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Brief imagery based metacognitive intervention for flashforwards in psychosis: a fixed baseline case series

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Abstract

Background: Distressing mental images are common in people with psychosis. The central role of metacognitive difficulties in psychosis suggests that metacognitive interventions with imagery properties could play a central role in managing distressing mental imagery. A brief imagery-based metacognitive intervention was developed to target the control mechanism of distressing mental images in psychosis.
Aims: A fixed baseline case series was designed to investigate whether the intervention was acceptable, feasible and effective.
Method: Eight participants who met criteria for a schizophrenia spectrum diagnosis and experienced distressing future-oriented mental images took part in the case series, which consisted of three phases; baseline, intervention, and follow-up. Symptoms of anxiety, depression, persecutory delusions and schemas were assessed pre- and post-intervention, and qualitative feedback was collected at follow-up.
Results: The metacognitive intervention was feasible, acceptable, and rated as highly satisfactory. One participant dropped out at the baseline phase. No adverse events were reported. Positive change scores with a decrease in symptoms were reported for anxiety, depression, persecutory delusions, and schemas. Tau-U analysis showed positive trends and high effect sizes on mental imagery characteristics at follow-up.
Conclusion: Our findings suggest that it is acceptable and feasible to engage people with psychosis in a brief imagery-based metacognitive intervention and that positive change can be achieved. Further studies are needed to replicate and clarify the findings of our study and develop the evidence base for this intervention.

Keywords: flashforwards; mental images; metacognitive intervention; novel intervention; persecutory delusions

Introduction

Cognitive therapy conventionally focuses on working with negative automatic verbal thoughts, unhelpful assumptions, and core beliefs. It is, however, well known that thoughts can be verbal or visual, also known as mental images (Beck, 1979). Mental images refer to the stimulation or recreation of perceptual experience across different sensory modalities, which gives rise to the experience of 'seeing with the mind's eye' or 'hearing with the mind's ear' (Kosslyn *et al.*, 2001). Studies have found that mental images compared with verbal thoughts, significantly amplify emotional effects and associated actions (Libby *et al.*, 2007). Thus, working with mental imagery may have a more powerful impact on emotions compared with working with verbal thoughts.

Mental images can be future-oriented, experienced as fantasies, worries or 'flashforwards', and can also be related to past events, experienced as memories or 'flashbacks' (Engelhard *et al.*, 2011;

Holmes *et al.*, 2007b). Mental images possess several sensory properties, such as being vivid, compelling, and sensory-detailed (Pearson *et al.*, 2013).

Intrusive distressing mental images have been identified across anxiety disorders (Hirsch and Holmes, 2007), bipolar disorder (Steel *et al.*, 2020) and psychosis (Paulik *et al.*, 2022; Schulze *et al.*, 2013; Taylor *et al.*, 2020a). Studies have found that 73–74% of individuals with psychosis experience intrusive mental images (Morrison *et al.*, 2002; Schulze *et al.*, 2013). Intrusive and uncontrollable images may signal psychopathology, play a ubiquitous role in the maintenance of psychosis, and thereby provide a target for alternative treatment techniques than simply language-based techniques.

Evidence for imagery-based techniques for psychotic symptoms is mounting (e.g. Clarke *et al.*, 2022; Ison *et al.*, 2014; Newman-Taylor, 2020; Paulik *et al.*, 2019; Taylor *et al.*, 2020), and a breadth of imagery techniques have been developed across mental health disorders, i.e. manipulating imagery to change beliefs about its significance, learning to discriminate between imagery and reality, transforming images – memories – and dreams, and creating new mental imagery (Ng *et al.*, 2013).

Two recent case series studies, both with five participants with persecutory delusions, found that a brief six-session imagery-focused intervention (iMAPS) was acceptable and feasible to deliver and reported reductions in imagery distress, persecutory delusions, negative schematic beliefs, and mood (Cairns *et al.*, 2023; Taylor *et al.*, 2020a).

Persecutory delusions are a common symptom of psychosis. They are typically characterised by future oriented threats (e.g. 'people are out to get me') and can be experienced in imagery form (e.g. 'seeing in the mind's eye, a group of people plotting to harm them').

It is also known that persecutory delusions are often accompanied by associated metacognitive beliefs – ideas – and interpretations (Harper and Timmons, 2021). Metacognitive beliefs are beliefs about 'thinking about thinking' (Papaleontiou-Louca, 2003) and refers to 'any knowledge or cognitive process that is involved in the appraisal, monitoring or control of cognition' (Wells, 2002; p. 6). Researchers have emphasised the role of unhelpful metacognitive beliefs in leading to biased information processing of threatening stimuli which consequently maintains unhelpful thinking styles, attentional biases, distress and attempts to control thoughts and other internal events (García-Montes *et al.*, 2006; Sellers *et al.*, 2017).

Specific, metacognitive beliefs in relation to controllability of a situation and controllability of thoughts (e.g. 'I have no control of my thoughts' or 'I have no control of my mental images') have been suggested to be a key component in the maintenance of psychotic phenomena such as persecutory delusions (Fett *et al.*, 2020; Freeman and Garety, 1999; Morrison *et al.*, 1995). Thus it appears that metacognitive beliefs about not having control of distressing mental images relating to persecutory delusions is of importance when understanding the maintenance of persecutory delusions.

Metacognitive techniques focus on altering metacognitions or their functions, such as increasing cognitive flexibility, modifying cognitive beliefs, and decreasing dysfunctional coping strategies (Moritz *et al.*, 2022). This can be achieved by manipulating mental imagery properties and reinforcing that 'mental images are just images' (Holmes *et al.*, 2019), which consequently reduces the emotional power of images, changes how people relate to images and increases individuals' metacognitive beliefs about control in relation to psychotic experiences.

Given the link between mental imagery and persecutory delusions, metacognitive techniques concerned with imagery properties are of potential therapeutic value (Lysaker *et al.*, 2018). There is a range of metacognitive techniques that focus on manipulating mental imagery properties, which reduces the emotional power of the image by changing how a person relates to the image (Holmes *et al.*, 2019).

To our knowledge, there are no studies that have investigated the acceptability and feasibility of imagery-based metacognitive therapy in flashforwards in psychosis.

Aims

A brief novel imagery-based metacognitive intervention to increase control of flashforwards in persecutory delusions was developed. The primary objective was to complete a case series to investigate the acceptability and feasibility in NHS settings. Case series design is recommended by the Medical Research Council for the initial stages of developing complex interventions (Medical Research Council, 2000). The secondary objective was to report change scores in outcome measures to help inform future research in this area. Given the nature of case series studies, the study was not designed or powered to fully assess treatment effectiveness.

We hypothesised that the intervention would: (1) be acceptable and feasible to deliver, (2) lead to improvements in measures of mental imagery characteristics (vividness, conviction, control, distress, and frequency), anxiety, depression, persecutory delusions, and schema beliefs and that (3) change will be maintained at one week follow-up.

Method

Design

A mixed methods fixed baseline case series design was used. Three phases were established. The baseline phase (1) included three points of data collection to meet the suggested criteria point of establishing experimental control within individuals (Barlow *et al*., 2009; Kazdin, 2011). This phase consisted of the initial assessment, session 1 of the metacognitive intervention which was psychoeducational, and session 2 which involved collaboratively developing a microformulation to increase a better understanding of the maintenance of flashforwards. Sessions 1 and 2 were not part of the core intervention. Experimental manipulations were introduced in the intervention phase (2). Morley (2017; p. 83) stated 'in any case one would require more than one treatment session to ensure that any changes are not a transient effect of novelty or a demand characteristic of the experiment'. Thus the intervention phase consisted of two data points (session 3 which focused on introducing and practising metacognitive techniques, and session 4 which broadened the application of metacognitive techniques and consolidated learning). The follow-up phase (3) consisted of the final follow-up session where post-intervention baseline, primary and secondary outcomes were measured. There was a 1-week gap between each session across all phases.

Participants

Eight participants were recruited from Adult Mental Health Teams (AMHT) and Early Interventions in Psychosis services (EIS) from 45 patients screened for participation. Participants aged 18–65 who met the following criteria were included in the study: (1) primary reported experiences of psychosis supplemented by diagnostic criteria for schizophrenia and schizoaffective disorder from the ICD-11; (2) identified a distressing flashforward image related to a persecutory delusion; (3) had sufficient understanding of English language; and (4) had capacity to give consent. Reasons for not participating were not meeting the inclusion criteria ($n = 25$), alcohol and substance misuse ($n = 3$), being non-contactable ($n = 2$), and not being interested in taking part in research ($n = 3$). Half the participants were White British and the remaining were People from the Global Majority. Six of the participants identified as female and the remaining two as male.

Measures

Baseline measures

Five baseline measures were completed at assessment (week 1) and follow-up (week 6). Reliable change and clinically significant change based on differences in pre- and post- intervention scores were reported.

The Persecutory and Deservedness Scale (PaDS; Melo et al., 2009). This is a 10 item self-report measure of the severity of paranoid thinking and the level of perceived deservedness for the persecution. Higher scores represent greater levels of persecutory and deservedness ideation. The PaDS demonstrates high validity and reliability and is validated for use in clinical samples (Melo *et al.*, 2009).

Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001). The PHQ-9 is a 9-item self-report scale consisting of signs and symptoms of low mood and depression. Respondents are asked to rate how often they have been bothered by the symptoms outlined, using a scale from 0 to 3 (where 0 is not at all, 1 is several days, 2 is more than half the days and 3 is nearly every day). The clinical cut-off point is a score of 9; higher scores indicate increased severity.

General Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006). This is a 7-item self-report measure of generalised anxiety disorder (GAD). Items are rated on a 4-point scale from 0 to 3, measuring how often the respondent has been bothered by common signs and symptoms of GAD. Total scores range from 0 to 21; greater scores indicate higher severity.

Brief Core Schema Scales (BCSS; Fowler et al., 2006). The BCSS is a 24-item self-report measure which assesses beliefs about self and others. Items are rated using a scale of 0 to 4, which consists of four factors (negative self, positive self, negative others, and positive others) with a score given for each factor. The greater the total of the negative beliefs, the greater the negative beliefs; and the larger the total of positive beliefs, the more positive beliefs one holds.

Primary outcome measures
Acceptability and feasibility were measured by attendance rates, safety in relation to experiences of adverse events, and qualitative feedback.

Secondary outcome measures
In each session, participants completed an adapted version of the Mental Imagery in Psychosis Questionnaire (MIPQ; Holmes *et al.*, 2016; Taylor *et al.*, 2020a). The MIPQ records characteristics of mental images (Taylor *et al.*, 2020a).

Our version of the MIPQ included five visual analogue scales, which asked individuals to rate various characteristics of their target distressing image. The characteristics measured were as follows:

Control Rating: On a scale from 0 to 100%, how much control do you have of the image?
Distress Rating: On a scale from 0 to 100%, how distressing is the image?
Frequency Rating: How often do you experience the image on a daily basis per week?
Conviction Rating: On a scale from 0 to 100%, how real does the image feel?
Vividness Rating: On a scale from 0 to100%, how vivid is the image?

Visual analysis and Tau-U analysis were completed to evaluate pre- and post-intervention changes in MIPQ ratings.

Qualitative measures
Qualitative feedback was gathered at follow-up sessions to assess acceptability and feasibility of the intervention. This measure included questions about acceptability, satisfaction, between-session use of techniques, demand, implementation, practicality, adoption, integration, clinical impact, and improvement recommendations. The measure was developed based on previous exit interviews (e.g. IBER Trial; Steel et al., 2022), which were co-produced with experts by experience.
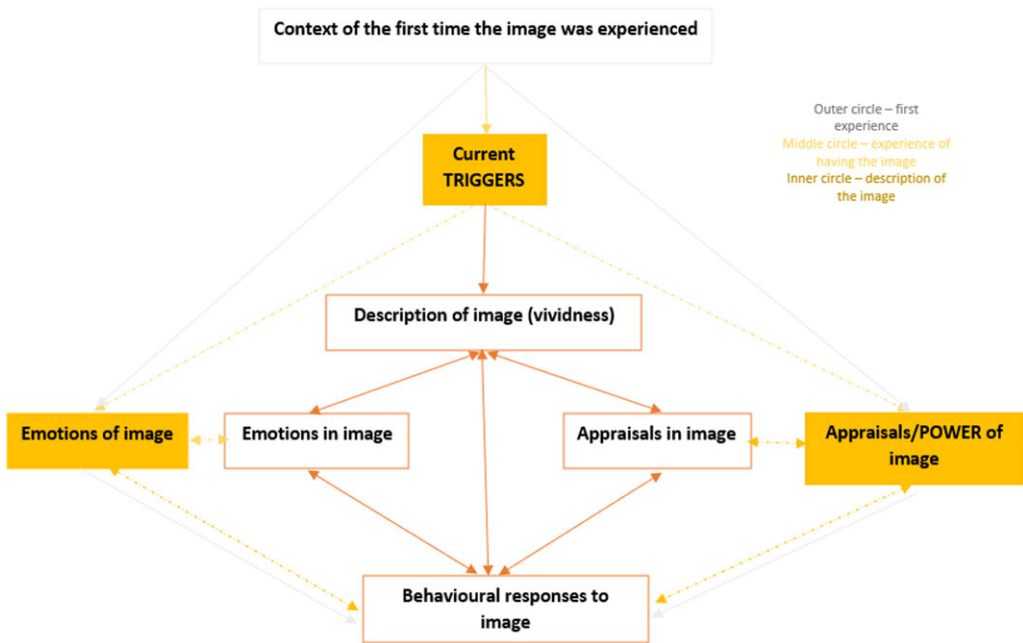
Figure 1. Microformulation for distressing non-trauma (flashforward) mental images.

Intervention

Treatment was delivered in a flexible manner to accommodate participants' idiosyncratic experiences and preferences. Patient-centred imagery-based metacognitive techniques were collaboratively developed and chosen to target appraisals about control of distressing mental images (e.g. 'I have no control of them').

Two types of metacognitive techniques were offered: (a) manipulation of mental images (Holmes *et al.*, 2019) and (b) attention training (Wells, 1990). For the first technique, similar to standard imagery interventions, participants were asked to evoke the target image in great detail, and ratings on emotional distress (using a scale from 0 to 100%) were taken. Participants were then asked to insert their chosen metacognitive technique and re-rate their emotional distress.

The first author delivered all sessions, which were closely supervised by the third author. Regular supervision took place to discuss the process of sessions and feasibility of the protocol.

Procedure

Participants were recruited via AMHT and EIS teams. All therapy sessions were delivered online using Microsoft Teams and were between 40 and 60 minutes in duration.

Following written informed consent, participants were invited for an initial assessment. This included a brief interview, and completion of baseline and secondary outcome measures. Participants received a £10 voucher for completing the assessment.

Following this, the brief four-session metacognitive intervention therapy proceeded. See Fig. 1 for an overview of the micro-formulation completed in session 2.

Sessions took place on a weekly basis. Participants were asked to complete the adapted MIPQ questionnaire at the end of all four sessions.

Participants were invited back for a 1-week follow-up to complete baseline and secondary outcome measures. Participants completed a qualitative feedback survey to share their experiences of the intervention. At this stage, they were reimbursed with an additional £15 voucher.

Analysis

Feasibility and acceptability were evaluated through inspection of descriptive data and qualitative feedback.

To assess change in outcome measures scores, The Leeds Reliable Change Index Calculator (Morley and Dowzer, 2014) was used. It evaluated reliable (reliable change index; RCI) and clinically significant change (CSC; Jacobson and Traux, 1991) for all participants, across baseline measures.

The MIPQ questionnaire scores were monitored and analysed throughout all phases of the study. Visual analyses were conducted looking for change in central tendency, trend, and variability, relative to the magnitude of the intervention effect (Kazdin, 2011) across all participants who completed the intervention, for controllability, vividness, conviction, distress, and frequency of flashforwards. Due to risks of Type II errors and the limited generalisability about intervention effectiveness (Fingerhut *et al.*, 2021) using visual analysis, additional Tau-U analysis was conducted using the Tau-U online calculator (Vannest *et al.*, 2016). Tau-U analyses non-overlap between study phases and provides trend control (Parker *et al.*, 2011).

Three comparisons were conducted: baseline *vs* intervention (to control for the effects of time and monitoring), intervention *vs* follow-up (to comprehensively evaluate post-intervention effects compared with preceding phases), and baseline and intervention *vs* follow-up (to comprehensively evaluate post-intervention effects compared with the preceding phases).

Results

Primary outcomes

Descriptive statistics

Clinical and demographic information of the eight participants who entered the study is presented in Table 1. One participant (P1) dropped out at session 3 due to difficulties committing to various health care appointments. One male and six female participants completed all phases of the study, with an age range of 20–56 (mean = 33.38; $SD = 13.78$).

Four participants were waiting for psychology input, two had completed a course of therapy, and two had concurrent therapy (CBTp). A flowchart of participants in different phases of the study is illustrated in Fig. 2.

All participants experienced at least one recurring distressing flashforward. None was related to any past memories or traumatic events. Personalised metacognitive techniques were developed through collaborative discussions following introducing and practising examples of metacognitive techniques.

Acceptability and feasibility

Eight out of 45 participants screened took part in the study. Overall, study adherence was good. Participants attended an average of 5.6 out of 6 sessions (seven participants attended all six sessions). All sessions took place 1–2 weeks apart.

Retention was high, with only one participant dropping out at baseline phase. There were no withdrawals during or after the intervention phase. All participants were able to engage in developing a microformulation, and developed and practised metacognitive techniques both in and between sessions. No risk or harm to self or others was reported by any of the participants throughout the study. No other adverse or serious adverse events (e.g. hospitalisation, death) were reported.

Table 1. Sample characteristics

| | | Therapy | | | |
| | | Waiting for therapy | In therapy | Completed therapy | |
Participant ID	Diagnosis				Religion
P1	First episode of psychosis			X	Christian
P2	First episode of psychosis		X		Church of England
P3	First episode of psychosis	X			New Spirituality
P4	Schizoaffective disorder	X			Muslim
P5	First episode of psychosis	X			Christian
P6	First episode of psychosis	X			Muslim
P7	First episode of psychosis		X		Non-religious
P8	First episode of psychosis			X	Spiritual/witchcraft

Secondary outcomes

Effectiveness: reliable and clinically significant change

A summary of mean data of eight participants for baseline measures is presented in Table 2. Highest reliable improvement was seen for GAD-7. Six participants showed reliable improvement. GAD-7 scores were, on average, in the severe range (16.5 out of 21) at pre-intervention and dropped down to 9.4, indicative of mild severity at post-intervention. Three participants met clinically significant case criteria (CSC). Half of the participants (n = 4) showed reliable improvement for PHQ-9. One participant met criteria for CSC.

Beliefs of persecution and deservedness, as measured by the two subscales on PaDS, showed a reduction in mean scores post-intervention *vs* pre-intervention. Only one case met RCI for both subscales and only met criteria for CSC on the persecution subscale. No participants' scores on the BCSS subscales met clinical significance, although three cases showed clinical reliable improvement in scores for the negative-self subscale. None of the participants scores deteriorated on any of the measures.

Effectiveness: target flashforward ratings

Descriptive analysis of study phase ratings for all MIPQ questions for the seven participants who completed all phases of the study is given in Table 1.

Visual analysis

As predicted, there was a positive linear trend between baseline, intervention and follow-up for all participants on all MIPQ scales, except P7. See Fig. 3 for a visual analysis of all MIPQ scores. P7's scores on vividness, conviction and distress remained static until the second intervention session. Minimal visual variability in baseline phase was seen for P8 or control, P4 and P6 for distress, P2, P4 and P8 for conviction ratings, and P5 for frequency.

Six participants (85.7%) showed a significant downward trend in vividness and reduction in central tendency of their flashforwards at follow-up compared with pre-intervention, except P7, whose scores remained at 100% throughout the study.

All participants experienced a change in trend and reduction in central tendency for control. This supported the prediction that the intervention will increase a sense of control post-intervention (mean = 79, $SD = 20.90$) compared with pre-intervention (mean = 7, $SD = 18.89$) and that this will be maintained at follow-up (mean = 87, $SD = 10.69$).

It was also predicted that there would be a decrease in level of distress post-intervention compared with pre-intervention and that this would be maintained at follow-up. A positive trend
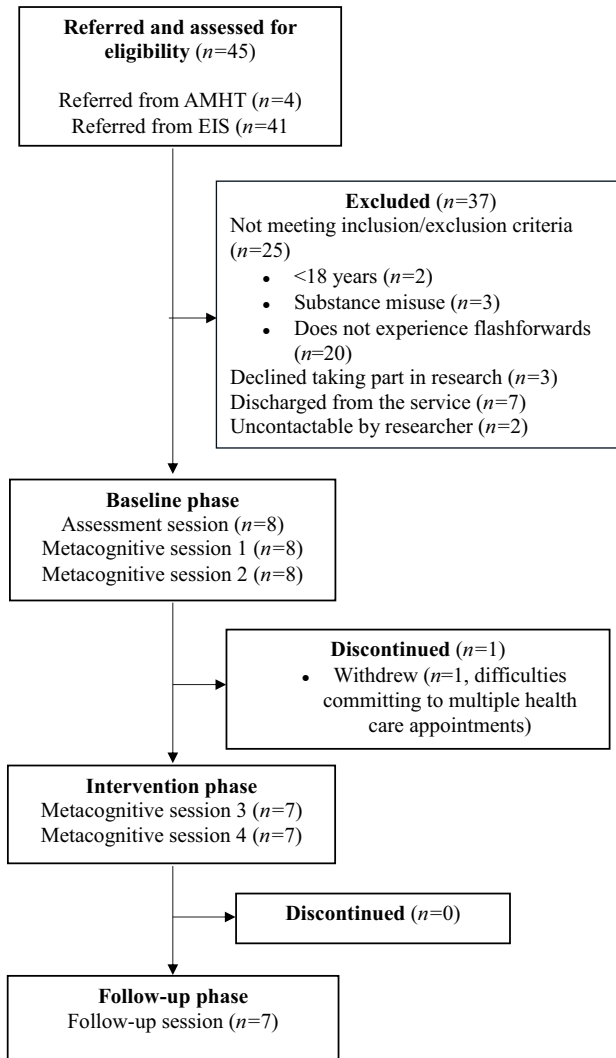
Figure 2. Overview of recruitment and participation.

with a decline in rating for distress was shown between all three phases: mean ratings at pre-intervention were 27 ($SD = 29.13$), post-intervention mean ratings were 99 ($SD = 25.82$) and mean follow-up ratings were 13 ($SD = 25.63$). P2–P6 showed a prominent change in trend and reduction in central tendency, whereas P7's scores showed a gradual trend.

Similar positive trends were found for conviction and frequency for all seven participants, which supported our predictions. Conviction ratings declined from a mean of 90% at pre-intervention to mean of 9% at follow-up. Four participants reported having 0% conviction, two participants remained 10% convinced, and P7 reported 40% conviction at follow-up. As a group, the majority ($n = 6$) reported not experiencing the target flashforwards at follow-up (0 images per week). However, P7 continued experiencing, on average, 20 target flashforwards per week (mean group frequency = 3).

Table 2. Descriptive statistics of group baseline measures ($n = 8$)

	Pre-intervention		Post-intervention		Standard error of difference at 95% confidence level	Cases indicating reliable change as measured by the RCI*	Cases meeting clinically significant change
	Mean	SD	Mean	SD			
GAD-7	16.5	4.75	9.4	4.24	4.27	6	3
PHQ-9	17.88	5.49	9.4	4.54	5.03	4	1
PaDS Persecution subscale	2.26	0.97	1.5	0.90	1.08	1	1
PaDS Deservedness subscale	1.48	1.17	0.7	0.83	1.30	1	0
BCSS Positive Self subscale	8.75	4.86	8.71	4.46	3.72	0	0
BCSS Negative Self subscale	8.88	3.83	5.71	2.29	3.94	3	0
BCSS Positive Others subscale	9.63	6.19	9	4.46	3.72	0	0
BCSS Negative Others subscale	12	7.15	12.14	6.80	6.15	0	0

Lower mean scores indicate lower distress.
*Reliable change is calculated as RCI(.05) = 1.96SDiff and indicated when pre score minus post score is greater than the standard error of difference score (Blampied, 2022).
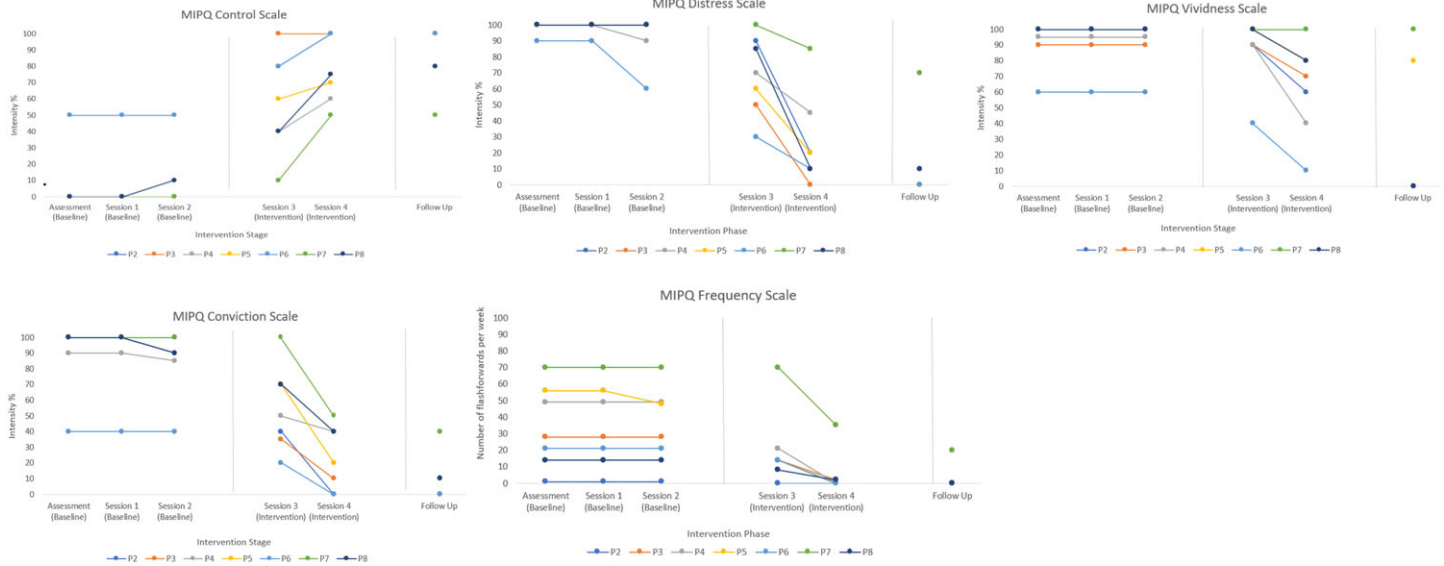
Figure 3. Visual analysis graphs for MIPQ scales.

Table 3. Comparison of MIPQ scores across study phases per participants

MIPQ target	Participant	Phase comparison	Tau-U	SD	Z	p	90% CI
Control	P2	A×B	1	3.46	1.73	.0833	0.050, 1
		B×C	0.5	1.63	0.61	.5403	−0.843, 1
	P3	A×B	1	3.46	1.73	.0833	0.050, 1
		B×C	0	1.63	0	1	−1, 1
	P4	A×B	1	3.46	1.73	.0833	0.050, 1
		B×C	1	1.63	1.22	.2207	−0.343, 1
	P5	A×B	1	3.46	1.73	.0833	0.050, 1
		B×C	0.5	1.63	0.61	.5403	−0.843, 1
	P6	A×B	1	3.46	1.73	.0833	0.050, 1
		B×C	0	1.63	0	1	−1, 1
	P7	A×B	1	3.46	1.73	.0833	0.050, 1
		B×C	1	1.63	1.22	.2207	−0.343, 1
	P8	A×B	1	3.46	1.73	.0833	0.050, 1
		B×C	1	1.63	1.22	.2207	−0.343, 1
Distress	P2	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P3	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−0.5	1.63	−0.61	.5403	−1, 0.843
	P4	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P5	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P6	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P7	A×B	−0.5	3.46	−0.87	.3865	−1, 0.450
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P8	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−0.5	1.63	−0.61	.5403	−1, 0.843
Frequency	P2	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	0	1.63	0	1	−1, 1
	P3	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P4	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−0.5	1.63	−0.61	.5403	−1, 0.843
	P5	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−0.5	1.63	−0.61	.5403	−1, 0.843
	P6	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−0.5	1.63	−0.61	.5403	−1, 0.843
	P7	A×B	−0.5	3.46	−0.87	.3865	−1, 0.450
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P8	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
Conviction	P2	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−0.5	1.63	−0.61	.5403	−1, 0.843
	P3	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P4	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P5	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P6	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−0.5	1.63	−0.61	.5403	−1, 0.843
	P7	A×B	−0.5	3.46	−0.87	.3865	−1, 0.450
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P8	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
Vividness	P2	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P3	A×B	−0.5	3.46	−0.87	.3865	−1, 0.450
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P4	A×B	−1	3.46	−1.73	.0833	−1, −0.050

(*Continued*)

Table 3. (*Continued*)

MIPQ target	Participant	Phase comparison	Tau-U	SD	Z	p	90% CI
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P5	A×B	−0.5	3.46	−0.87	.3865	−1, −0.450
		B×C	−0.5	1.63	−0.61	.5403	−1, 0.843
	P6	A×B	−1	3.46	−1.73	.0833	−1, −0.050
		B×C	−1	1.63	−1.22	.2207	−1, 0.343
	P7	A×B	0	3.46	0	1	−0.950, 0.950
		B×C	0	1.63	0	1	−1, 1
	P8	A×B	−0.5	3.46	−0.87	.3865	−1, 0.450
		B×C	−1	1.63	−0.22	.2207	−1, 0.343

A = baseline; B = Intervention; C = follow-up phase.

Statistical analysis of secondary outcomes

No baseline trends were found for any of the participants, and no individual variability was found for any of the study phases. Tau-U analysis generated a comparison of the weighted average of MIPQ score ratings across study phases (baseline, intervention and follow-up; Table 3). The largest effect size was consistently found when baseline and intervention were compared with follow-up, suggesting that post-intervention effects were significantly higher compared with preceding phases. A particularly high effect size was found for Conviction (Tau = 0.90, Z = 4.76) and Distress (Tau = 0.90, Z = 4.76).

Significant trends were found when baseline and intervention were compared for all MIPQ questions (this comparison controlled for effects of time and monitoring), with the largest effect size for Control (Tau = 1, Z = 4.58) and a moderate effect size for Vividness (Tau = 0.64, Z = 2.95). The smallest effect size was consistently found when intervention was compared with follow-up, suggesting that change is maintained, and some additional change was achieved.

Qualitative outcomes

Feedback from the qualitative survey revealed good acceptability, feasibility, and satisfaction with regard to the intervention. All participants except P7 stopped experiencing their target flashforward at follow-up. However, the frequency of P7's flashforwards had reduced from 70 to 20 times weekly. P7 reported feeling a drop in distress from 100% to 70%, and an increase to feeling 50% in control of her mental images at follow-up compared with 0% control at baseline. It is likely that P7 continued to experience her flashforwards as she experienced visual hallucinations of similar content which made it hard for her to separate the two experiences. A summary of participants' comments about perceived changes post-intervention is available in the Supplementary material. Five participants recommended adding additional follow-up sessions, suggesting that this would allow more time to practise the techniques and consolidate learning.

Acceptability and feasibility

Participants reported high satisfaction (95.71%) and high success rates (94.28%) with the intervention. All participants reported that they practised the intervention techniques between sessions and that they were likely to continue to use the techniques beyond the study. Furthermore, all participants reported being able to intervene and control their flashforwards which resulted in changes in vividness, conviction, distress, and frequency.

Discussion

To our knowledge, this is the first case series study designed specifically to target the metacognitive control mechanism of flashforwards in a sample of patients with persecutory delusions. The primary objective was to assess the acceptability and feasibility of delivering a brief 4-session imagery-based metacognitive intervention in people with persecutory delusions. The study also reports change scores in baseline and secondary outcome measures to assess preliminary signs of effectiveness.

Seven out of eight participants completed all study phases. As with previous brief imagery interventions for psychosis (Morrison, 2004; Ison *et al.*, 2014; Schultze *et al.*, 2013; Taylor *et al.*, 2020a), our findings indicate that it is feasible to administer brief, maintenance formulation-driven, symptom-specific intervention in isolation. Ratings of intervention satisfaction were high. The intervention was acceptable, with only one participant dropping out early during the baseline phase; this is comparable to drop-outs reported in similar brief imagery-based interventions for psychosis (Clarke *et al.*, 2022; Taylor *et al.*, 2020a; Ison *et al.*, 2014; Sheaves *et al.*, 2015).

The case series highlights a number of areas of clinical interest. All participants reported positive changes following therapy. The most common feedback was an increase in metacognitive control and reduction in distress, and general anxiety. Growing research has identified that recovery from psychosis consists of a wide range of maintenance factors of persecutory delusions, such as cognitive biases, worry and anxiety (Freeman and Garety, 2006), low mood and negative schematic beliefs (Smith *et al.*, 2006) and intrusive mental imagery (Morrison, 2004)

Statistical analysis showed an increase in control and reduction in distress, frequency, conviction, and vividness of mental imagery, which was maintained at 1 week follow-up. Some non-statistical changes in MIPQ scores were noticeable at baseline phase for some participants. This can be attributed to the impact of several uncontrolled factors (e.g. therapy stage, competing metacognitive beliefs such as religious beliefs, etc.)

Low control and high distress and conviction over internal experiences, such as mental images at baseline in our sample, suggest an inability to distinguish between internally and externally generated actions. This has parallels with delusions of control (Horne *et al.*, 2022) and negative schematic beliefs, which may contribute to the maintenance of persecutory delusions. The findings add to existing evidence supporting the relationship between mental images and affect (e.g. Holmes *et al.*, 2019). Images were experienced with a range of distressing emotions, including anxiety, fear, sadness, loneliness, and guilt. Interventions that help clients believe that they have control of flashforwards, such as manipulating imagery and shifting attention away from imagery, could be important for symptomatic control. This is something that is not routinely targeted in existing CBTp protocols.

One participant (P7) ended the study with the highest scores on all MIPQ questions. This was the only participant who continued to experience her target flashforward at the end of intervention. This may be because her target flashforward and visual hallucinations were alike in content. When working with P7, it was important to clearly distinguish the difference between her flashforward and visual hallucinations. Given the dual experience, her distress also remained high throughout the intervention, although did drop from 100% to 70%. This provides important clinical insight into the duality of hallucinations and flashforwards, suggesting that they may be separable but harder to treat. Studies have shown that meta-cognitive techniques can be used when treating hallucinations (García-Montes *et al.*, 2006), although it is possible that there might be additional mechanisms maintaining both experiences, worthy of further investigation.

Mean differences were observed for all baseline measures. Overall, reliable and CSC were found for anxiety and depression. One case showed reliable change for PaDS persecution and PaDS deservedness subscale. One person showed CSC for persecution subscale. Three cases showed reliable change for negative beliefs about others, although none showed met criteria for CSC. Similarly, the 6-session iMAPS study (Taylor *et al.*, 2020a) found changes in schematic beliefs

using brief imagery interventions. However, these did not meet criteria for CSC. This may suggest that brief interventions may not be sufficient to obtain CSC on schema beliefs; this could be because of their long-lasting nature and therefore require careful assessment before intervention is attempted (Taylor *et al.*, 2020a). Furthermore, like our findings, the authors of the iMAPS study also commented on the limited evaluation of and change in persecutory delusions in their study (Taylor *et al.*, 2020a). There are a number of plausible reasons for our findings. First, the intervention only targeted one flashforward. The majority of participants reported experiencing several flashforwards each. Second, the metacognitive technique focused on increasing a sense of control of the target flashforward and did not focus on engaging with the content or personal meanings of flashforwards, which may have been linked to specific persecutory beliefs and potentially associated schematic beliefs. Third, participants scored highly on PaDS at baseline; the duration of the study may not have been sufficient to shift highly convinced rigid beliefs.

Some participants continued to experience the target flashforward at the end of intervention phase (phase B) – however, the frequency had reduced for all participants. The vividness of images remained moderately high until they were no longer experienced. Similar findings were found in a recent case series study using imagery-based therapy for nightmares in individuals with psychosis. They found 'changes in content of nightmares and changes in their response to the nightmare either in terms of reduced distress or increased ability to cope' but not in relation to frequency of nightmares (Sheaves *et al.*, 2015). Descriptive analysis of our study indicated that there did not seem to be a relationship between vividness and distress. Scores in distress continued to drop when vividness remained high. This could indicate that like unhelpful thoughts, the presence of flashforwards are not linked to distress, but the belief about control of flashforwards is.

Although the intervention specifically only targeted one flashforward, in the fourth session, participants were invited to consolidate their learning and apply the techniques to other flashforwards which they experienced. The qualitative feedback gathered at follow-up suggests that participants found the techniques transferrable and were able to apply them to other flashforwards. However, future studies should investigate this further to support drawing more definitive conclusions regarding the effectiveness of the intervention.

Previous studies suggest that impaired cognitive control plays a role in the maintenance of positive symptoms of psychosis (Horne *et al.*, 2022), by targeting cognitive (imagery) control using imagery-based metacognitive techniques and may represent a valuable clinical mechanism which directly overlaps symptomology with treatment modality. The metacognitive nature allows a different level of process to be targeted in imagery work. Working with control compared with contents of images could potentially be less emotionally distressing and less time-consuming for clients and therapists. Given the brief nature of the intervention, and its core cognitive behavioural principles, it would be feasible to be integrated into existing CBTp protocols or be delivered as a stand-alone intervention.

Limitations

The study consisted of a small sample size and the majority were female participants. However, there was good diversity in relation to ethnicity, age, heterogeneity in psychotic presentations and religion. Future studies should include a larger and more representative sample. Given the sample size and nature of the study (i.e. non-powered), findings are tentative and should be considered with caution. Yet, the findings are encouraging and indicate that imagery-based metacognitive intervention in persecutory delusions can be helpful.

Second, the study was neither controlled nor blind; the same author conducted all phases of the case series with all study participants. Future studies should ensure there is a control group and that it is blind. Third, the PaDS was used to measure persecutory delusions. This is a measure which focuses on beliefs about persecution and deservedness – the mechanisms of the intervention did not directly overlap with the targets of the measure. Previous studies have used the PSYRATS.

This could have been a better measure to use to gain a better understanding of metacognitive beliefs and relationships with delusions. Fourth, participants' experience with CBTp varied. Two participants were actively involved in therapy – thus conclusions about their gains from the interventions need to be tentative, as it is unclear how much of it can be attributed to the metacognitive intervention *versus* CBTp. Furthermore, it is unclear whether pre-existing knowledge and socialisation could have had an impact on the intervention and outcomes. Lastly, a longer follow-up period would have warranted a better understanding of the long-term impact of the intervention. Overall, using a more rigorous design such as utilising a randomised baseline with additional baseline points would have strengthened the methodology of the study. Future studies should consider asking participants to keep daily records of the MIPQ experiences to gather further baseline data and overall better understanding of data.

Future directions

The current study was intended as a first step in developing and assessing the acceptability and feasibility of a novel intervention for the treatment of flashforwards for those with persecutory delusions. The results suggest that further research in this area is warranted. Future work should involve developing a feasibility randomised controlled trial to assess the intervention's efficacy and detect whole group changes in flashforwards, persecutory delusions and schemas.

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