		
Positive schizotypy			.01	.81
Low mood			.40	.01**
Stage 2	.26	*F*(2, 315)=22.13**		
Positive schizotypy			-.06	.28
Low mood			.22	.01**
Fear of negative emotion			-.03	.63
Fear of positive emotion			.41	.01**
Stage 3	.30	*F*(2, 313)=9.48**		
Positive schizotypy			-.02	.71
Low mood			.18	.01**
Fear of negative emotion			.01	.87
Fear of positive emotion			.36	.01**
Dampening			-.12	.06
Savouring			-.24	.01**
Stage 4	.45	*F*(2, 312)=88.12**		
Positive schizotypy			-.04	.45
Low mood			.10	.10
Fear of negative emotion			.00	.94
Fear of positive emotion			.11	.09
Dampening			-.05	.36
Savouring			-.09	.07
Social safeness			-.53	.01**

Note: * = p<.05; ** = p<.01

Mediation

A mediational hypothesis was derived a priori based on the findings of the hierarchical multiple regression (James & Brett, 1984). Social safeness was predicted to mediate the relationship between fear of positive emotion because it was directly correlated with both variables of interest (see Figure 2.). Variables were ordered in this sequence, because fear of positive emotion was thought to precede the development of a sense of social safeness (Whetten, 1989). The conditions for mediation were met (temporal precedence for the sequence, control for confounders, construct validity of measures, a priori hypotheses, and a pattern of results consistent with hypothesised relationships, Hayes, 2013).

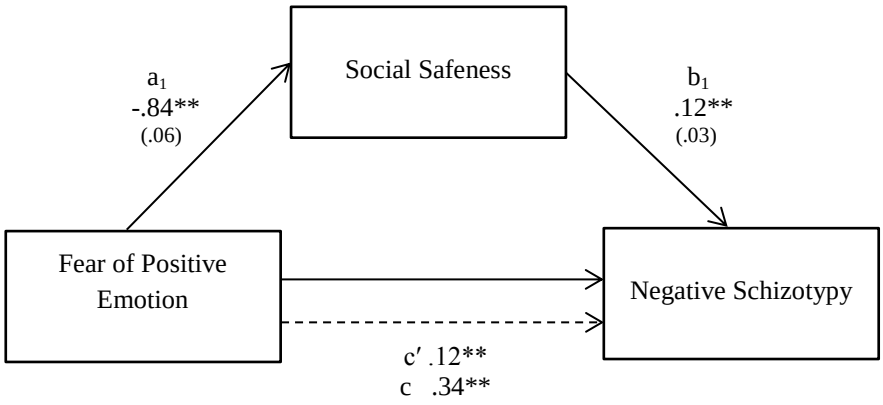

Figure 2. Regression coefficients for the relationship between fear of positive emotion and negative schizotypy when mediated by social safeness.

Note: Error terms appear in parentheses; C denotes the unmediated relationship between fear of positive emotion and negative schizotypy; c′ denotes the mediated relationship between fear of positive emotion and negative schizotypy when an indirect, path a-b, is included in the model; **p<.01

In order to evaluate hypothesis four the indirect and direct paths were calculated and examined in a four step mediational analysis (see Table 4 and Appendix O). The PROCESS macro for SPSS (Hayes, 2013) and a bootstrapping approach were used to test the model. The

dataset was resampled 5000 times. Sobel's (1982) test was used to determine significance. The 95% confidence intervals for the bootstrapper axb effect (paths a and b in Figure 2) did not cross zero and path c remained significant. Sobel's test ($Z = -3.85$, $p < .01$) confirmed that social safeness significantly partially mediated the relationship between fear of positive emotion and negative schizotypy.

Table 4. Mediation analysis

Independent variable	Mediating variable	Dependent variable	Effect of IV on M	Effect of M on DV	Direct effect	Indirect effect		Total effect		Sobel's Test
(IV)	(M)	(DV)	(a)	(b)	(c')	(a x b)	95% CI	(c)	95% CI	Z
Fear of positive emotion	Social safeness	Negative schizotypy	-.84**	.12**	.12**	.22**	(.18, .27)	.34**	(.28,.40)	-3.85**

Discussion

This study is the first known investigation of fear of positive and negative emotion, social safeness and emotion regulation strategy use in negative schizotypy. The results provide preliminary support for a 'functional avoidance' pathway to reduced anticipatory savouring in negative schizotypy, whereby savouring is avoided to prevent upregulation of positive emotion. Negative schizotypy was significantly negatively associated with savouring, and four other upregulating emotion regulation strategies (helping, activating, channelling, gratitude), but no relationship was observed between negative schizotypy and stimulating or avoiding strategies, and the negative predictive relationship between savouring and negative schizotypy became non-significant when social safeness was included in the regression model.

Contrary to the second hypothesis, both dampening and fear of negative emotion were also not significantly associated with negative schizotypy, once a low mood filter had been applied. It may be that downregulating emotion regulation strategies and fear of negative emotion are more pertinent to depression, as these associations disappeared when participants

with low mood were filtered out of the sample. Indeed, Beblo et al., (2012) found that fear of negative emotion and use of suppression was associated with low mood. Raes et al., (2012) reported that dampening predicted depressive symptoms.

Thus, whilst some support was found for reduced use of upregulating emotion regulation strategies in negative schizotypy, no support was found for use of downregulating strategies, such as dampening. It is possible that this pattern of positive and null findings reveals a trend towards people rating highly in negative schizotypy avoiding positive but not negative emotion and decreasing use of specific upregulating, but not downregulating, emotion regulation strategies in order to achieve this. The current study did not evaluate affective-cognitive control (Strauss, 2013) as a competing theory, so these findings may provide preliminary evidence of a second functional avoidance route to reduced anticipatory savouring in negative schizotypy, but they cannot discern whether this route supersedes alternative explanations of the same outcome. Future studies might examine the contributions of both affective-cognitive control and functional avoidance models of reduced savouring in negative schizotypy in tandem.

A second key finding of the current study was that reduced social safeness significantly predicted negative schizotypy, thereby strengthening support for the social defeat model of negative symptoms (White et al., 2013). In terms of quantifying contribution, social safeness was the strongest predictor of negative schizotypy. Social safeness also partially mediated the relationship between fear of positive emotion and negative schizotypy. Participants who were not in a relationship reported significantly higher negative schizotypy scores than those who were in a relationship, again indicating that differences in social and interpersonal circumstances might reflect other processes relating to the development and maintenance of negative schizotypy.

One interpretation of these findings might be that the relationship between fear of positive emotion and negative schizotypy is being maintained by an ongoing lack of social safeness. General fear of positive emotion might be the proximal indicator of an earlier problem in the development of social safeness, particularly as the soothing system is hypothesised to emerge during early life in response to signals of warmth and affection from caregivers (Kelly & Dupasquier, 2015). Alternatively, the relationship between social safeness and fear of positive emotion might be bi-directional, with both features emerging in early life and maintaining one another, or thirdly fear of positive emotion might precede social safeness. Finally, the relationships between fear of positive emotion, social safeness, savouring and negative schizotypy might be better explained by a fifth variable that was not accounted for in the current study. Given the current cross-sectional design, it is not possible to comment further on causality. However, future studies collecting longitudinal data might consider exploring the direction of this relationship further.

The results for types of positive affect were also understandable within the social defeat model of negative symptoms. Both active and safe affect were negatively associated with negative schizotypy in the current study. Social defeat theory suggests that negative symptoms are the outcome of a collapse in both drive and soothing (social safeness) systems, with lack of drive predicting loss of motivation to pursue rewards and lack of soothing predicting limited feelings of safeness during affiliative experiences (White et al., 2013). Interestingly, positive schizotypy was significantly associated with use of analysing emotion regulation strategies, i.e. questioning the source of the positive emotion, which might indicate that those high in positive schizotypy shift towards a position of evaluating potential threat when encountering signals of positive emotion, whereas those experiencing negative schizotypy may avoid upregulating positive affect as a safety mechanism to deal with perceived danger.

Clinical implications

The results in this particular sample suggest that social safeness may be a significant predictor of negative schizotypy, and a partial mediator of the relationship between fear of positive emotion and negative schizotypy. Therefore, it is possible that people reporting high levels of negative schizotypy may have a poor sense of social safeness, potentially due to an absence of early warmth, reassurance and social connection prompting later feelings of social threat and emotional vulnerability. Lack of social safeness could be a challenging difficulty to modify, because engagement in any type of intervention would require meeting with another person to modify perceptions regarding emotional warmth, despite the client potentially feeling socially insecure and amotivated to do so (Kelly & Dupasquier, 2015).

Despite these challenges, social safeness interventions, such as the social broad-minded affective coping (BMAC) task, have demonstrated effectiveness in increasing social safeness, warmth and relaxed affect in non-clinical populations, (Holden et al., 2017) and there is emerging evidence that engaging in group Compassion-Focused-CBT for psychosis (CF-CBTp) can help people experiencing psychosis to build internal feelings of safeness and affiliation (Heriot-Maitland, Vidal, Ball & Irons, 2014).

Future studies could investigate the current findings in a clinical sample. Replication of results might warrant evaluation of the effectiveness of a combined social safeness and savouring intervention for people experiencing negative symptoms. An intervention that succeeds in increasing sense of social safeness might also improve ability to engage in savouring, which in turn could enhance affective-cognitive control capacity and affective memory, causing upward spirals of positive emotion and improving motivated activity. At present, savouring interventions demonstrate some preliminary beneficial effects on co-occurring depression in people experiencing psychosis (Ricarte, et al., 2012) and appear to

enhance cognitive control (Ricarte et al., 2014) but they have produced inconsistent findings regarding their ability to impact mood and improve motivated activity.

Future research might also consider whether the pattern of relationships between fear of positive emotion and use of specific affect regulation strategies are unique to negative schizotypy, or whether they are more generally predictive of transdiagnostic emotion regulation difficulties, particularly as fear of positive emotion and use of dampening emotion regulation strategies, such as suppression, are also associated with lack of self-compassion (Gilbert, McEwan, Matos, & Rivis, 2011), social phobia, (Weeks Heimberg, Rodebaugh & Norton, 2008a; Weeks Heimberg & Rodebaugh, 2008b; Weeks, Norton & Heimberg, 2009) panic, anxiety, and obsessions and compulsions (Eisner, Johnson & Carver, 2009).

Limitations

This study has several limitations relating to design, sampling, measurement and experimental control problems. Firstly, the study used a cross-sectional design so it is not possible to infer causality in relation to the observed relationships between negative schizotypy and predictor variables. Future studies may wish to re-examine the current hypotheses using longitudinal data. Secondly, despite advertising the study on a wide variety of online forums, the final population were predominantly female and white, having completed university-level education. Hence, the sample was not representative. Future studies might attempt to replicate the findings in a more heterogeneous population.

Thirdly, all data were self-reported so participants may have been affected by response and social desirability biases There is some evidence to suggest that people are poor at reporting their own savouring behaviour (Applegate et al., 2014), so use of a behavioural measure of savouring might have been more robust. Similarly, participants were asked to reflect on their fear of positive emotion. A more reliable way of assessing this might have

been to carry out observations of participant behaviour or physiological responding to positive emotion evoking stimuli. Whilst attempts were made to control for confounding variables using hierarchical multiple regression and by applying a PHQ-9 caseness filter to the data during correlational analysis, the filter did not completely eliminate the association between low mood and negative schizotypy. Hence, the chosen cut off scores may have been too high, allowing some depressed participants to remain in the analysis. It may be that the null findings for stimulating or avoiding emotion regulation strategies related to problems with construct validity, as these two subscales had two of the lowest reliability coefficients, indicating potential problems with internal consistency.

Conclusions

Despite the identified limitations, the current study extended understanding of emotion regulation processes in negative schizotypy by evaluating a functional avoidance route to reduced savouring, finding that social safeness partially mediated the relationship between fear of positive emotion and negative schizotypy. People rating highly in negative schizotypy may avoid engaging in savouring (and other upregulating emotion regulation strategies) to decrease positive emotion, because positive emotion may feel unsafe. If these findings are replicated in a clinical sample, then it may be useful to offer therapeutic interventions that increase sense of social safeness prior to developing savouring skills. In time these skills might create upward spirals of positive emotion and motivated activity, thereby alleviating the distressing impact of negative symptoms.

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Appendices

Appendix A

Author guidelines for submission to Frontiers in Psychology

See: https://www.frontiersin.org/journals/psychology#author-guidelines

Manuscript Guidelines

Article type: Systematic review
Abstract maximum: 350 words
Figures/Tables: 15
Maximum manuscript length: 12,000 words

Original Content

Frontiers publishes only original content. It therefore requires that all submissions must consist as far as possible of content that has not been published previously. In accordance with COPE guidelines, we expect that "original wording taken directly from publications by other researchers should appear in quotation marks with the appropriate citations." This condition also applies to an author's own work, and to submissions adapted from conference abstracts and proceedings papers, please see the following sections for more information

Manuscript Length

Frontiers encourages its authors to closely follow the article word count lengths given in the Summary Table. The manuscript length includes only the main body of the text, footnotes and all citations within it, and excludes abstract, section titles, figure and table captions, funding statements, acknowledgements and references in the bibliography. Please indicate the number of words and the number of figures included in your manuscript on the first page.

Language Style

Authors are requested to follow American English spelling.

Frontiers requires manuscripts submitted to meet international standards for English language to be considered for publication. The default language style at Frontiers is American English. If you prefer your article to be formatted in British English, please specify this on your manuscript first page. For any questions regarding style Frontiers recommends authors to consult the Chicago Manual of Style.

Title

The title is written in title case, centered, and in 16 point bold Times New Roman font at the top of page.

The title should be concise, omitting terms that are implicit and, where possible, be a statement of the main result or conclusion presented in the manuscript. Abbreviations should be avoided within the title.

Witty or creative titles are welcome, but only if relevant and within measure. Consider if a title meant to be thought-provoking might be misinterpreted as offensive or alarming. In extreme cases, the editorial office may veto a title and propose an alternative.

Authors and Affiliations

All names are listed together and separated by commas. Provide exact and correct author names as these will be indexed in official archives. Affiliations should be keyed to the author's name with superscript numbers and be listed as follows: Laboratory, Institute, Department, Organization, City, State abbreviation (USA, Canada, Australia), and Country (without detailed address information such as city zip codes or street names).

Headings and Sub-headings

Except for special names (e.g. GABAergic), capitalize only the first letter of headings and subheadings. Headings and subheadings need to be defined in Times New Roman, 12, bold. You may insert up to 5 heading levels into your manuscript (not more than for example: 3.2.2.1.2 Heading title).

Abstract

As a primary goal, the abstract should render the general significance and conceptual advance of the work clearly accessible to a broad readership. In the abstract, minimize the use of abbreviations and do not cite references. The text of the abstract section should be in 12 point normal Times New Roman.

Keywords

All article types: you may provide up to 8 keywords; at least 5 are mandatory.

Text

The body text is in 12 point normal Times New Roman. New paragraphs will be separated with a single empty line. The entire document should be single-spaced and should contain page and line numbers in order to facilitate the review process. Your manuscript should be written using either LaTeX or MS-Word.

Nomenclature

The use of abbreviations should be kept to a minimum. Non-standard abbreviations should be avoided unless they appear at least four times, and defined upon first use in the main text. Consider also giving a list of non-standard abbreviations at the end, immediately before the Acknowledgments.

Sections

Your manuscript is organized by headings and subheadings. For Original Research Articles, Clinical Trial Articles, and Technology Reports the section headings should be those appropriate for your field and the research itself.

For Original Research Articles, it is recommended to organize your manuscript in the following sections or their equivalents for your field:

Introduction

Succinct, with no subheadings.

Material and Methods

This section may be divided by subheadings. This section should contain sufficient detail so that when read in conjunction with cited references, all procedures can be repeated. For experiments reporting results on animal or human subject research, an ethics approval statement should be included in this section.

Results

This section may be divided by subheadings. Footnotes should not be used and have to be transferred into the main text.

Discussion

This section may be divided by subheadings. Discussions should cover the key findings of the study: discuss any prior art related to the subject so to place the novelty of the discovery in the appropriate context; discuss the potential short-comings and limitations on their interpretations; discuss their integration into the current understanding of the problem and how this advances the current views; speculate on the future direction of the research and freely postulate theories that could be tested in the future.

References

All citations in the text, figures or tables must be in the reference list and vice-versa. The references should only include articles that are published or accepted. Data sets that have been deposited to an online repository should be included in the reference list, include the version and unique identifier when available. For accepted but unpublished works use "in press" instead of page numbers. Unpublished data, submitted manuscripts, or personal communications should be cited within the text only, for the article types that allow such inclusions. Personal communications should be documented by a letter of permission. Website urls should be included as footnotes. Any inclusion of verbatim text must be contained in quotation marks and clearly reference the original source.

Reference list: provide the names of the first six authors followed by et al and doi when available.

Appendix B

Alternative search terms

Rejected population search terms:

Anhedonia
Apathy
Avolition
Anergia
Asociality
Delusions
Delusional Disorder
Hallucinations
Negative Symptoms
Negative Schizotypy
Positive Schizotypy
Positive Symptoms
Social Withdrawal
Thought Disorder

Rejected intervention search terms:

Guided Mental Imagery
Mental Imagery
Mindfulness
Positive Rumination
Prospection
Reminiscence

Truncated search terms captured using 'Savo*', 'Schizo*', or 'Psycho*':

Psychosis
Psychosis-Not Otherwise Specified' (NOS)
Psychotic
Psychotic Symptom/s
Savor
Savoring
Savors
Savour
Savouring
Savours
Schizoaffective
Schizoaffective Disorder
Schizophrenia
Schizophreniform
Schizophreniform Disorder
Schizotypal
Schizotypy

Appendix C

Data supplement

Reasons why potentially relevant studies were screened out

Reference ID		data source	Decision
1.	Bentall2010	database search	Savoring cited but not measured
2.	Bossetti2014	database search	Savouring, not psychosis
3.	Carl2013	database search	Savouring, not psychosis
4.	Holden2014	database search	Savouring, not psychosis, reference search
5.	Parks2011	database search	Wellbeing, not savouring in psychosis, reference search
6.	Ali2017	database search	Psychosis, not savouring (Savo in name)
7.	Quick, 2008	database search	Savouring and psychosis in separate chapters
8.	Hechtman2013	database search	Savouring, not psychosis
9.	Gadeikis2013	database search	Savouring, not psychosis
10.	Gruber2011	database search	Bipolar disorder
11.	Burr2017	database search	Savouring, not psychosis
12.	Dipierro2015	database search	Savouring and psychosis discussed separately
13.	Raymond1940	database search	Opinion paper, reference search
14.	Elkis2016	database search	Psychosis, not savouring
15.	Morris 2014	database search	Savouring, not psychosis, reference search
16.	Ivtzan2016	database search	Savouring, not psychosis
17.	Garland2016	database search	Savouring, not psychosis, reference search
18.	Schrank2013b	hand search	Well-being, not savouring, reference search
19.	Schrank2014c	hand search	Well-being, not savouring, reference search
20.	Salvatore2014	hand search	Psychosis, not savouring
21.	Bryant2007	database search	Savouring, not psychosis
22.	Haut2017	database search	Psychosis, not savouring
23.	RashidHowes2016	hand search	Savouring, not psychosis
24.	Metecos2015	hand search	Bipolar disorder
25.	Craske2016	database search	Savouring in depressed group
26.	Chaix2017	database search	Savouring in non-clinical population
27.	Ricarte2017a	hand search	Psychosis, not savouring, reference search
28.	Ricarte2017a	hand search	Psychosis, not savouring, reference search
29.	Cox2017	hand search	Psychosis and guided imagery not savouring
30.	Smirnova2017	database search	Savouring, not psychosis
31.	Rashid2008	hand search	Savouring in depression, not psychosis
32.	Parks2015	hand search	Savouring, not psychosis
33.	Park-Perin2010	database search	Savouring, not psychosis
34.	Lyubomirsky2011	database search	Savouring, not psychosis
35.	Gruber2015	database search	Bipolar disorder
36.	Smith2017	database search	Savouring, not psychosis
37.	Raymond1940	database search	Psychosis, not savouring
38.	Scemes2016	database search	Not related to savouring or psychosis
39.	Strauss 2013	hand search	Psychosis, not savouring

Appendix D

Data extraction cover sheet*

Date:
Reviewer:
Reference or paper number:

1. Participant demographic characteristics (e.g. age, gender)

2. Way difficulty has been identified (schizophrenia, psychosis, schizotypy)

3. Country research carried out in

4. Intervention/s - psychological technique used - type of delivery, content, duration, "dosage"

5. Comparisons - any comparison arms

6. Outcome(s) - assessment type / frequency / adverse or unsafe effects

7. Study design - consideration of limitations, generalisability, risk of bias, randomisation, allocation, performance bias, detection bias, attrition bias, selective reporting bias - rated as high, low, unclear

8. Key message for systematic review

Appendix E

QATSDD Quality Assessment Tool

Criteria	0 = Not at all	1 = Very slightly	2 = Moderately	3 = complete
Explicit theoretical framework				
Statement of aims/objectives in the main body of the report				
Clear description of research setting				
Evidence of sample size considered in terms of analysis				
Representative sample of target group of a reasonable size				
Description of procedure for data collection				
Rationale for choice of data collection tool(s)				
Detailed recruitment data				
Statistical assessment of reliability and validity of measurement tool(s) (Quantitative)				
Fit between stated research question and method of data collection (Quantitative)				
Fit between stated research question and format / content of data collection tool e.g. interview schedule (Qualitative)				
Fit between research question and method of analysis				
Good justification for analytical method selected				
Assessment of reliability of analytical process (Qualitative only)				
Evidence of user involvement in design				
Strengths and limitations critically discussed				
Total score				
Percentage				

*Based on the PRISMA-P (2015) checklist

Appendix F

Author guidelines for submission to the Journal of Abnormal Psychology

See: http://www.apa.org/pubs/journals/abn/?tab=4

Regular Article

Regular articles typically should not exceed 9,000 words in overall length (excluding figures).

Manuscript Preparation

Prepare manuscripts according to the Publication Manual of the American Psychological Association (6th edition). Manuscripts may be copy-edited for bias-free language (see Chapter 3 of the Publication Manual). Review APA's Checklist for Manuscript Submission before submitting your article. Double-space all copy. Other formatting instructions, as well as instructions on preparing tables, figures, references, metrics, and abstracts, appear in the Manual. Additional guidance on APA Style is available on the APA website.

Tables

Use Word's Insert Table function when you create tables. Using spaces or tabs in your table will create problems when the table is typeset and may result in errors.

Abstract and Keywords

All manuscripts must include an abstract containing a maximum of 250 words typed on a separate page. After the abstract, please supply up to five key words or brief phrases.

General Scientific Summaries (GSS)

Please provide a General Scientific Summary of the paper on the manuscript file below the abstract. This should be a brief (2-3 sentences) statement that, in nontechnical language explains the contributions of the paper.

References

List references in alphabetical order. Each listed reference should be cited in text, and each text citation should be listed in the References section.

Appendix G

Chi square analyses for completers versus non-completers

Completion*Age

	Value	Df	Asymptotic significance (2-sided)	Exact Sig. (2 sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.57[a]	1	.06		
Continuity Correction[b]	2.77	1	.10		
Likelihood ratio	3.20	1	.07		
Fisher's Exact Test				.07	.05
Linear-by-Linear Association	3.56	1	.06		
N of Valid cases	403				

[a] No cells have expected count less than 5. The minimum expected count is 6.80

[b] Computed only for a 2x2 table

Completion*Gender

	Value	Df	Asymptotic significance (2-sided)	Exact Sig. (2 sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.46[a]	1	.23		
Continuity Correction[b]	1.12	1	.29		
Likelihood ratio	1.53	1	.22		
Fisher's Exact Test				.30	.14
Linear-by-Linear Association	1.46	1	.23		
N of Valid cases	400				

[a] No cells have expected count less than 5. The minimum expected count is 18.04

[b] Computed only for a 2x2 table

Completion*Education

	Value	Df	Asymptotic significance (2-sided)
Pearson Chi-Square	9.43[a]	5	.09
Likelihood ratio	8.86	5	.12
Linear-by-Linear Association	8.16	1	.04
N of Valid cases	403		

[a] 2 cells (16.7%) have expected count less than 5. The minimum expected count is 1.85

Completion*Ethnicity

	Value	Df	Asymptotic significance (2-sided)	Exact Sig. (2 sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.57[a]	1	.06		
Continuity Correction[b]	2.77	1	.10		
Likelihood ratio	3.20	1	.07		
Fisher's Exact Test				.07	.05
Linear-by-Linear Association	3.56	1	.06		
N of Valid cases	403				

[a] No cells have expected count less than 5. The minimum expected count is 6.80

[b] Computed only for a 2x2 table

Completion*Employment Status

	Value	Df	Asymptotic significance (2-sided)	Exact Sig. (2 sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.57[a]	1	.06		
Continuity Correction[b]	2.77	1	.10		
Likelihood ratio	3.20	1	.07		
Fisher's Exact Test				.07	.05
Linear-by-Linear Association	3.56	1	.06		
N of Valid cases	403				

[a] No cells have expected count less than 5. The minimum expected count is 6.80

[b] Computed only for a 2x2 table

Completion*Student Status

	Value	Df	Asymptotic significance (2-sided)
Pearson Chi-Square	1.68[a]	3	.64
Likelihood ratio	2.37	3	.50
Linear-by-Linear Association	1.18	1	.28
N of Valid cases	403		

[a] 3 cells (37.5%) have expected count less than 5. The minimum expected count is .62.

Completion*Relationship Status

	Value	Df	Asymptotic significance (2-sided)	Exact Sig. (2 sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.70[a]	1	.40		
Continuity Correction[b]	.48	1	.49		
Likelihood ratio	.69	1	.41		
Fisher's Exact Test				.39	.24
Linear-by-Linear Association	.70	1	.40		
N of Valid cases	395				

[a] No cells have expected count less than 5. The minimum expected count is 20.10

[b] Computed only for a 2x2 table

Completion*Mental Health Status

	Value	Df	Asymptotic significance (2-sided)	Exact Sig. (2 sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.31[a]	1	.58		
Continuity Correction[b]	.19	1	.67		
Likelihood ratio	.31	1	.58		
Fisher's Exact Test				.62	.33
Linear-by-Linear Association	.31	1	.58		
N of Valid cases	394				

[a] No cells have expected count less than 5. The minimum expected count is 38.78

[b] Computed only for a 2x2 table

Appendix H

Cronbach's alphas for IRPAS

IRPAS subscale	Cronbach's α
Activating	.74
Analysing	.83
Avoiding	.78
Calming	.73
Channelling	.83
Dampening	.86
Gratitude	.91
Helping	.80
Higher-connectedness	.83
Savouring	.89
Stimulating	.74

Appendix I

Study Questionnaires

Part 1 **Demographic Information**

Please complete these ten questions. This information won't be used to identify you but will be used in our analysis.

About you:

1. How old are you? ☐ years

Prefer not to say	☐

2. Are you:

Male	☐
Female	☐
Other (please specify below if you wish)	☐
Prefer not to say	☐

3. Please select your ethnicity from the options below:

White/British/Irish/Other	☐
Black/African/Caribbean/Black British	☐
Asian/Asian British	☐
Mixed/Multiple Ethnic Groups	☐
Other ethnic group	☐
Prefer not to say	☐

4. Are you in a relationship?

Yes	☐
No	☐
Prefer not to say	☐

5. Do you consider yourself to have current and/or past mental health difficulties?

No	☐
Current mental health difficulties	☐
Past mental health difficulties	☐
Current and past mental health difficulties	☐
Prefer not to say	☐

6. Are you a student?

Yes	☐
No	☐
Prefer not to say	☐

7. Are you in paid employment?

No	
Full time paid employment	
Part time paid employment	
Prefer not to say	

8. Please estimate how many times you have used an illegal drug or a prescription medication for non-medical reasons in the last 12 months.

Please enter number here	
Prefer not to say	

9. If you are female, how many times in the past year have you had 4 or more drinks in a day?

I'm male so I don't answer this question	
Number of times I've had 4+ drinks	
Prefer not to say	

10. If you are male, how many times in the past year have you had 5 or more drinks in a day?

I'm female so I don't answer this question	
Number of times I've had 5+ drinks	
Prefer not to say	

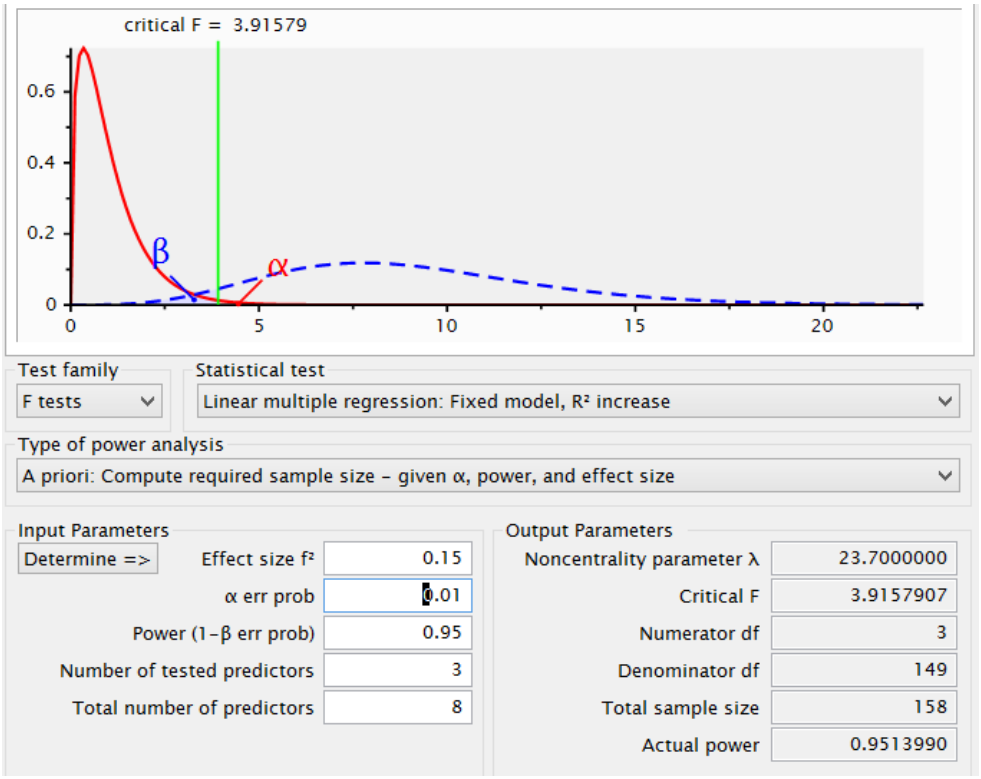
11. What is your highest educational qualification?

No formal qualifications	
High school education (GCSEs O Levels CSEs)	
College education (NVQ, GNVQ, BTEC, A-Levels)	
Workplace education (apprenticeships)	
Undergraduate university education (BA, BSc)	
Postgraduate university education (MA, MSc, PhD)	
Prefer not to say	

Thank you for completing the first part of the study.

Appendix J

Power calculation



F tests - Linear multiple regression: Fixed model, R^2 increase

Analysis:	A priori: Compute required sample size	
Input:	Effect size f^2	= 0.15
	α err prob	= 0.01
	Power (1-β err prob)	= 0.95
	Number of tested predictors	= 3
	Total number of predictors	= 8
Output:	Noncentrality parameter λ	= 23.7000000
	Critical F	= 3.9157907
	Numerator df	= 3
	Denominator df	= 149
	Total sample size	= 158
	Actual power	= 0.9513990

Appendix K

Ethical approval

Research Ethics Subcommittee for Non-Invasive Procedures

4 July 2017

Dear Dr Flood,

We are pleased to inform you that your application for research ethics approval has been approved. Details and conditions of the approval can be found below:

Reference:	1791
Project Title:	Positive Emotion and Unusual Experiences
Principal Investigator/Supervisor:	Dr Andrea Flood
Co-Investigator(s):	Dr Eve Applegate
Lead Student Investigator:	-
Department:	School of Psychology (including DClinPOsych)
Approval Date:	04/07/2017
Approval Expiry Date:	Five years from the approval date listed above

The application was **APPROVED** subject to the following conditions:

Conditions

- All serious adverse events must be reported via the Research Integrity and Ethics Team (ethics@liverpool.ac.uk) within 24 hours of their occurrence.
- If you wish to extend the duration of the study beyond the research ethics approval expiry date listed above, a new application should be submitted.
- If you wish to make an amendment to the research, please create and submit an amendment form using the research ethics system.
- If the named Principal Investigator or Supervisor leaves the employment of the University during the course of this approval, the approval will lapse. Therefore it will be necessary to create and submit an amendment form using the research ethics system.
- It is the responsibility of the Principal Investigator/Supervisor to inform all the investigators of the terms of the approval.

Kind regards,

Research Ethics Subcommittee for Non-Invasive Procedures

ethics@liverpool.ac.uk

0151-794-8290

0151-795-8355

Appendix L

Participant information page

Participant Information

Positive Emotion and Unusual Experiences

Institute of Psychology, Health and Society,
University of Liverpool
Waterhouse Building, Block B,
Brownlow Street,
Liverpool
L69 3GL

Principal Investigator:

Dr Andrea Flood:

Co-Investigators:

Dr Sandra Bucci
Dr James Kelly

Student Researchers:

Eve Applegate

Research ethics number:

You are being invited to take part in a study researching unusual experiences and beliefs, and responses to positive events. Before you decide to take part, please take time to read this information to understand why the research is being done and what it will involve. You do not have to accept this invitation and should only agree to take part if you really want to. Feel free to speak with your friends, relatives or GP for advice and please ask us if you would like more information. Thank you for reading this.

What is the purpose of this study?

We are interested in how people reporting unusual experiences and beliefs respond to positive emotions and events. We would like to ask people some questions about how they think, feel and behave during positive events so that we can understand more about what might be happening when people experience reduced enjoyment (anhedonia). Previous research has shown that people who experience anhedonia may think and behave differently during positive events and this might contribute to ongoing difficulties with motivation. We

Who can take part?

Anyone aged 18 or over, who can understand written English to a standard which enables them to fully comprehend the study questions can take part. We would ask that you read the questions carefully, respond as honestly as you can and please only take part once.

Do I have to take part?

No. Participation is completely voluntary and you do not have to take part. If you do take part, you will be asked to select boxes consenting (agreeing) that you understand this and that you do want to take part. If you change your mind part way through you can close the browser window. You don't have to give a reason or incur a disadvantage for not taking part.

What will happen if I do take part?

If you decide to take part you will be asked to complete five sets of questionnaires by selecting check boxes presented in the online survey which follows. The questionnaires will ask you about unusual experiences, unusual beliefs, low mood, positive and negative emotions and your response to positive events. Two example items from the questionnaires include, 'Have you ever felt that you have special, almost magical powers?' and, 'I feel a sense of warmth in my relationships with people'. We think that it will take about 15 minutes to complete the full survey but everybody goes at a different pace so the time taken may vary slightly. There are no wrong answers and you are not being timed.

The researchers will look at all of the information submitted and consider whether there are any links between unusual beliefs and experiences and the way people respond to positive events. We will write up a report, but all identities will be kept anonymous, and we won't write about you individually. We can send you a summary of the final results after the study is complete if you contact us to request this information.

Are there any risks in taking part?

We do not anticipate any significant risks from taking part. However, you will be asked about unusual experiences and beliefs and your thinking style and behaviour. If you feel upset by the questions you do not have to continue, and you can withdraw from the study at any time. You can access information about sources of support at the end of the study.

What are the possible benefits of taking part?

We do not anticipate that you will directly benefit from participation in this study but if you do take part you will be helping us to further this research. As a thank you for taking part in the study we are offering everyone who leaves contact details at the end of the survey the chance to enter a prize draw for one of thirteen gift vouchers (two £50 vouchers, six £25 vouchers and five £10 vouchers). Please only complete the study once.

Will my participation be kept confidential?

Yes. Your anonymous data will be kept securely in electronic form by the data custodian, Andrea Flood, until January 2027, when it will be deleted. If you choose to leave an email

address you will be entered into the prize draw. Your email address will be stored completely separately to your questionnaire answers so we will not know what you have stated.

What if I am unhappy or there is a problem?

If you are unhappy, or if there is a problem, please feel free to let us know by contacting the Principle Investigator, Dr Andrea Flood (0151 7945534; amflood@liverpool.ac.uk) and she will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with then you should contact the Research Governance Officer at ethics@liv.ac.uk. When contacting the Research Governance Officer, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make.

What will happen to the results?

Once the study is complete we will analyse the results and try to publish them in an academic journal. We will not identify you in any way within the publication. We can send you a summary of the final results after the study is complete if you contact us to request this information.

What will happen if I want to stop taking part?

You are free to stop completing the questionnaires at any time without giving a reason and without incurring a disadvantage. You can stop your participation by closing the survey window. We cannot withdraw the information that you have already provided prior to stopping because the information has been collected anonymously and it is not linked to your name. The incomplete information will remain available to the researchers and will be included in their analysis but no further information will be collected from you.

What if I want to ask questions not included in this information?

Please raise any further questions you have with the study researchers who will be happy to answer your query. You can email eveapple@liverpool.ac.uk. Alternatively please feel free to contact the Principal Investigator: Dr Andrea Flood (amflood@liverpool.ac.uk or telephone: 0151 7945534).

Can you give me advice on mental health difficulties?

We cannot give you any specific advice on mental health difficulties, but we do provide some details of organisations at the end of the study where you can seek information and support.

Thank you for reading this.

Appendix M

Participant consent form

Participant Consent

Positive Emotion and Unusual Experiences

Please read each statement below and answer either 'yes' or 'no'

I confirm that I have read and understand the information on the previous page for this study. I have had the opportunity to consider the information, ask questions and have these answered satisfactorily.

Yes No

I am aged 18 or over.

Yes No

I understand that my participation is voluntary and that I am free to stop answering study questions at any time without giving a reason and without my rights being affected. I can close the browser window to exit the study. I understand that if I do close the browser the answers that I have already provided will remain available to the researchers and will be included in their analysis but no further information will be collected. I understand that the information I provide cannot be withdrawn at a later stage because it has been collected anonymously and is not linked to my name.

Yes No

I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or any publications that result from the research.

Yes No

I agree to take part in the study.

Yes No

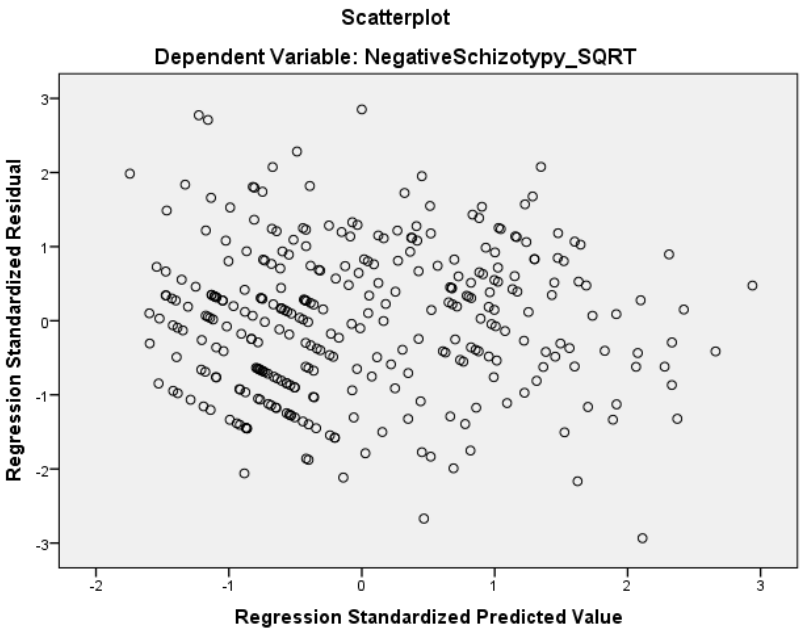
Appendix N

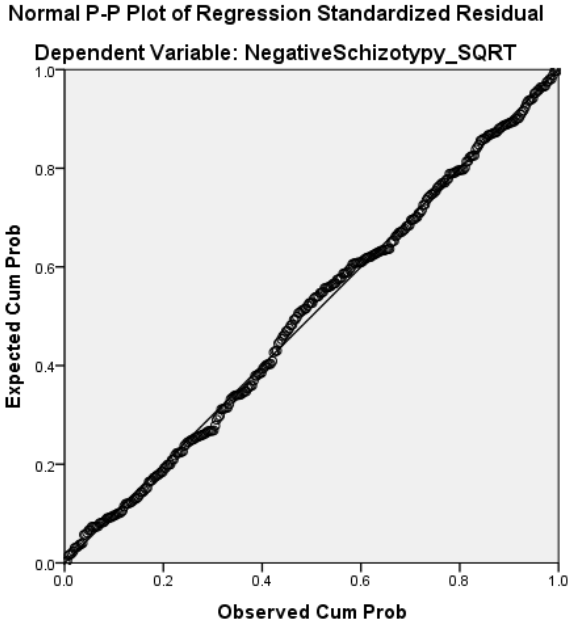
Plots of residuals

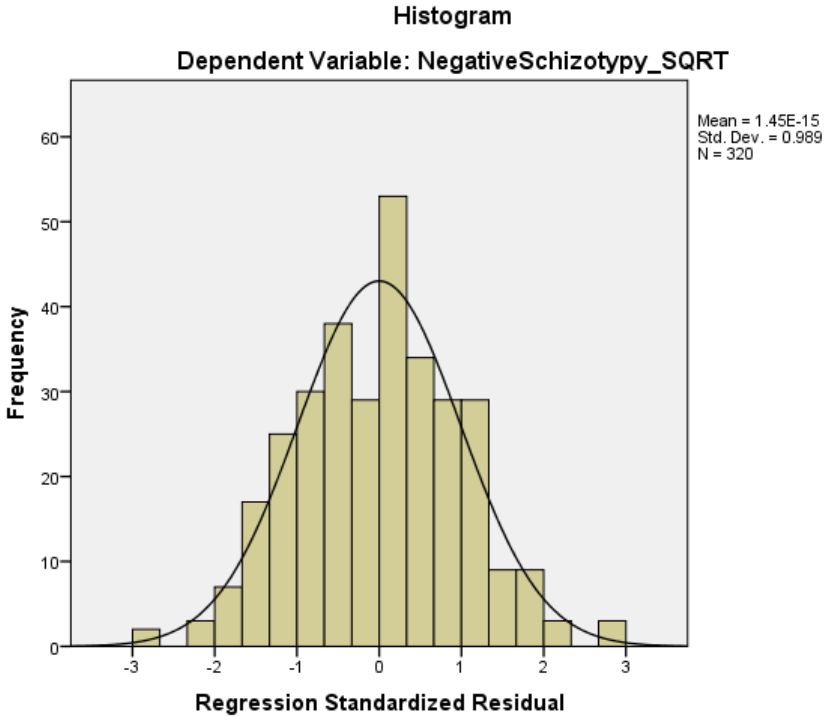
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.8453	4.6854	2.9033	.60635	320
Residual	-1.94761	1.89273	.00000	.65648	320
Std. Predicted Value	-1.745	2.939	.000	1.000	320
Std. Residual	-2.934	2.851	.000	.989	320

a. Dependent Variable: NegativeSchizotypy_SQRT




Normal P-P Plot of Regression Standardized Residual
Dependent Variable: NegativeSchizotypy_SQRT
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Histogram
Dependent Variable: NegativeSchizotypy_SQRT
Mean = 1.45E-15
Std. Dev. = 0.989
N = 320
Frequency
Regression Standardized Residual
0
10
20
30
40
50
60
-3
-2
-1
0
1
2
3

Appendix O

Mediation analysis

Mediation analysis calculations and PROCESS output

1) Fear of positive emotion predicts negative schizotypy - path c
   a) F(1, 338) = 131.36, p = <.01, R^2 = .28
   b) b = -.85, t(338)11.46, p = <.01
2) x variable predicts m - path a
   a) F(1, 338) = 211.16, p = <.01, R^2 = .39
   b) b = .34, t(338)-14.53, p = <.01
3) x and m together predicting y
   a) F(2, 337) = 149.25, p = <.01, R^2 = .47
   b) m variable predicts y - path b
      i) b = .12, t(337) = 3.65, p = <.01
   c) x variable no longer predicts y or is lessened predicting y - path c'
      i) b = -.26, t(337) =-10.98, p = <.01
4) Sobel's Test: Z = -3.85, p=< .01

	Input:		Test statistic:	Std. Error:	*p*-value:
a	-.84	Sobel test:	-3.84609579	0.0262084	0.00012001
b	.12	Aroian test:	-3.83705678	0.02627014	0.00012452
s_a	.06	Goodman test:	-3.85519899	0.02614651	0.00011564
s_b	.03	Reset all	Calculate		

PROCESS output

```
MODEL    : 4
    Y    : Negative  Positive
    X    : Treatment  Control
    M    : Reveal  Conceal
Sample
Size:  318

************** TOTAL EFFECT MODEL **************
OUTCOME VARIABLE:  BPS

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .0301      .0009    89.8223     .2911     1.0000   316.0000     .5900

Model
              coeff         se          t          p       LLCI       ULCI
constant     4.5283     .7272     6.2278     .0000     3.0972     5.9593
Treatment    -.1884     .3492     -.5395     .5900     -.8760     .4992

************** DIRECT AND INDIRECT EFFECTS OF X ON Y **************
OUTCOME VARIABLE:  Negative

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .0330      .0011    13.7118     .3451     1.0000   317.0000     .5576

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.8733     .1033    18.1273     .0000     1.6701     2.0765
Treatment    -.0522     .0889     -.5875     .5576     -.2273     .1229

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
      Effect         se          t          p       LLCI       ULCI       c_ps       c_cs
      -.1884     .3492     -.5395     .5900     -.8760     .4992     -.0301     -.0301

Direct effect of X on Y
      Effect         se          t          p       LLCI       ULCI      c'_ps      c'_cs
      -.0522     .0889     -.5875     .5576     -.2273     .1229     -.0083     -.0083

Indirect effect of X on Y:
         Effect    BootSE  BootLLCI  BootULCI
BPS      -.1362     .0911    -.3199     .0344

Partially standardized indirect effect of X on Y:
         Effect    BootSE  BootLLCI  BootULCI
BPS      -.0218     .0146    -.0512     .0055

Completely standardized indirect effect of X on Y:
         Effect    BootSE  BootLLCI  BootULCI
BPS      -.0344     .0230    -.0810     .0087

************** ANALYSIS NOTES AND ERRORS **************
Level of confidence for all confidence intervals in output:
  95.0000
Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000
NOTE: Variables names longer than eight characters were shortened.
      Shortened variable names are unambiguous.

---------- END MATRIX -----------
```