iMAgery focused psychological therapy for persecutory delusions in PSychosis (iMAPS): a multiple baseline experimental case series

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Abstract

Background: Many people with psychosis experience persecutory delusions and report negative schematic beliefs and intrusive mental images which may be maintaining factors for psychotic symptoms.
Aims: This study examined the feasibility and acceptability of a new psychological therapy targeting schemas and images (iMAPS therapy).
Method: The study used a randomised multiple baseline design. Participants with first episode psychosis were randomised using a multiple baseline design with 2–5 assessments. Six sessions of therapy, consisting of a combination of imagery techniques and imagery rescripting techniques, was used. In each session, participants completed a Mental Imagery in Psychosis Questionnaire (MIPQ) and imagery interview. Mood and delusional beliefs (PSYRATS) were also measured at each session.
Results: Five participants with first episode psychosis completed the baseline visits and attended all therapy sessions. One participant declined the final assessment. Results demonstrated significant reductions in negative schematic beliefs, delusions, imagery distress and other measures of schema (YSQ, SMI). Although multiple baseline randomisation strengthens the study, it lacked a control arm and blind assessments.
Conclusions: iMAPS appears a feasible and acceptable treatment for psychosis, and further evaluation is indicated.

Keywords: imagery; imagery focused therapy; persecutory delusions; psychosis; schematic beliefs; schizophrenia

Introduction

Negative schematic beliefs play a key role in psychological models of psychosis (Garety *et al.*, 2001; Morrison, 2001). Early experiences and negative life events (e.g. trauma, neglect) may lead to the development of negative beliefs about the self and others. These negative beliefs then contribute to the development and maintenance of psychotic symptoms such as hallucinations and delusions. Negative schemas have been defined as stable negative beliefs about the self and others which influence interpretations of specific situations, and often develop from early negative experiences (Beck, 2011). High levels of negative beliefs about the self and others are common in people with psychosis (Fowler *et al.*, 2006). Two recent

reviews have identified a connection between paranoia and negative self-beliefs (Kesting and Lincoln, 2013; Tiernan *et al.*, 2014). Early maladaptive schemas in individuals with psychosis have also been associated with distress and low social functioning (Taylor and Harper, 2017).

A case study outlined the use of imagery within cognitive therapy for psychosis some years ago (Morrison, 2004). Several years later, Schulze and colleagues (2013) examined intrusive images in 40 individuals with psychosis who had persecutory delusions. Seventy-three per cent ($n = 29$) reported persecutory beliefs, paranoid related images and associated beliefs (e.g. 'I am vulnerable and need to be on my guard') related to these images. In recent years, a small number of studies have examined imagery-focused work in relation to different aspects of psychotic experience, such as voices (Ison *et al.*, 2014), and more recently in relation to voice hearers with traumatic experiences (Paulik *et al.*, 2019), nightmares (Sheaves *et al.*, 2015) and in generating positive imagery in first episode psychosis (Laing *et al.*, 2016). In relation to imagery and paranoia, there have been two studies in non-clinical analogue samples: Bullock *et al.* (2016) and Newman-Taylor *et al.* (2019). To date, none of the above studies has focused on using an imagery-focused approach to work with images and schemas to reduce paranoia.

Taylor *et al.* (2020) used a qualitative approach to explore core beliefs and schema in psychosis and their links with hallucinations and delusions. Four emergent themes were identified: the solidity and permanency of core beliefs, the synergy between beliefs and symptoms, the concordance between life events and interpersonal relationships, and links between beliefs and images. The first examination of schemas in psychosis using the experience sampling method demonstrated that negative-self and negative-other schematic beliefs predicted severity of hallucinatory and delusional psychotic experiences and distress and functioning problems associated with these (Taylor, Bee, Emsley, Taylor, Ibbs, Baker and Haddock, manuscript under review).

Freeman *et al.* (2014) tested a brief intervention to reduce negative self-beliefs. The therapy aimed to improve self-confidence using strategies including positive psychology techniques and activities. The study found that both the therapy and the trial design were feasible and acceptable. Although this was not an efficacy study, outcomes were reported, indicating only a small reduction in negative schemas (Cohen's $d = -.24$) and a moderate reduction in paranoia ($d = 0.59$). There was no reported use of imagery-focused techniques to change beliefs or schema.

A recent systematic review examined whether schema therapy, a therapy incorporating imagery techniques, changed schema across mental health disorders (Taylor *et al.*, 2017), but no studies were found which tested schema therapy for psychosis. Imagery-focused cognitive behavioural approaches have previously been described (Hackmann *et al.*, 2011) in the treatment of other disorders, e.g. social phobia (Wild *et al.*, 2007) and bipolar disorder (Holmes *et al.*, 2016) which have shown benefits in reducing negative beliefs (Morina *et al.*, 2017), but again, no studies have tested these techniques in psychosis to reduce schema and images.

Imagery and perception both derive from shared neural mechanisms and in addition, a number of studies have highlighted that imagery is distinct from language (Kosslyn *et al.*, 2001; Pearson *et al.*, 2015).

The links between schemas and images highlighted in the earlier qualitative study (Taylor *et al.*, 2020) suggest that targeting both schemas and images may reduce distress in psychosis. Imagery can also have a more powerful effect on emotion than verbal language (Holmes and Mathews, 2010), and so has the potential to achieve more powerful change (compared with standard cognitive or thought-based approaches) if used within therapy for people with psychosis.

Given the close links between negative events, images, negative schema and paranoia, we developed a strategy to work with negative intrusive images and schema. We anticipated that that a reduction in negative schematic beliefs and improvement in positive schematic beliefs, through an imagery-focused therapy approach would lead to indirect change on persecutory delusions.

Case series multiple baseline designs are an established strategy for developing treatments (Craig *et al.*, 2008). Benefits include the creation of control measurements without the

addition of separate control participants and controlling for the therapeutic effect of contact with a therapist but without therapy being undertaken. It is also important to measure the therapeutic alliance, as this plays a crucial role in influencing outcomes (Priebe and McCabe, 2006; Mulligan *et al*., 2014). Furthermore, an area that has been under-examined previously in psychological studies is possible adverse effects of therapy (Klingberg *et al*., 2012).

Imagery rescripting has not yet been utilised in individuals with persecutory delusions. This study aimed to formally test the feasibility and acceptability of an imagery-focused approach for individuals with delusions, exploring the impact on negative schematic beliefs, imagery characteristics and persecutory delusions. This involved examining if participants could be recruited to a case series study, the number who completed sessions, the number who dropped out, reasons for dropping out, feedback on the intervention, and feedback on any adverse effects of therapy.

Method

Design

A non-concurrent A-B multiple baseline design was used. Participants were randomised to a multiple baseline of 2–5 assessments delivered weekly but flexibly. Participants then received six sessions of therapy and an end-of-therapy assessment.

Procedure

Participants were randomised to a specific baseline length by an independent researcher at a different institution using a secure web-based randomisation service (Sealed Envelope). This allowed allocation to differing baselines (2, 3, 4 or 5). Randomisation over differing baseline length conditions allowed treatment effects to be delineated from the effect of time. Therapy began at the end of the baselines, if there was stability in delusions. Similar to other multiple baseline designs, we defined stability as either a stable or worsening clinical presentation on the basis of PSYRATS (i.e. an absence of improvement; Wells *et al*., 2009). If the participant reported improved psychotic experiences within the baseline period, the baseline period would be extended for additional visits to assess if symptoms were continuing to improve. A further option was to offer the opportunity to be re-contacted at a future point to re-assess if symptoms and psychotic experiences had changed (either stablised or worsened).

The intervention was planned to be six sessions, with flexibility for one or two additional sessions, if indicated by presentation.

Participants

Inclusion criteria were: (i) a current or recent (within last 2 weeks) persecutory delusion meeting criteria outlined by Freeman and Garety (2000) (the individual believes that harm is occurring or is going to occur to him or her and the persecutor has the intention to cause harm), (ii) identifying a distressing image related to a persecutory delusion, (iii) capacity to give informed consent, (iv) finding their reported paranoid beliefs distressing or be help seeking for paranoid or suspicious beliefs (persecutory delusions; defined as distress rating of minimum 1 out of 4 on PSYRATS), (v) aged 18–65 years, (vi) meeting criteria for a schizophrenia-spectrum diagnosis (schizophrenia, schizoaffective disorder, delusional disorder; ICD-10; WHO, 1992), (vii) receiving care from an NHS mental health service, (viii) able and willing to complete the interview and assessments in English with scores which demonstrate either stability or an absence of improvement as defined by PSYRATS, and (ix) medication stable for ≥ 1 month prior to the study. Exclusion criteria were: (i) moderate/severe learning difficulties, acquired by brain injury/neurological impairment, (ii) severe substance misuse judged to be the

acute cause of psychosis, (iii) experiencing an acute episode requiring in-patient care, or (iv) currently participating in treatment studies or receiving psychological therapy.

Feasibility and acceptability

Our primary interest was the feasibility and acceptability of iMAPS therapy. This was assessed by measuring recruitment rates (numbers of potential participants approached, screened for eligibility, eligible and declined, eligible and consented), attendance at therapy sessions [did not attend (DNA) and could not attend (CNA) rates], adverse effects, whether therapeutic alliance was established and maintained, and serious adverse events. Previous CBT for psychosis trials have aimed to recruit one consenting participant for every three approached (Freeman *et al.*, 2011). We set a criteria of attending ≥3 sessions as reflecting reasonable attendance of a 6-session intervention. Therapeutic alliance scores below 30 or substantial discrepancies between therapist and client versions were considered poor according to the Working Alliance Inventory (WAI-SR; Hatcher and Gillaspy, 2006). A substantial number of adverse therapy effects (e.g. all participants worsening following therapy) or serious adverse events were indicators of therapeutic safety. Adverse effects were determined on a case-by-case basis.

Exploratory measures

We did not specify a primary outcome, as the study aimed to identify a suitable primary outcome for a larger trial (Lancaster *et al.*, 2004). Diagnosis was confirmed by the participant's psychiatrist, a case note review and a standardised ICD-10 checklist by the first author. The sessional and outcome measures were: the Psychotic Symptom Rating Scales (PSYRATS; Haddock *et al.*, 1999), the Positive and Negative Syndrome Scale Positive subscale (PANSS; Kay *et al.*, 1987), The Calgary Depression Rating Scale for Schizophrenia (CDSS), an interview schedule adapted from an imagery interview previously used in social phobia (Hackmann *et al.*, 1998; Ison *et al.*, 2014), the Mental Imagery in Psychosis Questionnaire (MIPQ; adapted from Holmes *et al.*, 2016), the Spontaneous Use of Imagery Scale (SUIS; Reisberg *et al.*, 2003), the Brief Core Schema Scales (BCSS; Fowler *et al.*, 2006), the Young Schema Questionnaire-Short Form (YSQ-S; Young, 2003), the Schema Mode Inventory (SMI; Lobbestael *et al.*, 2010), the Working Alliance Inventory (WAI-SR; Hatcher and Gillaspy, 2006) and the Adverse Effects in Psychotherapy (AEP) measure (Hutton, 2016; Pyle *et al.*, 2016). A measure of trauma was considered, but not included to reduce participant burden. Full details of the measures, the frequency of administration (sessionally, pre-post) and psychometrics are reported in the Supplementary Material. Higher scores across the measures generally indicate greater symptoms or greater distress.

The baseline and sessional measures were the PSYRATS Delusions scale, the MIPQ Imagery questionnaire and associated imagery interview questions and sessional mood. The AEP was offered after therapy was completed. All other measures were administered at assessment and end-of-therapy only. Participants were reimbursed £20 in total for participating in the initial assessments and end-of-therapy assessments, but not for the briefer baseline assessments or for attending therapy. Assessments were conducted by the first author, a clinical psychologist with extensive training and experience of the PSYRATS and PANSS, including good inter-rater reliability with other raters (average ICC 0.93).

iMAPS intervention

The intervention was developed by the authors from a number of sources, including a systematic review of schema therapy across mental health disorders (Taylor *et al.*, 2017), a qualitative study of core beliefs in psychosis (Taylor *et al.*, 2020) and a daily experience sampling method study of

positive and negative core schema in psychosis (Taylor *et al.*, manuscript under review). The approach was also influenced by existing cognitive behavioural imagery work (Hackman *et al.*, 2011), an adapted formulation model (Hales *et al.* (2014) and some schema therapy techniques (Young *et al.*, 2003; Arntz and Jacob, 2012); and the researchers' theoretical knowledge and clinical experience. These were utilised to create a new therapy manual. The iMAPS sessions followed standard CBT practices, including an agenda, regular summaries, feedback, and use of techniques such as a collaborative approach, socratic questioning, guided discovery and between-session tasks (Beck, 2011). The therapy is briefly described in Table 1 and in detail in Taylor *et al.* (2019). It was delivered over six sessions; an additional booster session or two were offered depending on the individuals' presenting difficulties. Sessions were usually weekly, but were held more or less frequently if requested.

The first session involved psychoeducation about images and imagery, identified images and negative schematic beliefs, and introduced a diary as a between-session task. A maintenance formulation was developed by the first or second session. Based on the assessment, the therapeutic techniques utilised included a safe place image to help practice imagery. The target for intervention was informed by the iMAPS collaborative formulation. Depending on the nature of the formulation, and discussion with the participant regarding goals, this informed whether a single image was chosen as the target for intervention, or multiple images or if an imagery rescript in relation to a past negative life event or future flash-foward was agreed. The image which was most distressing and the greatest focus of the therapy sessions is the one reported. The formulation informed which techniques could be chosen to be used in the sessions and these were selected from those listed in Table 1. Similar to CBT for Psychosis principles, depending on the presentation, all techniques listed may not necessarily be used, but this could be considered the range of interventions which the therapist could draw from.

Techniques also included image suppression experiments, behavioural experiments, manipulation of images and working with upsetting memories. Imagery rescripting was a key technique used to facilitate belief change and working with past events, flash-forward images, night-time imagery and creation of positive imagery.

Therapy was delivered by the first author who met BABCP (British Association for Behavioural and Cognitive Psychotherapies) minimum training standards for CBT, and who had previous experience as a CBT trial therapist on a recovery-focused CBT for psychosis clinical trial and post-qualification continuous professional development in psychosis. Treatment fidelity was ensured through (1) using the iMAPS manual, supervised fortnightly by the third and last authors (J.K. and G.H.), both experienced clinicians, and (2) audio recording and reviewing sessions in supervision for fidelity. Our study was approved by the United Kingdom Health Research Authority National Health Service (NHS) and from the NHS Trust R & D committee (reference no. 14/NW/1490).

Data analysis

The evaluation focused on feasibility, through assessing number of sessions attended, number of drop-outs, adverse effects of therapy and therapeutic alliance. Descriptive summary statistics for the outcome measures are reported. Visual inspection was used to establish whether therapy commencement preceded improvements in outcome variables. Following advice for pilot studies (Lancaster *et al.*, 2004), the analysis did not report *p*-values (Lancaster *et al.*, 2004). The standard deviation of the change scores are used. This was calculated as Cohen's $D = (\text{mean}_{pre} - \text{mean}_{post})/SD(\text{mean}_{pre} - \text{mean}_{post})$, where 'pre' is the initial assessment score and 'post' is the end-of-therapy score.

Table 1. Description of iMAgery focused therapy for persecutory delusions in Psychosis (iMAPS)

Phase of treatment	Main approach
Assessment, goals, psychoeducation	Interview
	Imagery measures
	Spontaneous Use of Imagery Scale (SUIS), Image Diaries, Assessing different types of imagery, Assessment of schema – core schema, early negative schema, schema modes
Formulation and case conceptualisation	Shared psychological formulation
Imagery CT approaches	
Safe place image	A real or imagined safe place, described in detail, across each of the senses that gives a strong sense of safety and happiness
Image suppression and behavioural experiments	Similar to thought suppression experiments and behavioural experiments within other areas of CBT but with a focus on images
Manipulation of images	To show images are only a mental event – improve sense of control
	Test any beliefs or appraisals regarding an image meaning you are 'going mad'
Working with upsetting memories	Transformation
	Provide a wider context by running image on past the worst point
	Updating aspects of the image
	Emotional bridge to past (also use as diagnostic imagery exercise – can identify key life events which link to core beliefs, current images and psychotic symptoms)
Imagery rescripting approaches	
Imagery rescripting past events	Past events
Imagery rescripting flash-forwards	Future flash-forwards
	Discussion of negative beliefs re self and others, schemas – imagery rescripting to change future anticipated image
Working with night-time imagery	Updating aspects of the image, rescripting new endings
Creating positive imagery	Deliberately generating positive images of the future

Clinically significant change

Clinically significant change was a ≥25% reduction in PSYRATS delusions from baseline to end-of-therapy assessment (Durham *et al.*, 2003). A 50% change was considered 'much improved'. All analyses were conducted utilising SPSS version 23.0 (IBM, 2015).

Results

Feasibility of recruitment

Eleven service users were approached by their care coordinators; three declined to find out more about the study. Eight participants were assessed for eligibility, with three excluded due to: (i) images resolved from referral to assessment (i.e. they no longer reported intrusive mental images), (ii) high levels of delusional beliefs interfering with ability to engage in assessments in the community, and (iii) disengagement from the assessment. Five participants were assessed as eligible. Therefore, 62.5% of participants who were eligible to consent ultimately participated, consistent with previous studies. These five attended all assessment, baseline and therapy sessions. One declined to attend the end-of-therapy assessment (Participant 5) due to a duty of care issue raised in the final session (see below).

Participants received a mean of 6.40 sessions ($SD = 0.89$; minimum $= 6$, maximum $= 8$). All participants had six sessions, except Participant 2 who had two extra sessions. Thus, all participants exceeded the 3-session attendance threshold previously set as a reasonable level of attendance. Each session lasted 60 to 80 minutes and were offered weekly. Adherence to iMAPS was acceptable, with all participants attending all sessions. Retention was good, with no withdrawals during therapy. There was one withdrawal from the end-of-therapy assessment, due to the disclosure of a risk issue which the therapist was duty bound to report to their manager, the trust and the local council and led to the participant declining

Table 2. Outcome data and Cohen's *D* effect sizes

	Initial Ax (N = 5) Mean (SD)	Last baseline (N = 5) Mean (SD)	End of treatment (N = 4) Mean (SD)	D
PSYRATS Delusions	16.60 (0.89)	15.80 (2.28)	8.25 (9.00)	0.96
PSYRATS Hallucinations	24.80 (14.24)	—	19.00 (13.61)	1.36
PANSS Positive	17.80 (1.64)	—	14.75 (0.96)	1.45
Imagery MIPQ (Q1-5) Total	44.00 (8.00)	31.20 (19.28)	20.00 (17.46)	1.08
Imagery Image Mood Relationship	6.60 (2.88)	5.40 (3.85)	8.25 (2.06)	−0.41
Imagery Positive Ways of Coping	2.40 (2.07)	2.80 (2.05)	7.50 (3.32)	−0.87
Imagery Frequency	1.5 (0.58)	2.00 (0.71)	1.00 (0.82)	0.39
Imagery Duration	1.75 (0.50)	1.80 (0.45)	1.00 (0.82)	0.78
Imagery Overall Distress	79.40 (22.84)	77.00 (20.49)	38.75 (37.50)	0.67
Mood (0–10)	6.00 (1.58)	5.00 (2.92)	6.50 (1.73)	0.00
Calgary Depression	9.80 (4.77)	—	8.25 (3.10)	0.10
BCSS-NS	10.40 (2.88)	—	5.50 (3.70)	0.81
BCSS-PS	2.80 (2.59)	—	7.25 (4.11)	−0.76
BCSS-NO	14.2 (7.79)	—	9.00 (6.05)	0.79
BCSS-PO	6.80 (3.42)	—	8.50 (7.94)	−0.07
YSQ-S Total	353.00 (49.7)	—	300.50 (61.15)	1.25
SMI Total	301.8 (53.42)	—	256.75 (13.4)	0.68
SUIS	43.00 (12.27)	—	43.00 (16.02)	−0.48
WAI SF Hatcher – Client	46.25 (11.21)	—	46.25 (4.65)	0.00
WAI SF Hatcher – Therapist	39.75 (3.94)	—	35.75 (7.41)	1.07

SD, standard deviation; PSYRATS, Psychotic Symptom Rating Scale (Haddock *et al.*, 1999); PANSS, Positive and Negative Syndrome Scale (Kay *et al.*, 1988); Imagery MIPQ, Mental Imagery in Psychosis Questionnaire; YSQ, Young Schema Questionnaire-Short Form (Young *et al.*, 2003); SMI, Schema Mode Inventory (Lobbestael *et al.*, 2010); SUIS, Spontaneous Use of Imagery Scale (Reisberg *et al.*, 2003); WAI-SF Hatcher, Working Alliance Inventory-Short Version (Hatcher and Gillaspy, 2006).

the end-of-therapy assessment. Participant 2 had eight sessions because at session 3, he attended in a state of distress, wanting to discuss another mental health issue, and aside from completion of the sessional measures, this session did not focus on the imagery protocol.

Potential adverse therapy effects are reported in the following section (and supplementary table S4), showing low incidence of negative effects of iMAPS therapy. Those reported were relatively minor, such as one participant reporting that taking part made them feel 'a little embarrassed talking about my problems with people I had not met before', 'a little more anxious', and taking part made them think a little 'too much about bad things which have happened in the past'. The one item which scored 'quite a lot' was regarding concerns about the stigma of psychosis ('people would think badly of me because of diagnosis'), although this was Participant 2, who overall seemed to benefit. Of the participants who reported one or two items having impacted them 'very little', there did not seem to be a pattern between benefiting from therapy and not benefiting from therapy, although this was a small sample size study. There were no serious adverse events related to participation.

During the study, an ethical amendment was submitted to the ethics committee to revise the number of baseline assessments to between two to three on the basis of participant feedback.

Finally, on the shortened Working Alliance Inventory (WAI Hatcher version), which measures therapeutic alliance on the basis of three components (goals, tasks and bond), therapist ratings were slightly lower than client ratings. The client average score was 46.25 (*SD* 11.21). Therapist scores were slightly lower.

Baseline data can be seen in Table 2.

The PSYRATS scores indicated high levels of distressing and pre-occupying persecutory delusions. The BCSS negative-self rating was low and positive-self beliefs were slightly lower than this (similar to Freeman *et al.*, 2014). Intrusive images were high in imagery characteristics, such as how compelling, vivid, real, absorbing and pre-occupying an image was (average 44.0 out of a possible 50) and highly distressing (79/100).

Demographic and clinical details

Five participants (three men and two women) meeting criteria for a schizophrenia spectrum disorder under the care of an NHS early intervention psychosis service were recruited. Participant ages ranged from 19 to 34 years (mean = 23.40; SD = 6.42). One participant met criteria for schizophrenia, one for delusional disorder, one for schizoaffective disorder and two had no formal diagnosis but were experiencing psychosis and met criteria for entry to receive care from an early intervention psychosis service. All five participants described themselves as White British. Participants' living arrangements included living in supported accommodation, in a bail hostel, with their partner and parents, and with parents and their child. Four participants were single and one was living with their partner. Two participants were in higher education and three were unemployed. Four were experiencing auditory hallucinations at initial assessment. All five were experiencing persecutory delusions at initial assessment and all had been prescribed one or more anti-depressant medications previously. Three continued with anti-psychotics and other medications during the study (see case descriptions for details). Participants' details were anonymised to protect confidentiality, and can be found in the supplementary material.

Feasibility and acceptability of therapy

As highlighted above, adherence to iMAPS was acceptable, with all five participants attending all sessions. Retention was good, with no withdrawals during therapy.

Clinical outcomes

Tables 2 and S3 offer a summary of the main outcome measures and the assessments of the proposed psychological maintenance factors. On initial assessment, the reported imagery characteristics, negative schematic beliefs (as measured by BCSS) and psychotic symptoms were high. Figures 1 and 2 display participants' MIPQ total scores and PSYRATS delusion total scores from initial assessment, baselines, therapy sessions and end-of-therapy assessments. Figure 3 displays the BCSS initial assessment and end-of-therapy assessment scores. As Participant 5 declined to attend the end-of-therapy assessment, each of the figures for Participant 5 has this data missing.

Clinically significant change

The results are examined in terms of the Durham *et al.* (2003) criteria, i.e. a 25% drop is 'clinically significant change' and 50% is 'much improved.'

Imagery characteristics

With regard to the overall imagery characteristics, two participants had a 'much improved' clinically significant change, with drops of 88.6 and 68%, respectively (Participants 1 and 2). Participant 3 had slight drop in imagery characteristics total score (6.4%). Participants 4 and 5 had slight increases in imagery.

Delusions

On the Durham *et al.* criteria basis, two participants achieved a 100% drop in PSYRATS delusions (Participants 1 and 2), suggesting much improved clinically significant change, and a third participant was approaching this 25% drop (Participant 3). These changes appear to suggest that imagery characteristics change and core schema change leads to improvement in symptoms. One participant had a slight increase in PSYRATS Delusions (Participant 4) and another had a more significant increase (Participant 5), which in the clinical judgement of the
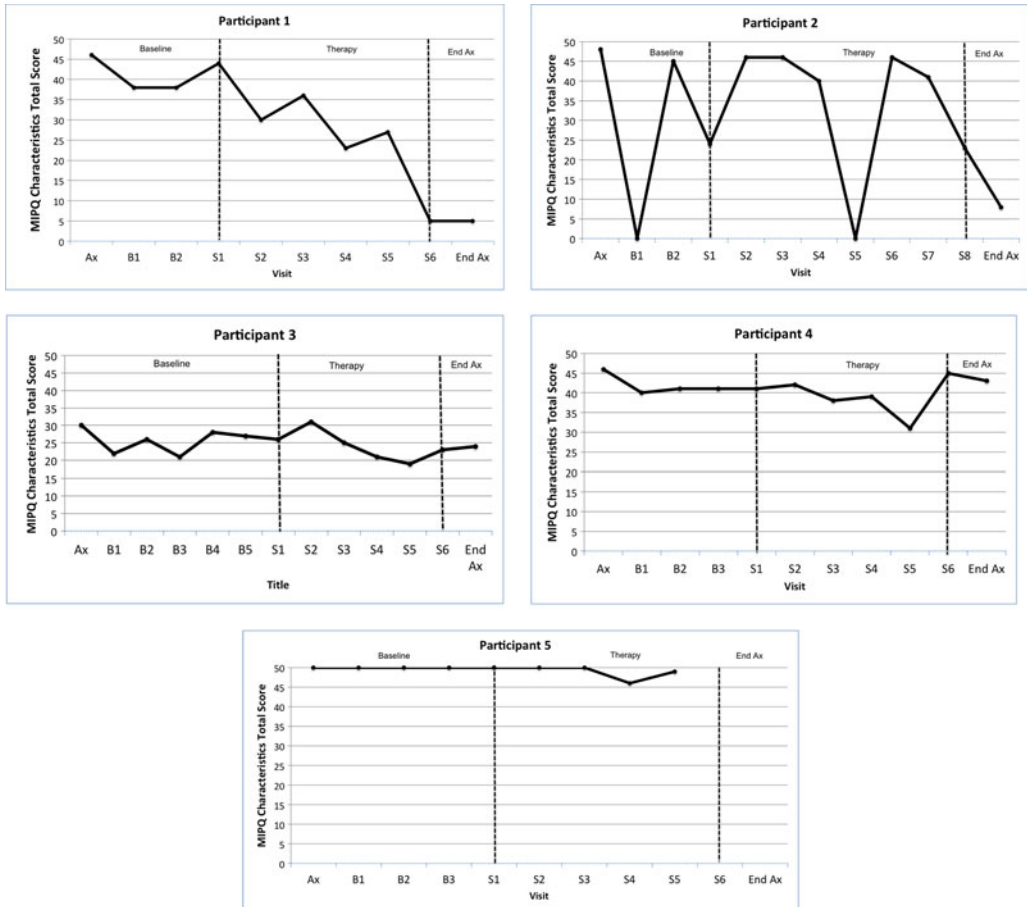
Figure 1. Changes to participant scores on the MIPQ characteristics of images.

therapist was due to other factors such as chronic insomnia which appeared to worsen their persecutory delusions and additional stress of exacerbated physical health difficulties. PANSS Positive subscale decreased by 17.1 %, which is in the direction of clinical significance, with a large effect size ($d = 1.45$).

Imagery distress

Across participants (see Table 2), imagery distress dropped by 50% from initial assessment to end-of-therapy assessment with a medium effect size ($d = 0.67$). Frequency of images decreased by 33%. Duration of images also decreased. However, it is notable that there appeared to be no change in mood mean scores on the Calgary Depression Scale across the participant group.

Schema change

As we were interested in whether an imagery-focused intervention would result in imagery change and change to schematic beliefs (with an indirect reduction on persecutory delusions), we also measured schema using two additional scales, the YSQ and the SMI. Three of the participants had reductions in early maladaptive schemas, as measured by the YSQ, but none of these reached clinical significance. Participant 3 had a 21% drop in YSQ total score, Participant 1 had a 17% drop, Participant 4 had a 13% drop, and Participant 2 had a very slight 1%
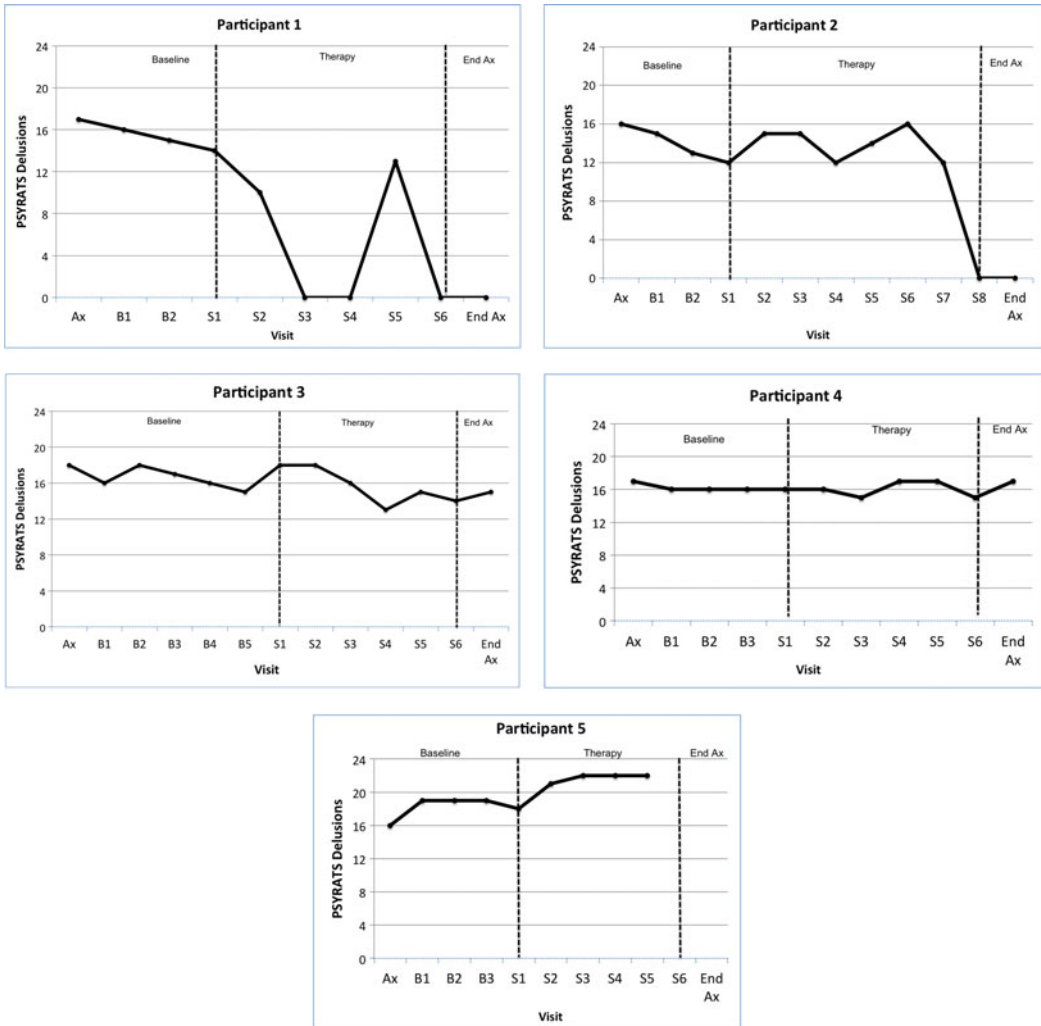
Figure 2. Changes to participant scores on the Psychotic Symptom Rating Scales (PSYRATS) Delusional beliefs.

increase. In terms of schema modes overall score, again three of the participants had reductions in schema modes as measured by the SMI but again, none of these reached clinical significance. Participant 3 had a 16% drop in modes, Participant 1 a 14% drop, Participant 4 had a 4% drop, and Participant 2 a 0.4% increase. In terms of the overall change for participants, supplementary table S3 highlights a 15% change in total scores on the YSQ ($d = 1.25$). The SMI also demonstrated a significant 14% reduction overall ($d = 0.68$). As can be seen in supplementary table S3, the 18 early maladaptive schemas all demonstrated a decrease, except emotional deprivation and unrelenting standards.

Hospital admission and serious adverse events

One serious adverse event was reported, for Participant 3 who also had co-occurring substance misuse and used cannabis between sessions 1 and 2, resulting in an increase in persecutory delusions, intrusive images and an informal admission to hospital. There was no evidence to
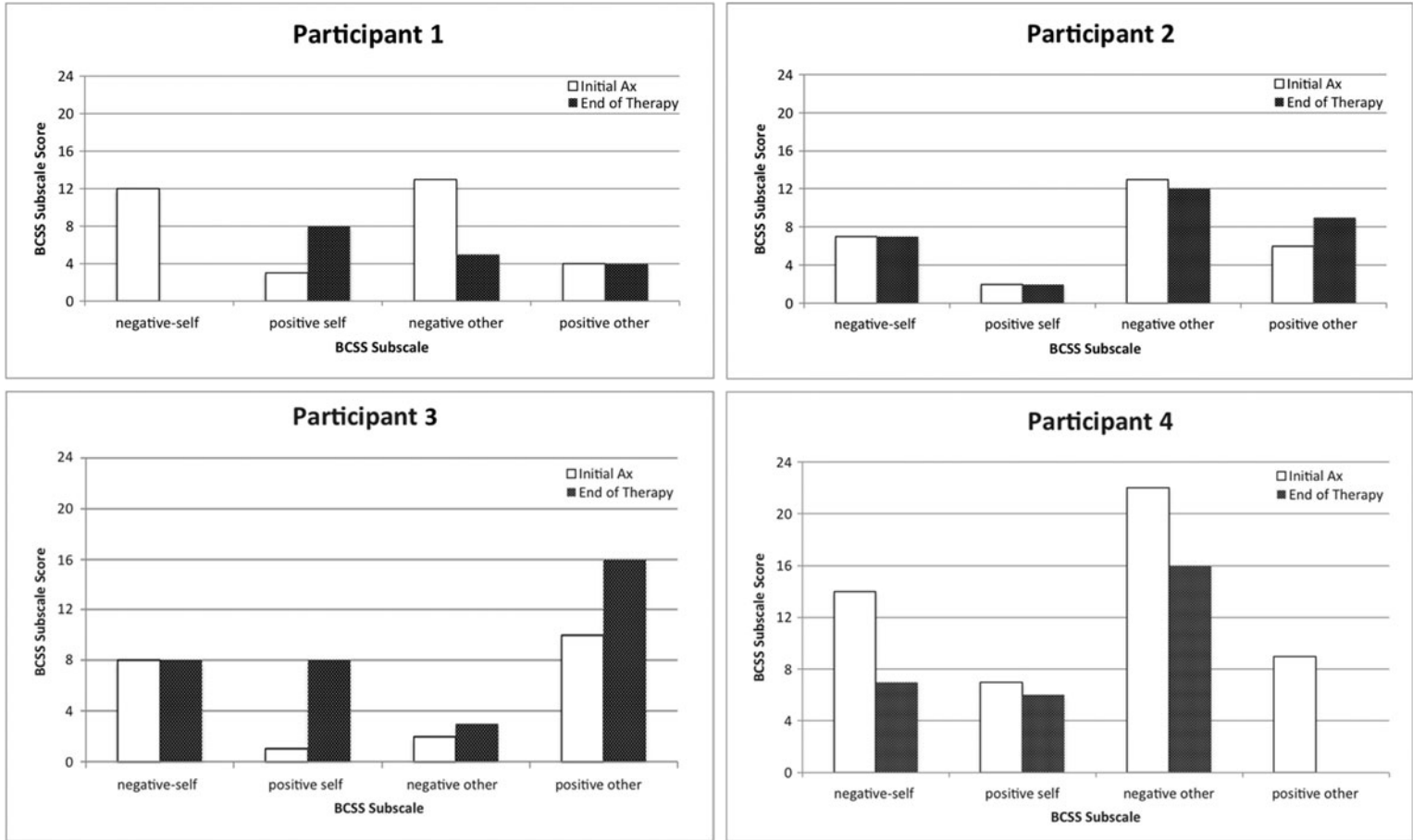
Figure 3. Changes to participant scores on the Brief Core Schema Scales.

suggest the admission was linked with the therapy intervention. No other serious adverse events occurred.

Discussion

The iMAPS therapy was received well by participants with persecutory delusions, as demonstrated by the high uptake and session completion rates. In three of the five cases, there were positive changes, with two cases achieving much improved clinically significant change with their images, schematic beliefs and persecutory delusions as measured by the PSYRATS. One participant had many more missed sessions, believed to be linked to co-occurring intravenous street diamorphine (heroin) substance misuse and various life events, and experienced a slight increase in PSYRATS. The final participant had numerous physical health problems and chronic insomnia which had an ongoing contribution to her difficulties, in addition to her images.

There was only one serious adverse event during the study, which was not related to the therapy intervention. More broadly, very few negative adverse effects of therapy were reported and these were relatively understandable for a one-to-one therapy intervention (e.g. feeling anxious, worrying what the therapist might think of them, thinking about the past). One participant worried people would 'think badly of me because of my diagnosis', highlighting the ongoing difficulties people with psychosis endure with stigma (Wood *et al.*, 2016). Although we did not specifically target stigma, it is reasonable to consider that future participants who reported images related to stigma or stigmatising episodes from their past might use the imagery techniques to reduce this distress.

Improvements on symptoms and beliefs measures demonstrated large effect size changes. The therapy aimed to work with intrusive negative images and then to use rescripting to achieve change in schematic beliefs and for three of five participants the iMAPS therapy achieved this. There was no overall change in mood, which was surprising. Examining the individual profile of mood changes, there were slight improvements or reductions in negative mood across the participants. Although several participants experienced change in intrusive images and schematic beliefs, and an indirect reduction in persecutory delusions, they also had a number of other symptomatic issues which were not addressed with the brief six-session iMAPS intervention. On the SMI, the negative schema modes all demonstrated a reduction, although some of these were limited, particularly the 'self-aggrandiser' mode (where the individual is self-absorbed and lacks empathy) barely changed. Usually, in schema therapy, this mode would be formulated and worked with therapeutically using a two-chair technique, a way of creating change between two sides of one's self (which was beyond the scope of the present study). The positive schema modes, such as 'contented child' and 'healthy adult' demonstrated some small increases too. Schema therapists formulating difficulties using a schema mode model would use imagery rescripting to work with vulnerable child modes, so it is notable that of the schema modes which did show change on their scores, vulnerable child mode appears to have one of the largest changes. As other modes were not specifically targeted during this brief imagery-focused therapy intervention, it makes sense that there was more limited change observed on these. The first trial of schema therapy for borderline personality disorder had a therapy window of three years (Giesen-Bloo *et al.*, 2006) and while subsequent trials have reduced this to 50 sessions (Bamelis *et al.*, 2014) this is considerably longer than the intervention delivered here.

There are some issues around the style of the intervention which it is worth commenting on. These include that there was little discussion of persecutory delusions, except to acknowledge them in terms of weekly PSYRATS sessional assessment and that in the formulation images and beliefs contributed to making these fears worse for participants (rather than working with delusional beliefs in a traditional CBT for psychosis approach; Kingdon and Turkington, 1994).

In terms of engagement, people with psychosis were willing to talk about these very distressing, vivid, real compelling internal mental images. Engagement was aided by usually spreading the initial assessment over two sessions, to allow trust to begin to be developed with the therapist and for participants to open up about any images which were ego dystonic. All participants also tolerated frequent and repeated assessment of the images and delusional beliefs using the PSYRATS from session to session. The assessment and multiple baselines design meant that the therapist and client were able to quickly move to formulation by session 2 when therapy began. Some case series studies give participants measures while in the waiting room or before the therapy session begins. We integrated this as part of the therapy session structure, having a brief state review and update, then collaboratively agreeing the agenda to include this detailed review of the images and fears, which we believed enhanced engagement in the therapy.

For the two participants where the intervention did not appear to work, in addition to the issues mentioned already, it is also worth noting that Participant 4 struggled to identify a safe place image, a useful first step. This participant struggled to identify any safe place image which can be common for individuals with difficult life histories (in this case, parents who were intravenous drug users). On reflection, moving onto the rescripting work sooner may have yielded more promising results. With Participant 5, a very distressing intrusive, flash-forward mental image had been present throughout the baseline period and sessions, but remained undisclosed until session 5. The addition of a standing agenda item about disclosing new images would be important in future work.

Some participants' scores were beginning to drop slightly during the baseline period and this could be attributed to the early stages of change which are known to occur when repeated and frequent measurement begins. Research into recovery from psychosis has identified that it consists of a much wider and greater range of facets than reduction in persecutory beliefs (Pitt *et al.*, 2007). In terms of the therapeutic alliance, the shortened WAI Hatcher version therapist ratings were slightly lower than client ratings, consistent with previous studies in psychosis (Mulligan *et al.*, 2014). As highlighted in the results, the client average score was 46.25 (*SD* 11.21), similar to a previous study of acceptance and commitment therapy in psychosis (White *et al.*, 2011). Therapist scores were slightly lower (although this therapist Hatcher version has ten items and scores range from 10 to 50), suggesting that the client thought the alliance was better than the therapist's perception of the alliance.

As a brief targeted intervention, it could be added as a module to other theoretically based approaches, which also have initial feasibility and acceptability (Freeman *et al.*, 2016; Hayward *et al.*, 2014). In terms of the change in these other brief targeted approaches, Freeman *et al.* (2016) found using strategies to improve self-confidence a small reduction in negative schemas (Cohen's $d = 0.24$) and a moderate reduction in paranoia ($d = 0.59$). Hayward *et al.* (2014), in a pilot randomised controlled trial of relating therapy, found a larger effect size of $d = 1.30$ on PSYRATS distress at end-of-therapy. Our much smaller case series would appear to compare favourably; however, larger studies need to be conducted before meaningful comparisons could be made.

Techniques from schema therapy could be piloted in a similar way for people with psychosis, or a full schema therapy protocol could be tested to assess if wider change in that conceptualisation of schematic beliefs results in a wider symptom improvement. Although this study recruited individuals who were reporting negative intrusive mental images related to their persecutory delusions, this would not necessarily be essential. An imagery-focused approach could have been used in relation to using imagery rescripting of past negative experiences.

Limitations

This was an uncontrolled study meaning that the improvements cannot be attributed with confidence to the iMAPS intervention. The assessments were not blinded, which increases risk

of bias, and there was no follow-up to assess if the changes were maintained. Three participants achieved change on images, schematic beliefs and reductions in persecutory delusions. Effect sizes were large and the change for two of the participants was highly clinically significant, and significant for a third participant. Therapy lasted on average six sessions to achieve change. However, two participants did not appear to gain substantial benefit, but did have significant other issues such as undisclosed intravenous drug use while in a bail hostel (Participant 4) and a wide range of physical health problems (Participant 5). Non-specific factors often appear to contribute to positive results, but the multiple baseline randomisation and several assessments can be argued to offer some control for these effects. A further limitation was that the participants recruited described their ethnicity as White British, limiting generalisability.

Our results suggest that iMAPS therapy for persecutory delusions should be evaluated further, in a larger case series or in a randomised controlled trial to overcome several of limitations highlighted above, including a follow-up period to see if change is sustained.

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