Thesis Submitted in Partial Fulfilment of the Degree of Doctor of Clinical Psychology (DClinPsych)

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Abstracts

Systematic Review of Literature Abstract

Cognitive models of social anxiety disorder (SAD) in adults indicate that negative self-imagery plays a key role in the development and maintenance of the disorder. Video feedback (VF) can be used to help socially anxious individuals correct their negative self-imagery, and it is hypothesised that providing individuals with accurate and objective information about how they come across to others reduces anxiety. This systematic review aimed to examine whether VF is effective in treatment of SAD symptoms. Seven databases were search for 'Social anxiety' and related terms (e.g. 'social phobia' and 'performance anxiety') combined with 'video feedback' and related terms (e.g. 'feedback'). The 17 studies that met the eligibility criteria provided evidence that VF improved negative self-perception. Video feedback interventions that included cognitive preparation were superior to VF alone. Furthermore, adding audience feedback to VF enhanced the therapeutic effects. There was limited evidence that VF with cognitive strategies improved anxiety. However, preliminary evidence suggested that VF combined with audience feedback had stronger effects on anxiety. Further research is required among clinical population to understand whether the therapeutic effects of VF generalise to natural or ecologically valid social situations.

Service Improvement Project Abstract

Background: Carers play an important role in the recovery of individuals with psychosis. Therefore, it is recommended that they are provided with education and support as early as possible in the early intervention in psychosis (EIP) services.

Objectives: To understand the experiences and needs of carers regarding education and support within the Oxford EIP service. To make recommendations to the service about ways in which it can further meet carer education and support needs.

Method: A quantitative survey was used to collect data from carers of individuals with psychosis about their experiences and needs of education and support in the EIP service currently providing care to these families.

Results: Only 36 carers completed the survey out of 90 contacted. Most of these carers received education verbally and from care coordinators. Overall, carers found the information helpful and felt supported upon receiving it. Receiving information as early as possible in a booklet and having an opportunity to discuss the content with a member of staff were identified as the most preferred timing and format of receiving education. In addition, most of the carers received carer support in the service, but would prefer to receive this support as early as possible.

Conclusion: There are specific areas of improvement for the delivery of carer education and support in the Oxford EIP service. Further work is needed to hear from more carers.

Theoretically Driven Research Project Abstract

Background: Experiencing intrusive mental images related to health concerns is common in health anxiety, although experimental studies are needed to clarify their role.

Objective: The study aimed to investigate the effects of health catastrophising imagery compared to general threat imagery in increasing anxiety, threat perception beliefs, and behavioural responses, and whether the response is specific to health anxiety.

Method: 63 individuals, meeting criteria for health anxiety or OCD, and a comparison healthy control group were included. Semi-idiographic health catastrophising and general threat mental imagery were induced, and responses before and after were measured as ratings of anxiety, threat appraisals, and behavioural responses.

Results: Health catastrophising mental imagery resulted in significantly greater increase in anxiety in the highly health anxious group relative to general threat imagery, and this was specific to that group. Health anxiety scores were significantly correlated with the increase in anxiety in response to the health image but not to the general threat image. No significant differences were detected for threat appraisals and behavioural responses to imagery.

Discussion: The findings are consistent with the hypothesis that mental imagery with a health catastrophising focus can result in increased anxiety among highly health anxious individuals, and this effect is specific to health catastrophising mental images. Findings suggest that such imagery taps into the specific appraisals of those experiencing health anxiety.

Systematic Review of Literature

Is Video Feedback Effective in the Treatment of Social Anxiety Disorder: A Systematic Review

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Word Count (excluding references and tables): 7048

Internal Project Supervisors: Dr Myra Cooper and Dr Brynjar Halldorsson

Proposed Journal: Journal of Clinical Psychology Review and it has been formatted for publication accordingly (Appendix F). This journal has been chosen as it is high impact and covers a range of topics in the field of clinical psychology.

My supervisors have read and provided feedback on this work and deems it suitable to submit for assessment.

Is Video Feedback Effective in the Treatment of Social Anxiety Disorder: A Systematic Review

Abstract

Cognitive models of social anxiety disorder (SAD) in adults indicate that negative self-imagery plays a key role in the development and maintenance of the disorder. Video feedback (VF) can be used to help socially anxious individuals correct their negative self-imagery, and it is hypothesised that providing individuals with accurate and objective information about how they come across to others reduces anxiety. This systematic review aims to examine whether VF is effective in treatment of SAD symptoms. Seven databases were search for 'Social anxiety' and related terms (e.g. 'social phobia' and 'performance anxiety') combined with 'video feedback' and related terms (e.g. 'feedback'). The 17 studies that met the eligibility criteria provided evidence that VF improved negative self-perception. Video feedback interventions that included cognitive preparation were superior to VF alone. Furthermore, adding audience feedback to VF enhanced the therapeutic effects. There was limited evidence that VF with cognitive strategies improved anxiety. However, preliminary evidence suggested that VF with cognitive strategies combined with audience feedback had stronger effects on anxiety. Further research is required among clinical population to understand whether the therapeutic effects of VF generalise to natural or ecologically valid social situations.

Keywords: Social Anxiety Disorder; Social Phobia; Video feedback; Systematic review

Introduction

Social anxiety disorder (SAD) is the second most prevalent anxiety disorder in adults, with a lifetime prevalence of 13%, and 12-month prevalence of 7.4% (Kessler et al., 2012). SAD is defined as excessive fear of negative evaluation by others in social or performance situations (American Psychiatric Association [APA], 2013). Anxiety can be triggered by a range of social situations (e.g., speaking in front of others, attending parties, and being assertive), and most individuals will recognise that the fear is excessive, yet they avoid anxiety-provoking situations or endure them with significant distress. SAD typically starts during mid-teens, and in the absence of treatment it is unremitting (Stein & Stein, 2008). SAD can negatively impact functioning and quality of life (Dalrymple & Zimmerman, 2011), and individuals with SAD show impairment in general health, employment stability, and academic performance (Ruscio et al., 2008).

Cognitive models of SAD propose that negative self-imagery plays a key role in the maintenance of the disorder among adults (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997). In social situations, individuals with SAD experience distorted self-images about their appearance and behaviour (Hackmann et al., 2000; Hofmann & Heinrichs, 2003). It is proposed that these mental images are a combination of information including retrieval from memory (e.g. past negative social interactions) and internal information (e.g. physical symptoms) (Clark & Wells, 1995). In addition to this, Rapee and Heimberg (1997) hypothesised that information from 'audience feedback' also contributes to the formation of negative mental images (Rapee & Heimberg, 1997). Negative self-imagery is thus idiosyncratic in nature, and

individuals with SAD use these images to make inferences about how they come across to others in social situations (Clark & Wells, 1995). Evidence shows that a majority of individuals with SAD experience intrusive negative self-imagery that is closely related to their feared outcomes (e.g. blushing, shaking) rather than how they come across (Hackmann et al., 2000), and negative self-images play a causal role in the maintenance of SAD (Hirsch et al., 2004; Hirsch et al., 2003, 2006).

One of the key features in cognitive behaviour therapy (CBT) for SAD involves correcting negative self-imagery using video feedback (VF), which is typically used early in treatment and throughout therapy (Clark & Wells, 1995). Video feedback provides individuals with an opportunity to view a video recording of their social performance in a feared social task such as public speaking. The purpose of video feedback is to provide individuals with objective information regarding how they come across to correct negative self-images. It is suggested that using cognitive techniques such as 'cognitive preparation' during video feedback (Harvey et al., 2000) promotes objective viewing of the video. During video feedback with cognitive preparation the individual is guided to imagine and describe how they think they will come across on the video, and during viewing of the video they are asked to focus on how they come across on the video rather than how they feel when viewing the video. Video feedback that also includes cognitive review involves a reflective conversation about how one actually comes across in comparison to the predicted negative self-image to enable a deeper level of processing following the viewing of the video. Video feedback innervations that are combined with audience feedback, include feedback from the audience about how the individual with SAD came across.

A meta-analysis investigated the active ingredients of CBT for SAD (Aderka, 2009) and reported that the use of VF was not a moderator of treatment outcome. This metanalysis investigated the therapeutic effects of adding VF interventions to CBT for SAD. However, their conclusions were based on a small number of studies, as only five of the included studies incorporated VF into CBT for SAD. In addition, the findings were focused on the pre and post CBT outcomes as a whole, rather than the direct effects of VF intervention itself.

Aims of the review

A range of studies has investigated the direct therapeutic benefits of VF on symptoms of SAD (Harvey et al., 2000; McManus et al., 2009), and this literature also includes variations of VF interventions (e.g., those that also include audience feedback) which can be incorporated into clinical practice. To our knowledge and to date there has not been a systematic review of the direct therapeutic effects of VF. Therefore, this study aimed to provide a systematic review of studies that have investigated the direct effects of VF on symptoms of SAD. Specifically, we aim to identify and synthesis the data on studies that include VF as an active intervention and report outcomes pre and post VF to provide a summary of the specific effectiveness of VF interventions on symptoms of SAD.

Methods

Protocol and registration

A systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) (Moher et al., 2010) and the protocol for the review was pre-registered on PROSPERO (ID CRD42021205404 available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42021205404)

Search strategies

The following electronic databases were searched on 14th February 2021: CINAHL, EMBASE, MEDLINE, Psycinfo, Scopus, Web of Science Core Collection and Web of Science Medline. Search terms included 'social anxiety disorder' and related terms (e.g. 'social phobia' and 'speaking anxiety'), combined with video feedback and related terms (such as 'video', 'video tape*' and 'record*). The searches were limited to all papers from 1980 to reflect the period when SAD was added to the Diagnostic and Statistical Manual-3 (APA, 1980), and no other restrictions were applied during the search phase. The reference lists of all included papers were also manually searched by the first author. An updated database search was completed on 12th July 2022 and there were no new eligible studies since the first database search.

Eligibility Criteria

The eligibility criteria were piloted and refined by the two reviewer authors (BP and BH) on a sample of ten papers. The studies were deemed eligible if they meet the following inclusion criteria:

- Participants are aged 18 and above
- Participants have either a diagnosis of SAD or symptoms of SAD. SAD in the context of neurodevelopmental disorder (e.g., Autism) was excluded. Papers were also excluded if they were published before SAD was recognised in DSM-3 (APA, 1980)
- The intervention includes VF as an active intervention, and it is possible to extract data for a specific association between VF and symptoms of SAD
- Paper is available in English, in a peer reviewed Journal
- Paper reports on human participants
- Paper reports novel findings

Study Selection

The study selection process involved screening of title and abstracts, followed by full text screening against the eligibility criteria. At both screening stages 25% of the papers were also rated by a second independent rater (RE).

Data Extraction

A data extraction tool was developed to extract data. Key characteristics of the research extracted included: authors, year of publication, country, study design, sample size, demographics including gender and age, treatment modality, nature of the VF intervention, and outcome measures used to capture the specific effects of the intervention. A second rater extracted data for 30% of the included studies to review accuracy and inter-rater agreement was 95%, Kappa= 0.84 (indicating almost perfect agreement).

Data Synthesis

The synthesis without meta-analysis (SWIM) guidelines were used as an extension to PRISMA to guide the synthesis of data (Campbell et al., 2020). The findings of the included studies were grouped according to design of the studies, with those that included a comparator and those that did not include a comparator assessed separately. To facilitate the narrative synthesis of the findings social anxiety symptoms were clustered into self-perception of performance, perception of coming across well, state anxiety, appraisals of bodily sensations, fear of negative evaluation, and other measures (e.g. avoidance).

Due to heterogeneity and small sample size among the included papers, it was not possible to complete a meta-analysis and therefore a descriptive synthesis was used to illustrate the effectiveness of VF with effect size calculations calculated and reported where possible.

Estimation of Effect Sizes

Within-group (e.g. pre and post) and between-group effect sizes were calculated wherever possible. Within-group effects should be interpreted with caution as they may simply reflect a regression to the mean. However, they were calculated and reported here as not all studies included a comparator, and the within-group effect sizes do allow comparison across interventions. Outcomes for follow-up refer to a second social performance task (usually a speech in front of an audience) that took place in the same session. Therefore, separate effect sizes were calculated using the pre-intervention and follow-up means, and standard deviations. Conclusions about the differences in effectiveness of VF on SAD symptoms are based on effect sizes rather than p-values, given that effect sizes provide differences in magnitude. The outcome measures selected included standardised and idiosyncratic self-reported ratings of social anxiety symptoms including self-perception of performance, perception of coming across well, state anxiety, appraisals of bodily sensations, fear of negative evaluation, and other measures (e.g. avoidance).

The effect size calculations were based on the reported means and standard deviations in each study and were computed using the online calculator https://www.psychometrica.de/effect_size.html.

Effect sizes were categorised using Cohen's *d* suggested values references (Cohen, 1988), where an effect size of 0.2 was interpreted as small, 0.5 as medium, and 0.8 as large. To help interpretation of data, effect sizes were coded as positive and negative. For the within-group effect sizes negative signs indicated improvement in outcome. For the between-group effect sizes positive signs indicated improvement in outcome in favour of the VF condition and comparator are highlighted in bold.

Quality Assessment

The quality of the included studies was assessed using the quality rating checklist developed by Kmet and colleagues (Kmet et al., 2004). This checklist assesses studies on 14 criteria including the design, power of sample, definition and psychometric properties of outcome measures, confounding variables and conclusions drawn from results. Items were rated on a scale of 0-2 (0= no, 1= partial, 2= yes), and items that were not applicable to the study were excluded from the possible total. The sum of all the items is divided by the highest possible total score, giving quality ratings ranging from 0 (low) to 1 (high). Quality ratings were interpreted as high (>0.75), moderate (0.55-0.75) or low (<0.55).

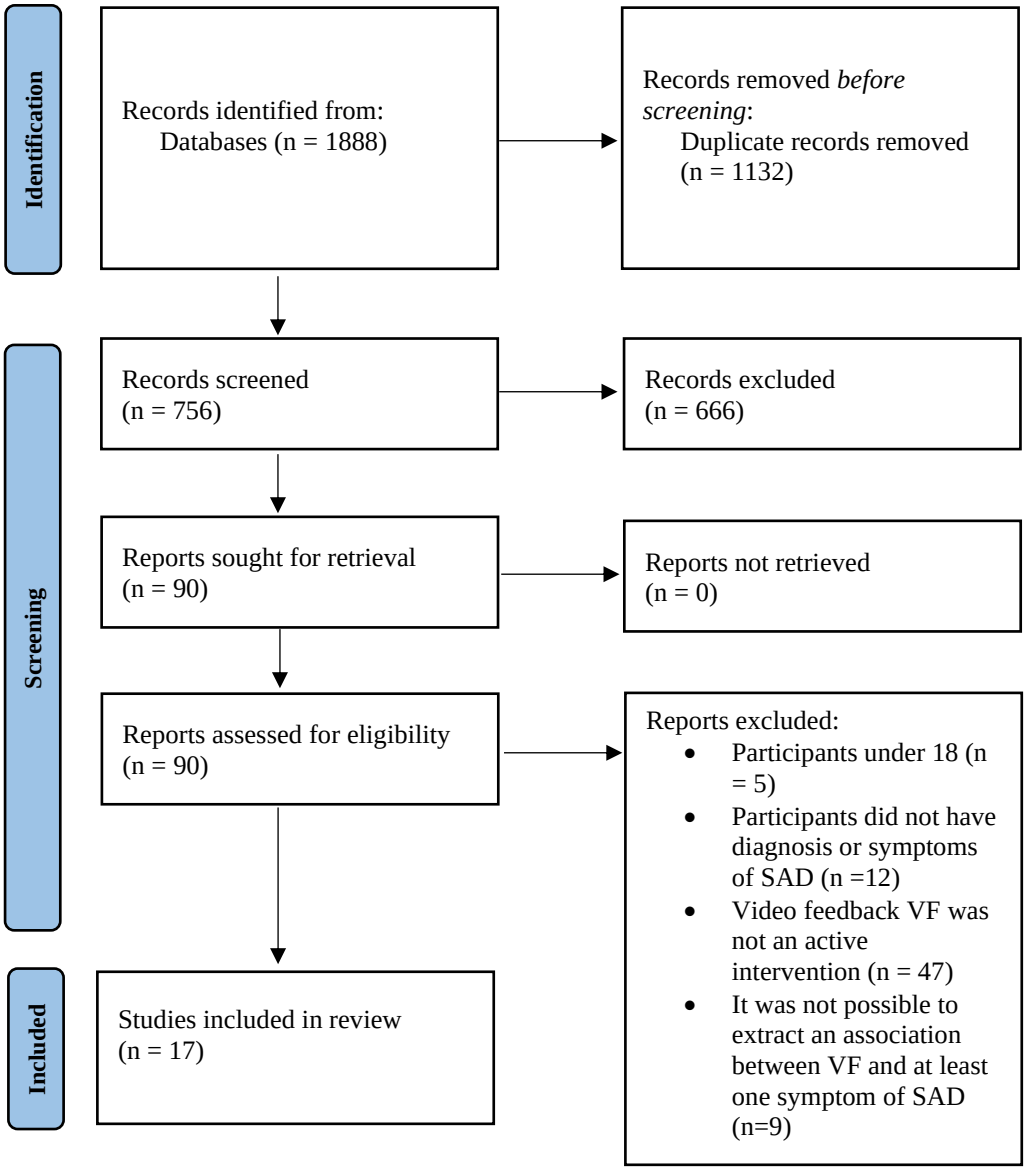
Results

The PRISMA flowchart describes the study selection for the systematic review (Figure 1). The combined electronic database yielded 1888 number of papers and 756 were retained following removing duplicates. Six hundred and sixty-six papers were excluded for not meeting the eligibility criteria at title and abstract screening, and 90 papers were taken forward for full text screening. Following full text screening, a total of 17 papers met the full eligibility criteria. Inter-rater reliability was 94.0%, kappa= 0.82 (indicating almost perfect agreement) at initial screening and 94.7%, kappa= 0.83 (indicating almost perfect agreement) at full text screening.

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Figure 1

PRISMA Flowchart of Study Selection Process



Study Characteristics

Table 1 displays a summary of the description of the nineteen studies that were included in the systematic review. The studies were published between 1982 and 2018. The mean reported age ranged from 18.94 to 36.54 years, and the percentage of female participants ranged from 38.4% to 95%. The studies were all conducted in high-income countries defined by the World Bank.

Five studies (26.3%) included treatment seeking clinical samples (Chen et al., 2010; Furukawa et al., 2009; Laposa & Rector, 2014; McManus et al., 2009; Rodebaugh et al., 2010), the remaining studies included non-clinical samples. Eleven studies had an experimental design (Chen et al., 2015, 2018; Harvey et al., 2000; Kanai et al., 2011; Kim et al., 2002; Orr & Moscovitch, 2010; Rapee & Hayman, 1996; Rodebaugh et al., 2010; Rodebaugh & Chambless, 2002; Rodebaugh & Rapee, 2005; Smits et al., 2006), and in seven of these studies the participants were randomised (Chen et al., 2015, 2018; Kanai et al., 2011; Kim et al., 2002; Rapee & Hayman, 1996; Rodebaugh et al., 2010; Smits et al., 2006). Five of the studies included analysis of data from previous randomised clinical trials for treatment of SAD and/or those receiving treatment for social anxiety disorder in a clinical setting (Chen et al., 2010; Furukawa et al., 2009; Laposa & Rector, 2014; McManus et al., 2009; Warnock-Parkes et al., 2017). One study re-analysed data from a previous study that is also included in this review, but revealed novel findings (Rodebaugh & Rapee, 2005).

In all studies the effects of VF were measured before and after intervention using standardised and idiosyncratic measures for symptoms of SAD. Video feedback interventions that were included in the studies included VF without cognitive preparation and cognitive review (VF), VF that was preceded by cognitive preparation (CP+VF), VF that was preceded by cognitive preparation and was followed by cognitive review (CP+VF+CR), and VF with cognitive preparation, cognitive review, and audience feedback (CP+VF+CR+AF). Video

feedback interventions were delivered in a single session in all studies, apart from Smits et al. (2006) which included more than three sessions of VF. In three studies VF interventions were delivered in a group setting (Chen et al., 2010; Furukawa et al., 2009; Laposa & Rector, 2014).

Table 1.

Study Characteristics and Quality Assessment

Study and Country	**Design**	**Sample Size (%female) Population**	**Mean age and (SD) ***	**VF Interventions Comparators Modality**	**Outcomes measured**	**Quality Rating**
(Chen et al., 2018) Australia	Within-between subjects	151 (75.7) Non-clinical	22.59 (6.57)	CP+VF CP+VF+CR CP+VF+CR+AF EXP 1-1	SAR; PSP; PCNE	High
(Warnock-Parkes et al., 2017) United Kingdom	Within-subjects	47 (49) Clinical	32 (8.82)	CP+VF 1-1	LSAS-SR; Self-reported rating of observable anxiety; feared social outcome; self-rating of performance	Moderate
(Chen et al., 2015) United States	Within-between subjects	421 (51.2) Non-clinical	19.7 (1.4)	CP+VF CP+VF+AF AF EXP 1-1	SAR; msPRS; CBS	Moderate
(Laposa & Rector, 2014) Canada	Within-subjects	93 (47) Clinical	36.54 (12.41)	VF+CP Group	SAR; Self rating of performance; ASC; FAQ	High
(Kanai et al., 2011) Japan	Within-between subjects	25 (72) Non-clinical	19.6 (1.3)	CP+VF+AF EXP 1-1	SAR; Self-reported rating of observable anxiety; self-reported rating of fear of negative evaluation	High
(Rodebaugh et al., 2010) United States	Within-between subjects	26 (38.4) Clinical	31.50 (10.90)	CP+VF EXP 1-1	BSAM; SPQ	High
(Orr & Moscovitch, 2010) Canada	Within-between subjects	68 (51.5) Non-clinical	17-35*	CP+VF CP+VF +CR EXP 1-1	PSP; SAR	High
(Chen et al., 2010) Japan	Within-subjects	52 (40.4) Clinical	31.3 (10.1)	CP+VF+AF Group	Self-reported performance rating; Feared outcome rating; mSPRS; AAR	Moderate

(Furukawa et al., 2009) Japan	Within-subjects	45 (53.3) Clinical	18-52*	CP+VF Group	Self-reported observable anxiety; Self-reported performance rating; Self-reported feared outcome	Moderate
(McManus et al., 2009) United Kingdom	Within subjects	34 (44.1) Clinical	31.3 (-)	VF+CP 1-1	Self-reported observable anxiety rating, Self-reported performance rating, Self-reported feared social outcome, SPWSS	High
(Smits et al., 2006) United States	Within-between subjects	77 (57) Non-clinical	18-51*	VF+CP VF+AR EXP 1-1	LSAS-SR	High
(Rodebaugh & Rapee, 2005) Australia	Within subjects	87 (80.5) Non-clinical	22.46 (8.77)	VF 1-1	PSP	High
(Rodebaugh, 2004) United States	Within-between subjects	95 (66.3) Non-clinical	NR	CP+VF NP+VF 1-1	BSAM; PSP	High
(Harvey et al., 2000) United Kingdom	Within-between subjects	74 (73) Non-clinical	18.94 (0.7) 20.80 (7.14) 19.06 (0.66) 20.55 (6.01)	CP+VF VF 1-1	Self-reported rating of coming across well; self-reported performance rating, behaviour composite score	High
(Rapee & Hayman, 1996) Australia	Study 2: Within subjects Study 3: within-between subjects	62 (85.5) Non-clinical 40 (75) Non-clinical	22.8 (8.6) 24.9 (10.4) 19.3 (3.3)	VF 1-1 VF EXP 1-1	Measure of public speaking performance Self-reported rating of performance; SAR	High High
(Rodebaugh & Chambless, 2002) United States	Within-between subjects	90 (66.7) Non-clinical	NR	VF EXP 1-1	PSP	High
(Kim et al., 2002) Sweden	Within-between subjects	40 (85) Non-clinical	27.95 (6.90)	CP+VF VF 1-1	SEQ – coming across well SEQ- Behaviour composite	High

VF= video feedback; CP+VF = video feedback that was preceded by cognitive preparation, NP+VF = Video feedback that was preceded by neutral preparation, VF+AF = Video feedback focused on audience reaction, CP+VF+CR= Video feedback that was preceded by cognitive preparation and followed by cognitive review, CP+VF+AF = Combined audience feedback and video feedback that was preceded by cognitive preparation, CP+VF+CD+AF = Combined audience feedback and video feedback that was preceded by cognitive preparation and followed by cognitive review; EXP = Exposure to social performance task without VF; SAR = State Anxiety Rating; PSP = Perception of Speech Performance; PCNE = Probability and Cost of Negative Evaluation Questionnaire (PCNE); LSAS-SR =Self-Perception ratings; Liebowitz Social Anxiety Scale; mSPRS = Modified

version of Performance Rating Scale; ASC -NE = Appraisals of Social Concerns – Negative evaluation; ASC- OS = Appraisal of Social Concerns – Observable symptoms; BSAM = Brief State Anxiety Measures; SPQ = Speech Performance Questionnaire; SPWSS = Social Phobia Weekly Summary Scale; LSAS-SR = Liebowitz Social Anxiety Scale – Self-report version; CBS = The cognition of bodily sensations; FAQ= focus of attention questionnaire; NR = not reported ; * = mean age and SD was not available and therefore age is reported,

The effects of video feedback on symptoms of social anxiety in studies that included a comparator

The findings for studies that included a comparator were grouped together. The comparators in the study were either another type of VF intervention or no VF.

Self-perception of Performance

Eight studies (one with a clinical sample) reported the effects of VF interventions on self-perception of performance in a social interaction task (e.g. speech in front of an audience). Self-perception of performance was measured using standardised questionnaires (e.g. Perception of Speech Performance (PSP) (Rapee & Lim, 1992)) or performance rating scales, with higher scores indicating better performance.

Two studies focused on the effects of VF without cognitive preparation and cognitive review (Rapee & Hayman, 1996; Rodebaugh & Chambless, 2002). Compared to no VF, those who received VF reported improvement in self-perception of performance (between-groups d= 0.52 to 0.57) (Rapee & Hayman, 1996; Rodebaugh & Chambless, 2002). However, at follow-up the effects were small (between-groups d= 0.19 - 0.46) (Rapee and Hayman, 1996).

Several studies focused on the effects of VF interventions that were preceded by cognitive preparation (CP+VF) (Chen et al., 2015, 2018; Harvey et al., 2000; Orr & Moscovitch, 2010; Rodebaugh, 2004; Rodebaugh et al., 2010). Among a non-clinical population CP+VF was associated with improved self-perception of own speech performance (between-groups d= 0.71 -

0.72), compared to no VF (Chen et al., 2018; Orr & Moscovitch, 2010). However, the effects at follow-up were small (between-groups d= 0.37 - 0.41). Similarly, in a clinical population those who received CP+VF self-rated their own performance better than those who did not receive VF (t(20) = 3.75, p = 0.001) (Rodebaugh et al., 2010). Furthermore, they continued to rate their own performance significantly better, 7 days post intervention t(11,81) = 2.58, p= 0.024). However, these benefits did not generalise to a new speech at follow-up (7 days post intervention) *t*(20) = 1.73, *p* = .099 (d= 0.73)(Rodebaugh et al., 2010).

Several studies have investigated whether CP+VF was superior to VF alone, and these findings are inconsistent (Chen et al., 2015; Harvey et al., 2000; Rodebaugh, 2004). Harvey et al., (2000) found that in comparison to VF, CP+VF had moderate to large between-group effects (between-groups d= 0.55 – 1.10) in terms of self-ratings of own performance among high and low socially anxious individuals. However, Chen et al., (2015) found small between-group effects (between-groups d= 0.19) and reported that CP+VF was not superior to VF alone. Furthermore, Rodebaugh (2004) compared the effects of CP+VF to an active VF intervention that was preceded by neutral preparation (NP+VF). In a clinical population those who received CP+VF self-rated their own performance significantly better than those who received NP+VF (F(1, 92) = 12.43, partial n2 = 0.12, p = 0.001). Furthermore, these improvements were maintained at follow-up (re-rating of speech at 2-weeks follow-up) (t(51) = -2.22, d = 0.62, p = 0.03) (Rodebaugh, 2004).

Two studies investigated the efficacy of VF intervention preceded by cognitive preparation and followed by cognitive review (CP+VF+CR) on self-perception of performance (Chen et al., 2018; Orr & Moscovitch, 2010). CP+VF+CR had moderate to large effects (between-groups d= 0.69 - 1.14), compared to no VF. However, small effects were found when

compared to CP+VF (between-groups d= 0.08-0.41) (Chen et al., 2018; Orr & Moscovitch, 2010). At follow-up the effects of CP+VF+CR were small (between-groups d = 0.05 - 0.37) compared to CP+VF and no VF (Chen et al., 2018).

Two studies examined whether adding audience feedback to VF that also included cognitive strategies (e.g., CP and CR) (Chen et al., 2015, 2018) had superior effects on self-perception of performance (Chen et al., 2015, 2018). In both studies CP+VF+CR+AF and CP+VF+AF had large effects post intervention (between-group d= 1.52 – 2.53), as it showed more improvement in self-perception than VF interventions without audience feedback (CP+VF and CP+VF+CR) and no VF (Chen et al., 2015, 2018). Furthermore, these benefits were maintained at follow-up (second speech following the intervention) (between-groups d= 0.72 – 1.13) (Chen et al., 2018).

Perception of Coming Across Well

Two studies reported the effects of CP+VF intervention on self-reported measures of coming across well. These findings have not been grouped together with ratings of performance as the definition of "coming across well" was not specified in the studies (Harvey et al., 2000; Kim et al., 2002). CP+VF had small to large effects post intervention (between-group d = 0.49 – 1.03), compared to those who received VF without cognitive preparation (Harvey et al., 2000; Kim et al., 2002). Furthermore, these benefits generalised to a second speech immediately post intervention (between-groups d = 1.36) (Kim et al., 2002).

Table 2

The Effects of Video Feedback on Measures of Self-perception

Study	**Outcome measure**	**Effect Size**		**Effect Size**	
		Within-groups		**Between-groups**	
		Post intervention	**Follow up**	**Post intervention**	**Follow up**
(Chen et al., 2018)	PSP	CP+VF –0.78° CP+VF+CR -1.09° CP+VF+CR+AF -2.40° EXP - 0.37 °	CP+VF 1.11 CP+VF+CR -1.42 CP+VF+CR+AF -1.93 EXP -1.07	**CP+VF** VS EXP 0.71** **CP+VF** VS CP+VF+CR 0.11 CP+VF VS **CP+VF+CR+AF** 1.52** **CP+VF+CR** VS EXP 0.69** CP+VF+CR VS **CP+VF+CR+AF** 1.86 ** **CP+VF+CR+AF** VS EXP 2.34 **	**CP+VF** VS EXP 0.41 **CP+VF** VS CP+VF+CR 0.05 CP+VF VS **CP+VF+CR+AF** 0.72** **CP+VF+CR** VS EXP 0.37 CP+VF+CR VS **CP+VF+CR+AF** 0.79** **CP+VF+CR+AF** VS EXP 1.13 **
(Warnock-Parkes et al., 2017)	Self-reported rating of performance	VF + cognitive elements -1.60*			
	Self-reported rating of looking anxious	VF + cognitive elements -1.82*			
(Chen et al., 2015)	mSPRS	CP + VF 0.32* CP+VF+AF -1.77* AF -1.61* VF -0.43*		**CP + VF** VS VF 0.19 CP+VF VS **CP+VF+AF** 2.01** CP+VF VS AF -1.14** **CP+VF+AF** VS AF 1.02 **CP+VF+AF** VS VF 2.53 ** AF VS VF -1.54	
	CBS	CP + VF -0.50° CP+VF+AF -2.04°		**CP + VF** VS VF 0.45 CP+VF VS **CP+VF+AF** 0.62 **	

		AF -1.70° VF -0.93°		CP+VF VS AF -0.63** CP+VF+AF VS AF 0 **CP+VF+AF** VS VF 1.47** AF VS VF -1.46**	
(Laposa & Rector, 2014)	Self-reported rating of Performance	CP + VF (1st taping) - 0.84* CP + VF (2nd taping) -0.83*			
	ASC – OS	CP + VF (1st taping) -0.63* CP + VF (2nd taping) -0.47*			
(Kanai et al., 2011)	Self-reported rating of observable anxiety	CP+VF +AF -1.67* EXP -0.31		**CP+VF+AF** VS EXP 0.04**	
(Rodebaugh et al., 2010)	SPQ	◊	◊	◊	◊
(Orr & Moscovitch, 2010)	PSP	CP+VF -1.27* CP+VF+CR -1.20* EXP - 0.13		**CP+VF** VS EXP 0.72 CP+VF VS **CP+VF+CR** 0.08 **CP+VF+CR** VS EXP 1.14*	
(Chen et al., 2010)	msPRS	CP+VF+AF -1.05°			
	Self-reported rating of performance	CP+VF+AF -0.46°			
(Furukawa et al., 2009)	Self-reported rating of observable anxiety	VF +CP -0.71* (with SB and SFA) -0.60 * (without SB and SFA)			
	Self-reported rating of performance	VF +CP -0.17 (with SB and SFA)			

		-0.31 (without SB and SFA)			
(McManus et al., 2009)	Self-reported rating of observable anxiety	CP+VF -1.20* (with SB and SFA) -0.75* (without SB and SFA)			
	Self-reported rating of performance	CP+VF -1.68* (with SB and SFA) -1.15 * (without SB and SFA)			
(Rodebaugh & Rapee, 2005)	PSP	VF -0.62*	VF -0.53**		
(Rodebaugh, 2004)	PSP	◊	◊	◊	◊
(Harvey et al., 2000)	Self-reported rating of coming across well	CP+VF -1.19* (high anxiety group) CP+VF -1.06* (low anxiety group) VF -0.27* (high anxiety group) VF -0.27* (low anxiety group)		**CP+VF** VS VF 0.49* (high anxiety group) **CP+VF** VS VF 1.06* (low anxiety group)	
	Self-reported rating of performance	CP+VF -0.52* (high anxiety group) CP+VF -1.10* (low anxiety group) VF -0.63*(high anxiety group) VF -0.31* (low anxiety group)		**CP+VF** VS VF 0.55* (high anxiety group) **CP+VF** VS VF 1.10* (low anxiety group)	
	Behaviour composite score	CP+VF -1.13* (high anxiety group) CP+VF -1.58* (low anxiety group)		**CP+VF** VS VF 0.69* (high anxiety group) **CP+VF** VS VF 1.09* (low anxiety group)	

		VF -0.52* (high anxiety group) VF -0.25 (low anxiety group)			
(Rapee & Hayman, 1996)	Measure of public speaking performance	VF -0.49* (high anxiety group) -0.45* (low anxiety group)			
	Self-reported rating of performance	VF -1.28° EXP -0.29°	VF -1.47° EXP -0.45°	**VF** VS EXP 0.52**	VF VS EXP 0.46**
(Rodebaugh & Chambless, 2002)	PSP	VF -0.47° EXP -0.13°	VF -0.73° EXP -0.7 °	**VF** VS EXP 0.57 ** VF of non-social task VS EXP 0.20	**VF** VS EXP 0.19 VF of non-social task VS EXP 0.38
(Kim et al., 2002)	SEQ –self-reported coming across well	CP+VF -1.47° VF -0.80°	CP+VF -1.81° VF -0.27°	**CP+VF** VS VF 1.03*	**CP+VF** VS VF 1.36**
	SEQ – self-reported Behaviour Composite	CP+VF -1.6° VF -0.97°	CP+VF -2.23° VF -1.85°	**CP+VF** VS VF 0.66	**CP+VF** VS VF 1.21**

VF= video feedback; CP+VF = video feedback that was preceded with cognitive preparation, NP+VF = Video feedback that was preceded with neutral preparation, CP+VF+CR= Video feedback that was preceded with cognitive preparation and followed by cognitive review, CP+VF+AF = Combined audience feedback and video feedback that was preceded with cognitive preparation, CP+VF+CD+AF = Combined audience feedback and video feedback that was preceded with cognitive preparation and followed by cognitive review, EXP = No VF and exposure to social interaction task only (e.g. speech in front of audience), PSP= Perception of Speech Performance; Symbols. mSPRS= Modified version of Performance Rating Scale; CBS= Cognition of bodily sensations, ASC- OS = Appraisal of Social Concerns – Observable symptoms, SEQ= Speech Evaluation Questionnaire. SB= Safety behaviours, SFA = self-focused attention. Symbols: * = significant within-group differences reported, ** = significant between-group differences reported, ° = statistical analysis examining within-group differences were not reported, ∞ = effect size as reported in paper, ⋄ = effect sizes not reported in paper and no information provided to calculate them

Anxiety

Six studies (one with a clinical sample) investigated the effects of VF interventions on state anxiety measured using self-reported scales (e.g., anxiety rating scale) or standardised outcome measure (e.g., BSAM (Berg et al., 1998)).

Two studies focused on VF interventions without cognitive strategies on state anxiety (Chen et al., 2015; Rapee & Hayman, 1996). In both studies VF had small effects on state anxiety (between-groups d = 0.07 - 0.19).

Four studies explored the effects of VF interventions that included cognitive preparation (CP+VF) on self-reported anxiety, and the findings were mixed (Chen et al., 2015, 2018; Orr & Moscovitch, 2010; Rodebaugh, 2004; Rodebaugh et al., 2010). In two studies, among non-clinical populations CP+VF had small to moderate effects (between-groups d= 0.15 – 0.53) (Chen et al., 2018; Orr & Moscovitch, 2010), compared to no VF. Similarly, in a clinical population CP+VF had small effects on anticipatory anxiety (between-groups d= 0.38) and speech anxiety (between-groups d= 0.23), compared to no VF (Rodebaugh et al., 2010). In addition, one study found limited benefits of adding cognitive preparation to VF, as CP+VF had small effects on anxiety (between-group d= 0.07), compared to VF (Chen et al., 2015). However, Rodebaugh (2004) found CP+VF was significantly beneficial in reducing self-reported anticipatory anxiety at follow-up (second speech) compared to a VF intervention that was preceded by neutral preparation ($F(1, 92) = 4.55$, partial $n2 = 0.05$, $p = 0.04$) (Rodebaugh, 2004). It was not possible to calculate effect sizes for this study, and thus the magnitude of change between-groups remains unknown.

Two studies explored whether adding cognitive review to VF interventions that also included cognitive preparation (CP+VF+CR) had superior effects on anxiety (Chen et al., 2018; Orr & Moscovitch, 2010). CP+VF+CR had small effects on self-reported anxiety compared to CP+VF (between-groups d = 0.08 - 0.41) and moderate effects compared to no VF (between-groups d = 0.58 – 0.63) (Chen et al., 2018; Orr & Moscovitch, 2010). However, the effects at follow up were small (between-groups d = 0.09 – 0.26) (Chen et al., 2018).

Three studies examined the effects of adding audience feedback to VF interventions that also included cognitive strategies (CP+VF+CR+AF and CP+VF+AF). Receiving CP+VF+CR+AF and CP+VF+AF showed more reduction in anxiety with moderate to large group effects (between-groups d= 0.67 – 1.38), compared to no VF and other types of VF (e.g., CP+VF; CP+VF+CR) (Chen et al., 2015, 2018; Kanai et al., 2011). These benefits also generalised to a new speech shortly after the VF intervention (between-groups d= 0.74 – 1.15) (Chen et al., 2018; Kanai et al., 2011).

Appraisals of Bodily Sensations

Two studies examined the effects of VF interventions on negative appraisals of bodily sensations in non-clinical populations (i.e., the extent to which one fears bodily sensations or anxiety symptoms are visible) (Chen et al., 2015; Kanai et al., 2011). Compared to VF, receiving CP+VF had small effects on appraisals of bodily sensations (between-groups d= 0.45) (Chen et al., 2015). However, moderate to large effects were found for CP+VP+AF (between-groups d= 0.62 – 1.47). In another study CP+VF+AF was associated with small effects in comparison to no VF (between-groups d = 0.04) (Kanai et al., 2011).

Fear of Negative Evaluation

Two studies reported the effects of VF interventions on fear of negative evaluation among non-clinical populations (Chen et al., 2018; Kanai et al., 2011). Chen et al., (2018) found small effects for VF interventions that included cognitive preparation and cognitive review (CP+VF or CP+VF+CR) compared to no VF (between-group d= 0.14 – 0.4), and these findings were similar at follow-up (between-groups d= 0.02 – 0.32). However, the effects of CP+VF+CR+AF were moderate to large (between-groups d= 0.67 - 1.75), compared to VF interventions without audience feedback (e.g., CP+VF or CP+VF+CR) and no VF (Chen et al.,

2018; Kanai et al., 2011). There were moderate to large effects at follow-up (second speech) (between-group d= 0.74 – 1.21) (Chen et al., 2018; Kanai et al., 2011).

Other Outcomes

One study reported the effects of VF intervention on symptoms of SAD, as measured on a standardised outcome (Liebowitz Social Anxiety Scale – self-report version (LSAS-SR)) (Smits et al., 2006). Small effects were found following three sessions of CP+VF, compared to three sessions VF focused on audience reaction or no VF (between-groups d = 0.11 – 0.28), and at follow-up (between-groups d = 0.16 – 0.39) (Smits et al., 2006).

In the study of Rodebaugh (2004), avoidance was measured as duration of a given speech, and there were no significant improvements for CP+VF compared to those who received VF with neutral preparation ($t(80) = 0.37$, $d = 0.01$, $p = 0.97$). In addition there was also no significant effect when avoidance was measured as not attempting a new speech, following the VF intervention ($t(54) = 0.06$, $d = 0.02$, $p = 0.95$) (Rodebaugh, 2004).

Table 3

The Effects of Video Feedback on Measures of Anxiety

Study	**Outcome measure**	**Effect Size**		**Effect Size**	
		Within-groups		**Between-groups**	
		Post intervention	**Follow up**	**Post intervention**	**Follow up**

(Chen et al., 2018)	SAR	CP+VF -0.34° CP+VF+CR -0.72° CP+VF+CR+AF -1.42° EXP -0.35°	CP+VF -0.41 CP+VF+CR -0.50 CP+VF+CR+AF -1.31 EXP -0.42	**CP+VF** VS EXP 0.18 CP+VF VS **CP+VF+CR** 0.41 CP+VF VS **CP+VF+CR+AF** 1.20** **CP+VF+CR** VS EXP 0.58 CP+VF+CR VS **CP+VF+CR+AF** 0.77** **CP+VF+CR+AF** VS EXP 1.38**	**CP+VF** VS EXP 0.15 CP+VF VS **CP+VF+CR** 0.09 CP+VF VS **CP+VF+CR+AF** 0.92** **CP+VF+CR** VS EXP 0.26 CP+VF+CR VS **CP+VF+CR+AF** 0.94** **CP+VF+CR+AF** VS EXP 1.15**
(Chen et al., 2015)	SAR	CP + VF 0.13° CP+VF+AF -2.58° AF -1.25° VF -0.43°		**CP + VF** VS VF 0.07 CP+VF VS **CP+VF+AF** 1.40** CP+VF VS AF - 0.67** **CP+VF+AF** VS AF 0.05 **CP+VF+AF** VS VF 1.17** AF VS VF -0.56**	
(Laposa & Rector, 2014)	SAR	CP + VF (1st taping) -1.18* CP + VF (1st taping) -1.54*			
(Kanai et al., 2011)	SAR	CP+VF+AF -0.86*∞ EXP 0.09∞	CP+VF +AF -1.10*∞ EXP -0.42*∞	**CP+VF +AF** VS EXP 1.26*∞	**CP+VF +AF** VS EXP 0.74∞
(Rodebaugh et al., 2010)	BSAM Anticipatory anxiety	◊		**CP+VF** VS EXP 0.38∞	
	BSAM Speech anxiety	◊		**CP+VF** VS EXP 0.23∞	
(Orr & Moscovitch, 2010)	SAR	CP+VF -0.51 CP+VF+CR		**CP+VF** VS EXP 0.53 CP+VF VS	

		-0.58 EXP -0.11		**CP+VF+CR** 0.08 **CP+VF+CR** VS EXP 0.63	
(Chen et al., 2010)	AAR	CP+VF+AF -1.05°			
Rodebaugh, T.L. 2004	BSAM	◊	◊	◊	◊
(Rapee & Hayman, 1996)	SAR	VF -1.03 EXP -0.50		**VF** VS EXP 0.19	

VF= video feedback; CP+VF = video feedback that was preceded with cognitive preparation, NP+VF = Video feedback that was preceded with neutral preparation, CP+VF+CR= Video feedback that was preceded with cognitive preparation and followed by cognitive review, CP+VF+AF = Combined audience feedback and video feedback that was preceded with cognitive preparation, CP+VF+CD+AF = Combined audience feedback and video feedback that was preceded with cognitive preparation and followed by cognitive review, EXP = No video feedback and exposure to social interaction task only (e.g. speech in front of audience), SAR= Subjective Anxiety Rating, BSAM= Brief State Anxiety Measure, AAR = Anticipatory Anxiety Rating, Symbols: * = significant within-group differences reported, ** = significant between-group differences reported, ° = statistical analysis examining within-group differences were not reported, ∞ = effect size as reported in paper, ◊ = effect sizes not reported in paper and no information provided to calculate them, °° = statistical analysis examining between-group differences were not reported

Table 4

The Effects of Video Feedback on Other Measures of SAD

Study	**Outcome measure**	**Effect Size**		**Effect Size**	
		Within-groups		**Between-groups**	
		Post intervention	**Follow up**	**Post intervention**	**Follow up**

(Chen et al., 2018)	PCNE	CP+VF -0.5 CP+VF+CR -0.60 CP+VF+CR+AF -1.83 EXP -0.13	CP+VF -0.52 CP+VF+CR -0.70 CP+VF+CR+AF -1.57 EXP -0.33	**CP+VF** VS EXP 0.14 CP+VF VS **CP+VF+CR** 0.24 CP+VF VS **CP+VF+CR+AF** 1.49 * **CP+VF+CR** VS EXP 0.40 CP+VF+CR VS **CP+VF+CR+AF** 1.26 * **CP+VF+CR+AF** VS EXP 1.75 *	**CP+VF** VS EXP 0.02 CP+VF VS **CP+VF+CR** 0.27 CP+VF VS **CP+VF+CR+AF** 1.05 ** **CP+VF+CR** VS EXP 0.32 CP+VF+CR VS **CP+VF+CR+AF** 0.80 ** **CP+VF+CR+AF** VS EXP 1.21 **
(Warnock-Parkes et al., 2017)	Self-reported feared social outcome	CP+VF -2.33			
	LSAS	CP+VF -0.37*			
(Laposa & Rector, 2014)	ASC – NE	CP + VF (1st taping) -0.53* CP+VF (2nd taping) -0.30*			
	FAQ – self	CP + VF -0.35*			
	FAQ – other	CP + VF -0.12			
(Kanai et al., 2011)	ASC-NE	CP+VF +AF -1.13* EXP 0.01		**CP+VF+AF** VS EXP 0.67*	
(Chen et al., 2010)	Self-reported feared outcome rating	CP+VF+AF -1.37°			
(Furukawa et al., 2009)	Self-reported feared outcome rating	VF +CP -0.93* (With SB and SFA) -0.83* (Without SB and SFA)			
(McManus et al., 2009)	SWPSS	CP+VF -0.45*			

	Self-reported feared social outcome	CP+VF -1.68* (with SB and SFA) -1.15 * (without SB and SFA)			
(Rodebaugh, 2004)	Avoidance (Duration of speech)	◊	◊	◊	◊
	Avoidance of new Speech	◊	◊	◊	◊
(Smits et al., 2006)	LSAS	CP+VF -0.82* VF+AR -0.39* Exposure -0.74*	CP+VF -0.84* VF+AR -0.35* Exposure -0.82*	**CP+VF** VS VF+AR 0.28 **CP+VF** VS EXP 0.11	**CP+VF** VS VF+AR 0.39 **CP+VF** VS EXP 0.16

VF= video feedback; VF+AR = video feedback focused on audience reaction; CP+VF = video feedback that was preceded with cognitive preparation, NP+VF = Video feedback that was preceded with neutral preparation, CP+VF+CR= Video feedback that was preceded with cognitive preparation and followed by cognitive review, CP+VF+AF = Combined audience feedback and video feedback that was preceded with cognitive preparation, CP+VF+CD+AF = Combined audience feedback and video feedback that was preceded with cognitive preparation and followed by cognitive review, EXP = No VF and exposure to social interaction task only (e.g. speech in front of audience), LSAS= Liebowitz Social Anxiety Scale, ASC-NE= Appraisals of Social Concerns – Negative Evaluation, SPWSS = Social Phobia Weekly Summary Scale. PCNE= Probability and Cost of Negative Evaluation Questionnaire, Symbols: * = significant within-group differences reported, ** = significant between-group differences reported, ° = statistical analysis examining within-group differences were not reported, ∞ = effect size as reported in paper, ◊ = effect sizes not reported in paper and no information provided to calculate them.

The Effects of Video Feedback on Social Anxiety Symptoms in Studies that did not Include a Comparator

Within-group effect sizes are reported for studies that did not include a comparator.

Self-perception of Performance

In two studies with non-clinical samples small to moderate within-group effects were found for VF interventions without cognitive preparation and cognitive review (within-group d= 0.45 - 0.62) (Rapee & Hayman, 1996; Rodebaugh & Rapee, 2005), and at follow-up (second speech) (within-group d= 0.53) (Rodebaugh & Rapee, 2005).

Studies with clinical populations found moderate to large effects for CP+VF delivered either in 1-1or group settings (within-group d= 0.58 -1.60) (Laposa & Rector, 2014; McManus et al., 2009; Warnock-Parkes et al., 2017). However, Furukawa et al., (2009) found only a small effect size for CP+VF (within-group d= 0.17 - 0.31). In addition, one study that focused on CP+VF+AF delivered in a group setting also found a small effect size (within-group d = 0.46) (Chen et al., 2010).

Anxiety

Two studies focused on anxiety and delivered VF interventions in group settings among clinical populations (Chen et al., 2010; Laposa & Rector, 2014). In one study a large effect size was found for CP+VF following the first taping session (within-groups d= 1.18), as well as the second taping session 4 weeks after the first VF intervention (within-groups d= 1.54) (Laposa & Rector, 2014). Similarly large effects were found for VF intervention that also included audience feedback (CP+VF+AF) (within-groups d= 0.75 - 1.10) (Chen et al., 2010).

Appraisals of Bodily Sensations

Four studies reported on appraisals of bodily sensations among clinical populations (Furukawa et al., 2009; Laposa & Rector, 2014; McManus et al., 2009; Warnock-Parkes et al., 2017). For CP+VF moderate to large effects were found post intervention (within-group effect size 0.75 – 1.20) (McManus et al., 2009; Warnock-Parkes et al., 2017). In addition, moderate effects were found for CP+VF delivered in group settings post intervention (within-group d= 0.63 to 0.71) (Furukawa et al., 2009; Laposa & Rector, 2014).

Feared Social Outcomes

Some studies reported the effects of VF on feared social outcomes amongst clinical populations (Chen et al., 2010; Furukawa et al., 2009; Warnock-Parkes et al., 2017) . Feared social outcomes were defined in behavioural terms such as hands trembling whilst drinking from a cup, a sneer can be seen on the face of company, or I will look boring. For CP+VF large effects were found post intervention (within-group d= 2.33) (Warnock-Parkes et al., 2017). Similarly large effect sizes were found for CP+VF delivered in group settings (within-group d= 0.82 - 0.93) (Furukawa et al., 2009) and for CP+VF+AF (between-group d= 1.37) (Chen et al., 2010).

Fear of Negative Evaluation

Only the study of Laposa and Rector (2014) focused on fear of negative evaluation among a clinical population, and found a moderate effect size for CP+VF delivered in a group setting (within-group d = 0.53).

Other Outcomes

Two studies reported the effects of VF intervention on symptoms of SAD using standardised measures among clinical populations. In both studies small effects were found in the scores of SPWSS and LSAS post CP+VF (within-group d= 0.45; d = 0.37 respectively) (McManus et al., 2009; Warnock-Parkes et al., 2017).

One study examined the effects of VF on focus of attention following 2 sessions of VF delivered in a group setting (approximately 4 weeks apart) and found small effect sizes for inward attention and outward attention (within-group d = 0.35; d = 0.12 respectively). (Laposa & Rector, 2014).

Quality Assessment

The quality of the included studies was rated by BP and 50% of the total studies was also rated by a second independent rater (RE). Inter-rater reliability was 93.65, Kappa = 0.89. Quality ratings for the included studies ranged from 0.59 (moderate) to 0.89 (high). All the studies included clear research objectives however some studies did not sufficiently describe the aims (Chen et al., 2010; Kim et al., 2002; Rodebaugh & Rapee, 2005; Warnock-Parkes et al., 2017). There was considerable variability in terms of the design as some studies used within-group and cross-sectional designs (Chen et al., 2010; Furukawa et al., 2009; Laposa & Rector, 2014; McManus et al., 2009; Rapee & Hayman, 1996; Rodebaugh & Rapee, 2005; Warnock-Parkes et al., 2017). A limitation of such designs was that it was not possible to conclude whether the observed effects of VF were due to the intervention per se. In studies where randomisation of group was possible, most of these studies did not include blinding of investigators and participants. In addition, six studies reported findings on clinical groups (Chen et al., 2010; Furukawa et al., 2009; Laposa & Rector, 2014; McManus et al., 2009; Rodebaugh et al., 2010; Warnock-Parkes et al., 2017), however only one of these studies included a comparator intervention (Rodebaugh et al., 2010). Studies with non-clinical groups used appropriate cut-off scores on reliable and validated measures for SAD (e.g. The Social Phobia Scale (Mattick & Clarke, 1998)).

The effects of VF on symptoms of SAD were primarily measured using idiosyncratic VAS ratings to capture changes in anxiety and self-perception. However, such measurements were appropriate for the outcomes that the study aimed to measure, although standardised outcome measures for symptoms of social anxiety such as PSP (Rapee & Lim, 1992) were also used to capture change in some studies. In terms of sample size, some studies were rated lower on appropriateness of sample size as power calculation was not used to determine sample size

and the studies did not discuss lack of power contributing to non-significant findings. The studies were rated lower when confounding variables (e.g., age, and gender) were not controlled for appropriately. Not including a comparison group was identified as a key confounding variable. The majority of the studies used appropriate statistical analysis and discussed the results in sufficient detail, and conclusions were supported by the results.

Discussion

Cognitive models of SAD propose that negative self-imagery plays a key role in development and maintenance of SAD, and therefore VF is integrated within CBT protocols for SAD to correct negative self-imagery (Clark & Wells, 1995) . This systematic review identified 17 studies that examined the direct effects of VF on symptoms of SAD. Different variations of VF were examined, including VF without cognitive strategies, VF that was preceded by cognitive preparation (CP+VF), elaborated VF preceded by cognitive preparation and followed by cognitive review (CP+VF+CR) and VF intervention combined with audience feedback (e.g., CP+VF+AF or CP+VF+CR+AF). Most of the studies reported on the effects of a single session VF intervention, and experimental studies that included comparison of VF interventions to a control (e.g. speech exposure without VF) and variations of VF (e.g., CP+VF+CR).

The evidence overall suggests that VF interventions that include cognitive strategies (i.e. CP+VF and CP+VF+CR) improved self-perception of performance among non-clinical socially anxious individuals (moderate to large between-groups effects). In addition, limited studies replicated these findings among clinical populations. However, due to insufficient data it was not possible to calculate the effect sizes (Rodebaugh, 2004; Rodebaugh et al., 2010). The effects at follow-up (e.g. second speech) were small and non-significant, with the exception of one study that found large between-group effects at follow-up (Kim et al., 2002). The findings in this

study are based on follow-ups that occurred either immediately following the intervention or within one-week. Therefore, it remains unclear whether the benefits of VF interventions also generalised to novel and wider social interactions within a longer timeframe. Furthermore, VF intervention that preceded by cognitive preparation (CP+VF) had superior effects with moderate to large effect sizes, on self-perception (ratings of own performance and coming across well) than VF without cognitive preparation(Harvey et al., 2000; Kim et al., 2002). The evidence suggested that adding audience feedback to VF interventions significantly enhanced the therapeutic effects of self-perception of performance, with large between-group effects post intervention and moderate to large effects at follow-up (Chen et al., 2015, 2018). Overall, the current literature supports the theory that providing individuals with objective feedback about their performance improves distorted self-perceptions (Clark & Wells, 1995).

Video feedback provides socially anxious individuals objective information that is incompatible with their negative self-image, which is suggested to improve mental representation of the self and reduce anxiety (Clark & Wells, 1995). However, evidence here consistently suggested that CP+VF and CP+VF+CR had small and at best moderate effects on anxiety (Chen et al., 2018; Orr & Moscovitch, 2010). Moderate to large effects were observed only when such interventions were combined with audience feedback (e.g., CP+VF+CR+AF) (Chen et al., 2015, 2018). It is possible that larger sample size is required to capture the subtle effects of CP+VF and CP+VF+CR on symptoms of anxiety. Although it was not within the scope of this review, perhaps the benefits of VF in reducing anxiety are limited to those who think they look worse and those most anxious about their appearance (Orr & Moscovitch, 2014). Furthermore, it is possible that change in anxiety following VF required time and changes to other constructs hypothesised to maintain SAD (Clark & Wells, 1995).

Limited studies found that VF combined with audience feedback (CP+VF+AF) was associated with improvement in appraisals of bodily sensations, with small or moderate to large effect sizes (Chen et al., 2015; Kanai et al., 2011). Furthermore, improvement in fear of negative evaluation was only found for VF interventions with cognitive strategies that included audience feedback, with moderate to large effect sizes (Chen et al., 2018; Kanai et al., 2011). There was no evidence for improvement in measures of avoidance and overall social anxiety symptoms measured using standardised outcomes.

The findings for the within-group changes in symptoms of SAD should be interpreted with caution, as these studies lack a comparator group and therefore it was not possible to conclude whether the reported effects were due to VF interventions per se. Nevertheless, in these studies improvements following intervention were reported in self-perception of performance, anxiety, appraisals of bodily sensations, feared social outcomes, and fear of negative evaluation. However, small effect sizes were found for the effects of VF on avoidance and symptoms of SAD measured using standardised outcome measures such as SPWSS and LSAS.

Limitations

One of the limitations of this systematic review was that it did not synthesis data about moderators and mediators. Therefore, it did not address questions regarding for whom video feedback interventions are more beneficial. In addition, this study explored the direct effects of VF interventions in isolation from other components of CBT for SAD. However, in practice the therapeutic effects of VF may also be combined with other components of CBT such as experiments to reduce self-focused attention and safety seeking behaviour. Although a standardised quality assessment tool was used, the quality of the studies was moderate to high. This should be interpreted with caution as for the within-group design studies several of the

quality criteria was not relevant and thus were excluded from overall score calculation. In addition, the quality assessment does not imply strong methodological quality per se but rather good quality for the design of a given study.

Conclusions

Overall, VF interventions that included cognitive strategies are effective in improving negative self-perception in individuals who are socially anxious, with limited evidence among clinical population. However, the evidence regarding whether these benefits generalised to new social situations was limited. Furthermore, the effect of VF on anxiety related to social interaction was weak, unless the VF interaction included cognitive strategies and audience feedback. Addition of audience feedback to VF interventions that included cognitive strategies was associated with stronger effects on anxiety, self-perception, and fear of negative evaluation. Further studies are required with larger sample sizes and among clinical populations to investigate the effects of VF interventions with cognitive strategies and audience feedback. The current findings may not generalise to new social situations or to a longer time frame as the follow-up data is based on follow-ups immediately following the intervention and not in ecologically valid social situations. Therefore, further research is also required to investigate whether the benefits generalise to new social situations and over a longer period of time.

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Service Improvement Project

The Delivery of Carer Information and Support in the Oxford Early Intervention in Psychosis (EIP) Team in Oxford – A Service Improvement Project

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Proposed Journal: This report is intended for submission to the Journal of Early Intervention in Psychiatry and it has been formatted for publication accordingly (Appendix I). This journal has been chosen as it relates to early intervention in psychiatric disorders including psychosis and welcomes research related to early intervention services.

My supervisors have read and provided feedback on this work and deems it suitable to submit for assessment.

The Delivery of Carer Information and Support in the Oxford Early Intervention in Psychosis (EIP) Team in Oxford – A Service Improvement Project

Abstract

Background: Carers play an important role in the recovery of individuals with psychosis. Therefore, it is recommended that they are provided with education and support as early as possible in the early intervention in psychosis (EIP) services.

Objectives: To understand the experiences and needs of carers regarding education and support within the Oxford EIP service. To make recommendations to the service about ways in which it can further meet carer education and support needs.

Method: A quantitative survey was used to collect data from carers of individuals with psychosis about their experiences and needs of education and support in the EIP service currently providing care to these families.

Results: Only 36 carers completed the survey out of 90 contacted. Most of these carers received education verbally and from care coordinators. Overall, carers found the information helpful and felt supported upon receiving it. Receiving information as early as possible in a booklet and having an opportunity to discuss the content with a member of staff were identified as the most preferred timing and format of receiving education. In addition, most of the carers received carer support in the service, but would prefer to receive this support as early as possible.

Conclusion: There are specific areas of improvement for the delivery of carer education and support in the Oxford EIP service. Further work is needed to hear from more carers.

Keywords: Psychosis, Early intervention in psychosis, Carer education, Carer support

Introduction

A psychotic disorder is a serious mental health illness, and symptoms include hallucinations, delusions, disorganisation, and unusual behaviour. Early intervention in Psychosis (EIP) services are community-based multidisciplinary teams for individuals aged 14-65, which aim to reduce treatment delays at the onset of a first episode of psychosis (FEP) and improve outcomes (Marshall & Rathbone, 2011). A biopsychological approach is implemented to engage individuals and their families in assessment and treatment, and input can last for up to three years (National Institute for Health and Care Excellence, [NICE] 2014). To ensure that intervention is offered without delay, the NHS England Access and Waiting Time (AWT) Standard requires that individuals with suspected FEP are assessed within two weeks of referral, allocated to a care coordinator within an EIP team, and offered the NICE recommended treatments for psychosis and schizophrenia (NHS England, 2016). One of the key elements of EIP services is involving families in the care of the patient and providing family and carer support and interventions (NICE, 2014). Family members of individuals with FEP have needs for education and support given that psychosis is a distressing illness for the individual and their families (Sin et al., 2017). It is recognised the family support and interventions improve outcomes for individuals with psychosis (NICE, 2014).

The onset of psychosis typically occurs during adolescence or early adulthood (Lieberman & Fenton, 2000), and this means that individuals either live at home or have close contact with their families (Fisher et al., 2008). Often, individuals with psychosis require long-term support from those in their close network. Family members and significant others who provide support without being paid are recognised as informal carers (referred to as carers hereafter). Carers of individuals with psychosis play an important role in ensuring the care, wellbeing, and recovery of the individual (Pharoah et al., 2010). It is often the carers who seek

treatment for their relative at the onset of the illness and support sustained engagement with services (Chung et al., 2010). Evidence suggests that individuals with psychosis who receive care from their family network have better prognosis and improved quality of life than those who do not receive such caregiving support (Pharoah et al., 2010).

Whilst caring for an individual with psychosis can be perceived by the carer as a positive experience (Kulhara et al., 2012), it is often a demanding role that is associated with high levels of stress (Kuipers et al., 2010; Sin et al., 2021). Carers of individuals with psychosis experience a range of emotions as they navigate their complex caregiving role whilst they also process and understand the illness of their loved one. Feelings of distress, fear, hopelessness, guilt, and isolation are common (Dillinger & Kersun, 2020; Jones, 2009). Carers may also experience stigmatisation through withdrawal and social exclusion by virtue of having a family member with psychosis (González-Torres et al., 2007). Overall, the evidence suggests that carers of individuals with psychosis have poorer mental health than non-carer counterparts (Sin et al., 2021), and the experience of carer burden is well established in the literature (Kuipers et al., 2010). Poorer wellbeing in carers can also negatively influence their ability to provide support to the individual with psychosis, which is believed to impact on the patient's recovery and prognosis (Kuipers et al., 2010; Smith et al., 2014)

Carers commonly report the need for reliable information and support from services (Dillinger & Kersun, 2020; Sin et al., 2005). Carers are typically unfamiliar with many aspects of the illness, including diagnosis, symptoms of the illness, treatment, mental health services, and the impact of psychosis on the individual and families (Lowenstein et al., 2010; Sin et al., 2007). Carers also have their own support needs including coping with stigmatisation (Corrigan & Miller, 2004; Poon et al., 2018) and mental health difficulties and physical health problems

(Gupta et al., 2015). Psychoeducational interventions, improves carers' global morbidities, knowledge about perceived burden, and negative caring experiences (Sin et al., 2017). Despite the importance of carer education and support, evidence suggests that within mental health services carers are dissatisfied by the quality of information that is provided to them (Wainwright et al., 2015).

Current policies and guidance recommend that services identify carers of individuals with psychosis and provide them with support and interventions as early as possible (NHS England, 2016; NICE, 2014). NICE (2014) guidelines recommend providing carers and family members of individuals with psychosis information about various topics including psychosis, the services involved, recovery, right to carer's assessment, support during crisis, and available carer support.

Service Context

The EIP service in Oxford provides carer support by firstly identifying the carers of patients accessing the service. It then offers a psychoeducation 'carers pack' that includes information about psychosis, the service, and treatment. Carers can be referred for direct individual support from a specialist carer support worker, and the family can be referred for behavioural family therapy (BFT).

The leadership team of the Oxford EIP service had identified carer education and support as a key area in need of improvement. The annual National Clinical Audit of Psychosis (NCAP) evaluates performance against standards based on NICE quality statements for psychosis and schizophrenia in adults, and recommendations in implementing the EIP access and waiting time standard (NHS England, 2016; Royal College of Psychiatrists, 2022). The Oxford EIP service submits 100 cases, selected randomly from the total caseload of 250 cases. In the past two years,

this audit reported that the percentage of carers who took up carer-focussed education and support programmes was 39%, in the “needs improvement” range (>50% required for “performing well”). Furthermore, following a serious incident in 2021, a Trust investigation into the care received by the client concluded that there were ‘missed opportunities to provide formal carers assessment and carers support in line with EIP standards.’

The aims of this service improvement project were: (a) to understand the experience of carers regarding carer education and support within the Oxford EIP service; (b) to understand the education and support needs of carers in the service; (c) to make recommendations to the service about ways to improve how it meets the education and support needs of carers of individuals with FEP.

Methods

Design

The project was informed by the Institute for Healthcare Improvement (IHI) Model for Improvement (Institute for Healthcare Improvement [IHI], 2022). The IHI frames an improvement project with three questions at the discovery phase: 1) what are we trying to accomplish; 2) how will we know that a change is an improvement; 3) what change can we make that will result in an improvement. The model then proposes a Plan-Do-Study-Act (PDSA) cycle to test whether change results in improvement. At the discovery phase it was determined that the service needed to improve the delivery of carer education and support, to reach the “performing well” range. To inform the changes made by the team, the first step was to collect data to understand the experiences and needs of carers in the Oxford EIP service. These data were used to make recommendations for improvements in carer education and support. This project did not include the implementation of the improvement recommendations.

Materials

The study received audit and quality approval from Oxford Health NHS Foundation Trust clinical governance department. A questionnaire was co-produced with staff and four carers of individuals with FEP in the Oxford EIP service, which aimed to gather anonymous feedback about carers' experiences and needs of education and support within the Oxford EIP service.

The questionnaire development involved consultation with the service, including the service managers, the specialist carer support worker, and clinical psychologists to generate the questions. These questions covered the type of information and support the service was currently providing, as well as other education and support needs of carers suggested by the literature and policies. Further consultation took place with four carers, who gave feedback on the content and format of the questions. The questionnaire was designed to generate quantitative data to allow sampling of more carers and collection of more responses than in-depth qualitative interviews permit. In addition, given the demands of caregiving, it was important to use quantitative methods to reduce participant burden. The importance of this was also highlighted by those carers who were involved in developing the questionnaire.

The questionnaire comprised three sections to elicit the following:

1. Non-identifiable information about the carer (age range, relationship to patient, duration of contact with the service) and their perceived level of involvement in the care of their family member with FEP
2. Feedback about the experiences and needs of carer education within the Oxford EIP service. The section sought to determine the perceived experiences of receiving carer education on eleven topics, including the format in which the information was received,

who provided the information, how it felt to receive the information, and perceived helpfulness of the given information. To address needs in relation to carer education, questions were also asked about carer preference regarding timing of information sharing, format, and clinician giving the information.

3. Feedback about the experiences and needs of carer support within the Oxford EIP service. The section sought to determine the experience of carer support across seven domains, including the perceived helpfulness of received support. To address needs in relation to carer support, questions were asked about carer preference regarding timing of support.

Sample

Carers were either named relatives or a significant person involved in the care of the patient currently receiving treatment from the Oxford EIP service. To identify potential carers to participate, the caseload of patients was screened on the electronic patient record database. However, only a small number of patients had a named carer recorded on their electronic records. Therefore, care coordinators and the specialist carer support worker in the service also identified known carers of those individuals on their caseloads. In addition, carers were also identified from the BFT waiting list. Through this process 90 carers were identified.

Data Collection

The researcher and the assistant psychologist in the team contacted the carers to inform them about the service improvement project and the survey. Eighty-six carers agreed to be provided with a link to the online anonymous questionnaire (appendix G); four carers declined to participate due lack of time or current stressors. Reminders about the questionnaire were sent within 3-4 weeks of the initial contact to increase the response rate. A total of 36 carers completed the online questionnaire.

Results

Analysis

Descriptive statistics were used to explore the questionnaire data.

Carers Demographics

Thirty-six carers completed the online questionnaire (response rate 40%), carers were primarily aged 45 – 54-year-old (39% of the sample) and mothers (42%). Most of the carers self-identified as being extremely involved in the care of the patient (64%), and most were receiving input from the Oxford EIP service for more than 24 months (33%) (see Table 1).

Table 1

Carer Demographics (n = 36)

Characteristics	**N (%)**
Age	
25 – 34	5 (13.9)
35 – 44	3 (8.3)
45 – 54	14 (38.9)
55 – 64	9 (25)
65 +	5 (13.9)
Relationship to client	
Partner	8 (22.2)
Father	7 (19.4)
Mother	15 (41.7)
Sibling	2 (5.6)
Friend	1 (2.8)
Other	3 (8.6)
Degree of involvement in care of the client	
Extremely involved	23 (63.9)
Somewhat involved	8 (22.2)
Not very much involved	2 (5.6)
Other	2 (5.6)
Duration of input from the Oxford EIP Service	
<6 months	3 (8.6)
6 – 11 months	6 (16.7)
12 – 17 months	8 (22.2)
18-23 months	7 (19.4)
>24 months	12 (33.3)

Carers' Experiences of Receiving Information from the Oxford EIP service

Information Given to Carers

The top five topics of information that carers received are information about psychosis and treatment, the EIP service, supporting an individual with psychosis, crisis support, and confidentiality and data protection. Less than half of the carer sample was informed about recovery and ongoing support after the individual is discharged from EIP service (See table 2).

Table 2

What Information do Carers Receive from the Oxford EIP Service (n=36)

Information	**Received N (%)**	**Not received N (%)**
Psychosis and treatment	35 (97.2)	1 (2.8)
The EIP service	34 (94.4)	2 (5.6)
How to support an individual with psychosis	31 (86.1)	5 (13.9)
Where to seek support in a crisis	28 (77.8)	8 (22.2)
Confidentiality and data protection	24 (65.7)	12 (33.3)
Different types of diagnosis other than psychosis	24 (65.7)	12 (33.3)
Emotional support for carers and families from other NHS services	22 (61.1)	14 (38.9)
The emotional impact of psychosis on carers and family	22 (61.1)	14 (38.9)
The Mental Health Act (MHA)	20 (55.6)	16 (44.4)
Support group for carers	19 (52.8)	17 (47.2)
Recovery and ongoing support after the individual is discharged from EIP service	17 (47.2)	19 (52.8)

Format of Received Information

Carers indicated that, across all topics, they mainly received the information verbally (see figure 1). Leaflets were the second most common format of information giving, followed by written in a letter or care plan. Online (links to websites) was the least common way of receiving information. In addition, some carers did not recall how they mainly received the information.

Professionals Providing Carer Information

Overall care coordinators are mostly providing carer information across all topics, apart from information about psychosis and treatment and different types of diagnosis, which is mainly provided by psychiatrists. Psychologists, nurses, and occupational therapists provided the least amount of carer information. Some carers also indicated that they did not remember who provided the information to them. In addition, carers who had rated 'other' explained that they had received the information from multiple professionals in the service (See figure 2).

Figure 1

Format of Received Information

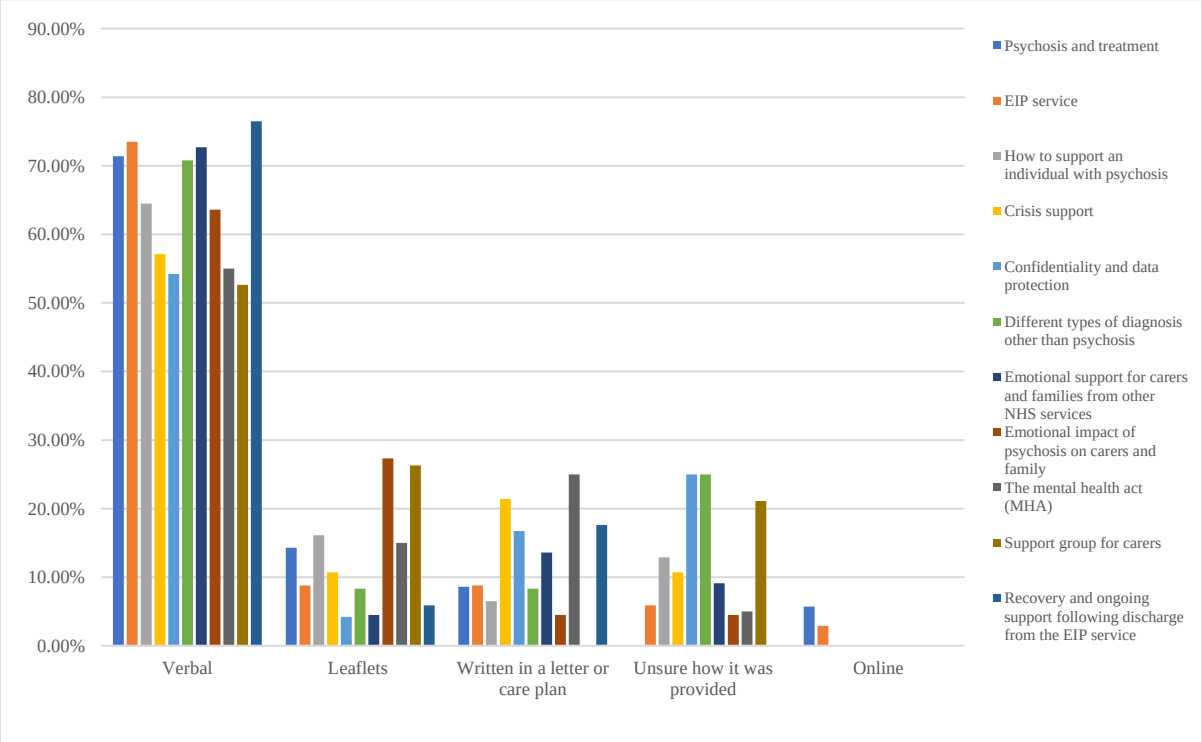
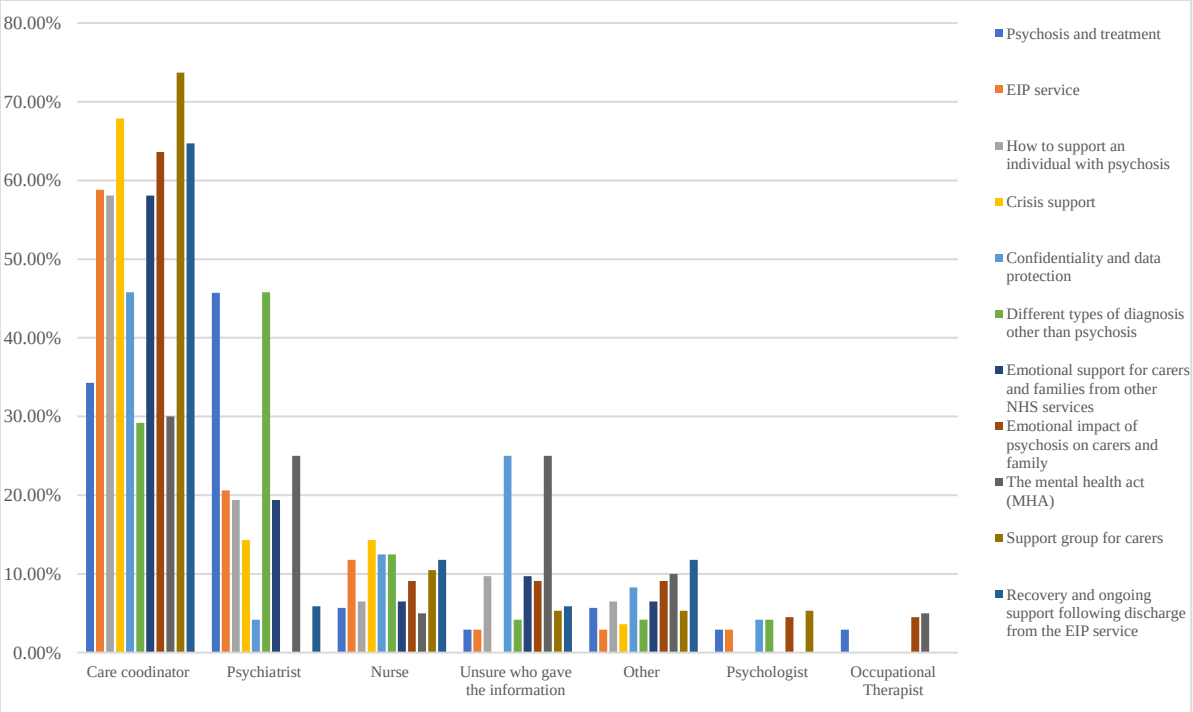


Figure 2

Which Professionals in the Service are Providing Carer Information

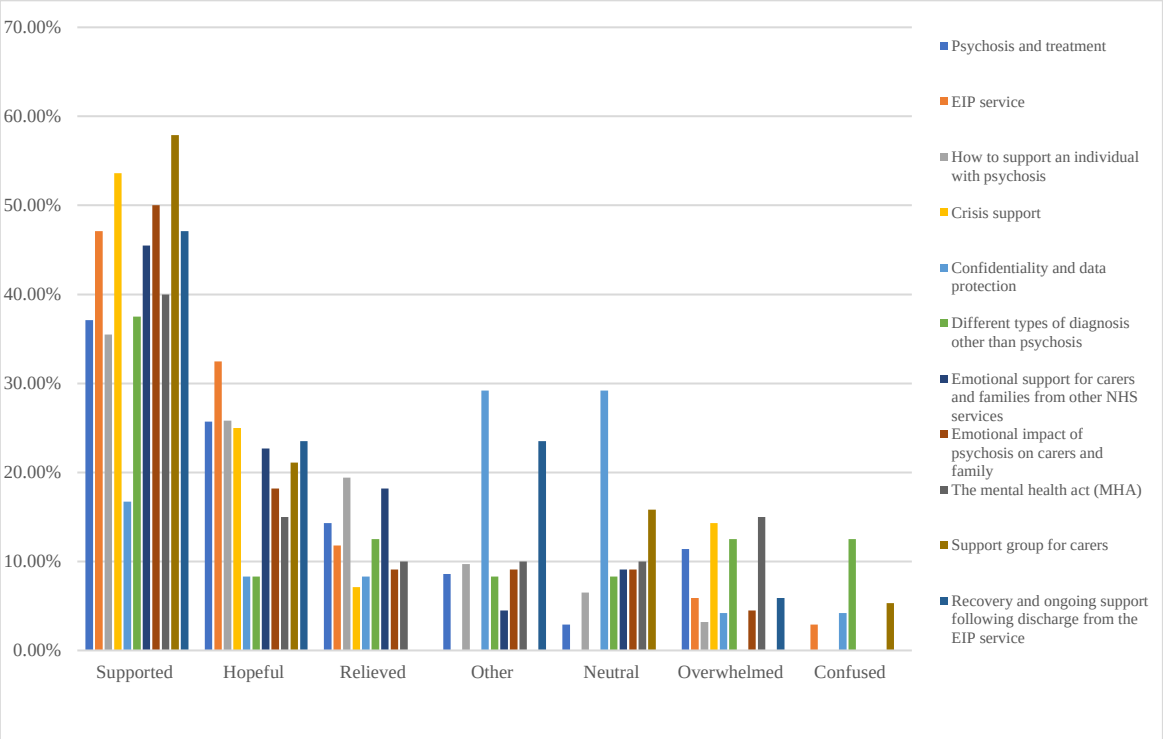


How do Carers Feel Upon Receiving Carer Information?

Overall, the majority of carers reported that they felt supported upon receiving carer education (see figure 3). Feeling hopeful was the second most reported emotion, followed by feeling relieved. In addition, some carers who had responded ‘other’ explained that they experienced mixed emotions. Carers also reported feeling neutral, overwhelmed, and confused, but to a lesser degree.

Figure 3

How Carers Feel Upon Receiving Carer Information



What is the Perceived Helpfulness of the Information Provided to Carers?

Carers rated the perceived helpfulness of the information that they had received on a scale of 1 to 5, where 5 represented extremely helpful and 1 represented not helpful at all (see table 3). The top four most helpful topics included emotional impact of psychosis on carers and families (3.81), how to support an individual with psychosis (3.81), recovery and support following discharge from the EIP service (3.76), and different types of diagnosis other than psychosis (3.71).

Table 3

Perceived Helpfulness of Carer Information

Information	Mean (SD)
Emotional impact of psychosis on carers and family	3.81 (1.01)
How to support an individual with psychosis	3.81 (0.91)
Recovery and ongoing support following discharge from the EIP service	3.76 (1.03)
Different types of diagnosis other than psychosis	3.71 (0.91)
EIP service	3.68 (1.01)
Emotional support for carers and families from other NHS services	3.68 (0.99)
Psychosis and treatment	3.66 (0.96)
Crisis support	3.64 (0.95)
Confidentiality and data protection	3.42 (1.18)
Support group for carers	3.42 (1.07)
The mental health act (MHA)	3.40 (1.19)

Carers' Experiences of Receiving Support from the Oxford EIP Service

Support Provided to Carers

The majority of carers received emotional support via conversations with care coordinators, were signposted to other NHS services for emotional support for themselves and were given support resources for emotional and practical needs. Fewer than half of carers received BFT or were signposted to other relevant services and support in the community such as charities, and fewer than third were offered a carer psychoeducation group and carer peer support group (see table 4)

Table 4

What Support is Provided to Carers at the Oxford EIP Service (N=36)

Type of support	Received	Not Received
Emotional support via conversation with care coordinators	28 (77.8)	8 (22.2)
Signposted to other NHS services for emotional support for carers	23 (63.9)	13 (36.1)
Guidance to relevant support resources for carers	18 (50.0)	18 (50.0)
Behavioural Family Therapy (BFT)	13 (36.1)	23 (63.9)
Signposted to other relevant services and support for carers in the community such as charities	13 (36.1)	23 (63.9)
A carer peer support group	10 (27.8)	26 (72.2)
Carer psychoeducation group	8 (22.2)	28 (77.8)

What is the Perceived Helpfulness of the Support Provided to Carers?

Carers rated the perceived helpfulness of the support they had received on a scale of 1 to 5, where 5 represents extremely helpful and 1 represents not helpful at all (see Table 5). The top three most helpful forms of support were emotional support via conversations with care coordinators (4.04), signposting to other NHS services for emotional support for carers (4.00), and BFT (4.00).

Table 5

Perceived Helpfulness of Received Support

Type of support	Mean (SD)
Emotional support via conversation with care coordinators	4.04 (1.23)
Signposted to other NHS services for emotional support for carers	4.00 (0.85)
Behavioural Family Therapy (BFT)	4.00 (1.22)
Relevant support resources for carers practical and emotional needs	3.72 (1.07)
Signposted to other relevant services and support for carers in the community such as charity	3.30 (1.18)
A carer peer support group	3.30 (1.06)
Carer psychoeducation group	3.25 (1.04)

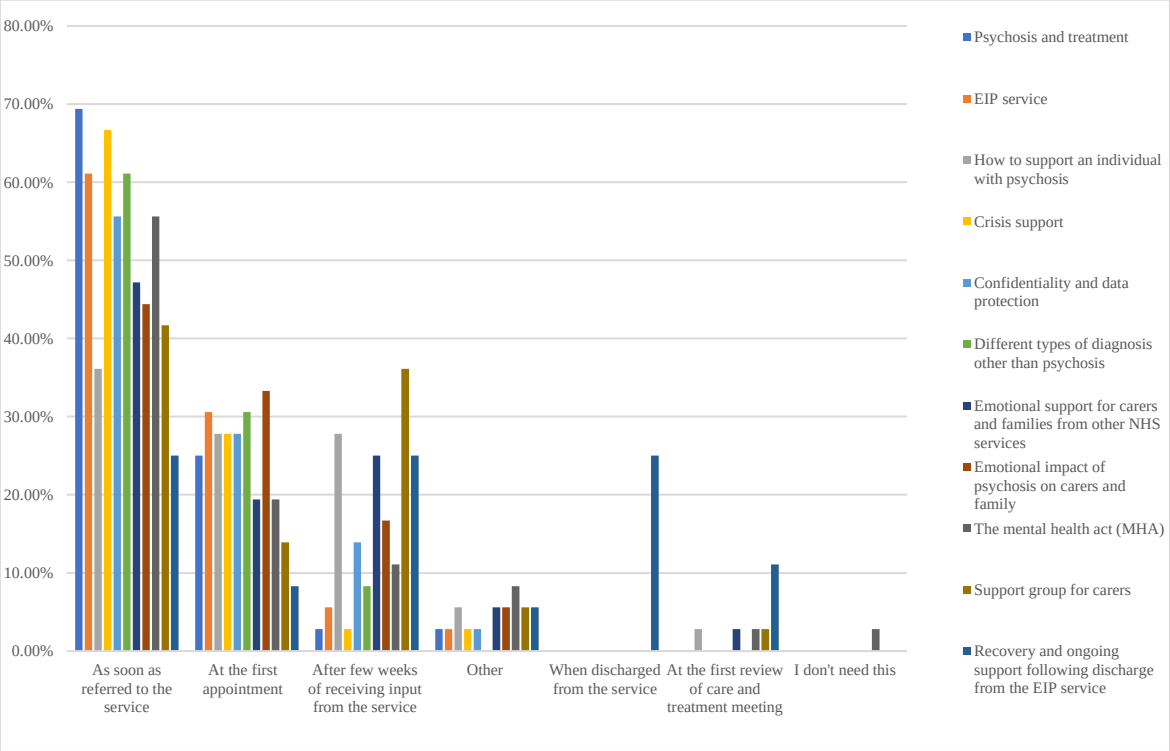
How to Meet the Information Needs of Carers in the Oxford EIP Service?

When do Carers Want to Receive Information?

Carers were asked to indicate at what point during their time with the Oxford EIP service they would find receiving carer information most helpful. Across all topics the most preferred time was as soon as the person with FEP is referred to the Oxford EIP service, with the exception

of information about recovery and on-going support following discharge (25%). The second most preferred time was the first appointment in the service, and third was after a few weeks of being in the service. The least preferred time points to receive carer information was other (which referred to multiple times), at the point of discharge (with the exception of information about recovery and ongoing support following discharge (25%)) and at the first review of carer and treatment meeting (CPA) (usually 6-7 months after being accepted into the service).

Figure 4
Preferred Time to Receive Carer Information (N=36)



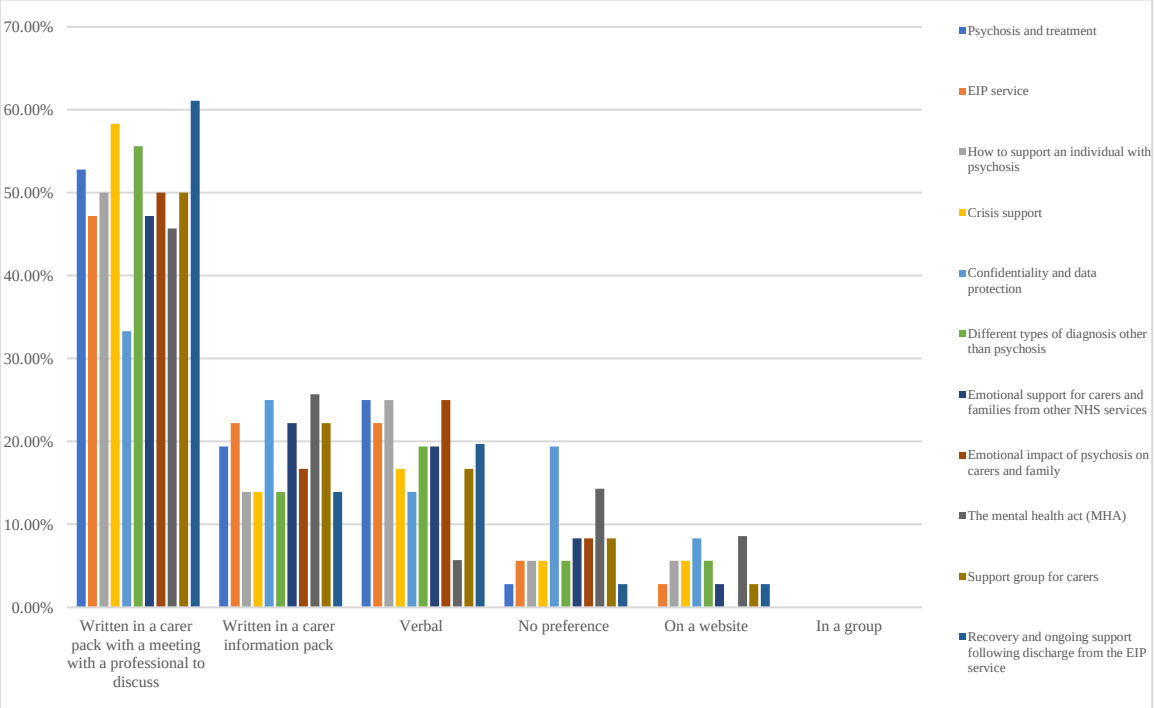
Preferred Format of Delivery

The majority of the carers indicated that a carers pack with a meeting with a professional to discuss the content was their preferred method of receiving information. The second preferred method was a carers pack alone, followed by information just given verbally. The least preferred

format of delivery was online (links to websites) and in a group. Interestingly the carers in this sample did not want to receive any of the topics of information in a group setting.

Figure 5

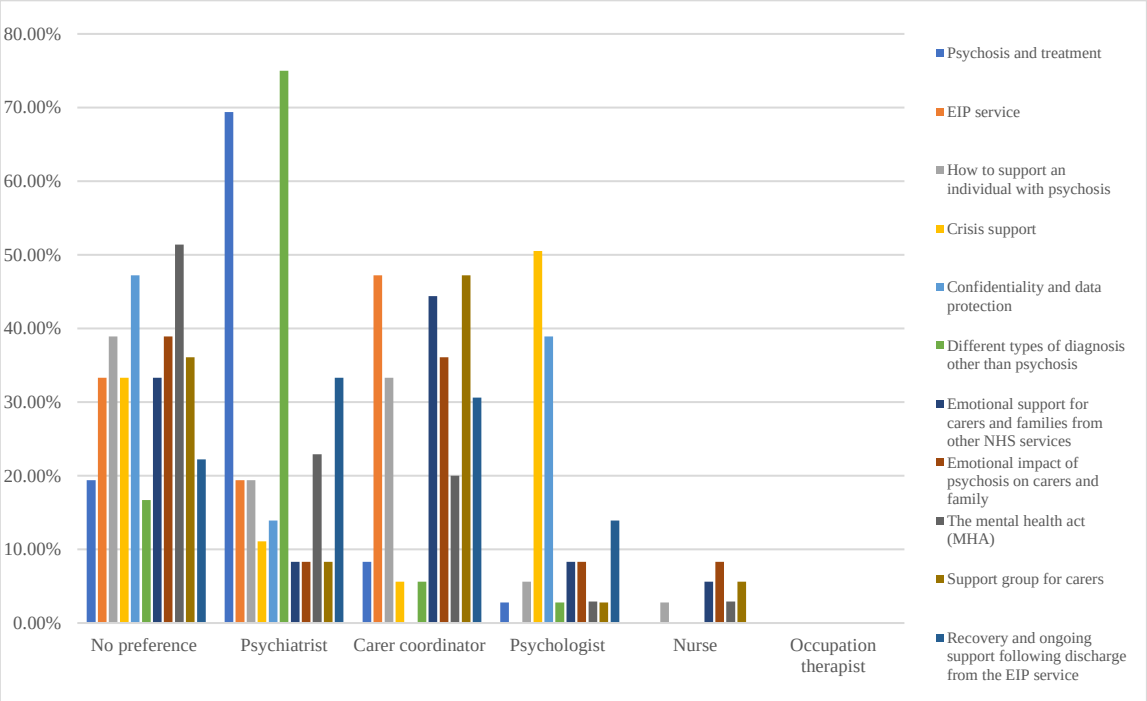
Preferred Format of Information Giving (N=36)



Who Should Give the Information to Carers?

Overall, carers did not express a preference for role of clinician giving information, with the expectation of particular topics. The majority of the carers preferred psychiatrists to deliver information about psychosis and treatment (69%) and different types of diagnosis other than psychosis (75%). Psychiatrists were also the most preferred clinician for information about recovery and support following discharge (33%). More than half of the carers preferred to receive information about crisis support from a psychologist (51%). Care coordinators were the preferred clinician for information about the EIP service (47%), other NHS services for emotional support for carers (44%) and support groups for carers (47%).

Figure 6
Preferred Clinician for Information Giving



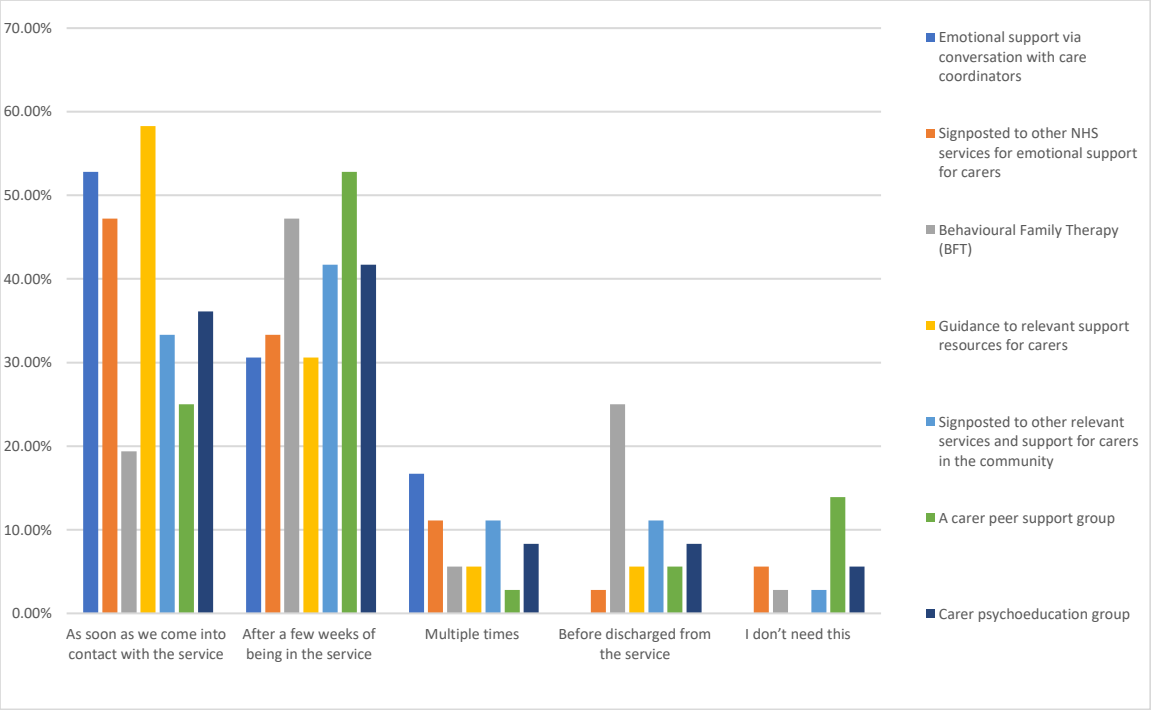
What are the Support Needs of Carers in the Oxford EIP Service?

What Support Do Carers Want and When Do They Want This Support?

Overall, the majority of carers indicated that they wanted all seven types of support, but when that they would find most helpful in receiving different types of support varied. The majority of carers indicated that 'as soon as coming into contact with the EIP service' was their preferred time to receive emotional support via conversations with care coordinators, to be signposted to other NHS services for emotional support for themselves, and to be provided relevant support resources for carers' emotional and practical needs. 'After a few weeks of being in the service' was the most preferred time to receive BFT, to be signposting to other relevant service and support for carers in the community such as charities, a carer peer support group, and carer psychoeducation group.

Figure 7

Preferred Time Point to Receive Carer Support



Dissemination of the Results

The survey results were presented to the leadership team within the service and a summary of findings was disseminated to the wider team. The leadership team discussed and used the findings of this study to develop an action plan to implement the following improvements:

- Continue redefining the term 'carer' to 'caregivers' of individuals with psychosis. The term 'carer' may be misinterpreted as 'paid carers' by family members and others giving care to individuals with psychosis.
- Continue identifying and recording a named carer for patients at the point of accepting referrals to ensure that their education and support needs are met as early as possible.

- To review the newly developed carer education pack to ensure it includes all the eleven topics of information that the majority of carers in the survey wanted to receive from the service.
- To review the format of the carer education pack with a small group of carers in the service including those who are not fluent in English.
- Care coordinators to provide the carer education pack to carers and family members at the first point of contact and offer an opportunity to discuss the content in the pack with carers.
- To develop a pathway whereby the specialist carer support worker in the service routinely checks whether carers of newly referred patients in the service have been identified and have received the carer education pack.
- To consult with carers regarding what type of group education or support intervention they would find helpful as this survey did not explore this question.
- To build on the findings of this study to conduct further service improvement projects to meet carers' education and support needs.

Discussion

This service improvement project aimed to understand carers' experiences of receiving information and support, and their education and support needs, within the Oxford EIP service. The knowledge was provided to the service to improve the delivery of carer education and support, in line with EIP national standards.

In terms of understanding carers' experiences of receiving information in the Oxford EIP service, the results showed that most of the carers surveyed received information about eleven different topics verbally and from care coordinators. However, as expected, information about

psychosis and treatment and different types of diagnosis was given mainly by psychiatrists. The perceived helpfulness of carer education can be further improved as the perceived helpfulness of received information ranged 3-4 out of 5. The questionnaire and the study design did not address factors that impacted the perceived helpfulness; however, it was hypothesised that the format, timing, and the quality of the information given may contribute to this. The survey showed that most carers felt supported upon receiving information (across all topics). This finding highlighted the value of information-giving in supporting carers of individuals with psychosis.

The results also highlighted the experiences of receiving carer support in the Oxford EIP service. In this sample, most carers have received emotional support via conversations with care coordinators, were signposted to other NHS services for emotional support for themselves and were given support resources for carers' emotional and practical needs. However, other types of support including signpost to other relevant services and support in the community such as charities, BFT, carer psychoeducation group, and carer peer support group were provided to less carers in this sample. The perceived helpfulness of support was rated an average of 4 or higher (out of 5) for emotional support via conversations with care coordinators, signpost to other NHS services for emotional support for themselves, and BFT. This indicates that support which met carers' emotional needs was perceived as most helpful. This is not surprising as the need for emotional and wellbeing support for carers of individuals with psychosis is recognised in the literature (Askey et al., 2009).

The carers in this sample reported several ways in which the service can meet their education and support needs. In terms of education needs, going through a carer education pack together with a member of staff was the most preferred way of receiving information (although verbal delivery was the most common mode that information was currently provided to carers).

In this sample carers did not want to receive any of the eleven topics of information in a group format, and the questionnaire did not address whether they wished to receive any other types of information in a group setting. Carers preferred to receive information about psychosis and treatment and other types of diagnosis from psychiatrists. One of the key findings was that carers preferred to receive all types of information at the earliest stage of contact with the service. This result is not surprising since carers of individuals with psychosis have high information needs (Askey et al., 2009).

In relation to their support needs, most of the carers indicated that they would like to receive support across all seven domains and preferred to receive this at the earliest stage of coming into the service. One of the supports those carers would like to receive was a carer psycho-education group, however the survey did not explore what education and support they would like to receive in groups. Although, the findings indicated that they did not want to receive the eleven topics of information in a group setting.

To meet the information and support needs of carers, the service will use the findings to implement several improvements. Since carers want to receive information and support as soon as possible, the service aims to identify a named carer when the patient is accepted onto the team's caseload. It also aims to redefine the term 'carer' to 'caregivers' by giving information to staff and informal carers to clarify the definition and role of a carer within this service context. To measure whether redefining the term carer leads to improvements, the service can use data from the electronic patient record to monitor routinely the number of patients who have a named carer recorded. In addition, the service will consult with carers in the service regarding the format of the carer education pack, which they aim to give to carers within the first few contacts. A possible evaluation of this improvement measure could be a further survey or focus groups to

collect feedback from carers about their experience of the education pack. The service also aims to consult with carers about the content, format and function of a carer psychoeducation group and carer peer support group. It also aims to implement further service improvement projects focused on carer support.

This service improvement project has several limitations. Firstly, data collection was limited to a quantitative questionnaire, and therefore it was not possible to obtain an in-depth understanding of the perceived experiences and needs of carers. The questionnaire included a free text box for collection of qualitative data, but only a small number of carers provided written information, and this was insufficient for qualitative analysis. This study could be further improved by including qualitative interviews in addition to collecting the quantitative data. The total sample size was small and mostly comprised mothers who identified as extremely involved in the care of the person with FEP. To preserve anonymity, information about gender, and ethnicity was not collected (although gender can be inferred for some carers, e.g. mother, father). The sample was too small to compare with the full sample of carers of patients on the caseload, and it remains unknown how representative it is of all carers supported by the Oxford EIP service. In addition, the survey was developed in consultation with a small group of carers who were White British, and their consultation will not be representative of the range of carers receiving input from the service.

Conclusion

This service improvement project explored the experiences and needs of carer education and support in the Oxford EIP service. The results showed that overall carers are receiving some information and support, and they find this helpful. However, the carer education and support can be further improved in terms of how and when it is provided by team members. Carers have

highlighted that they need both information and support as soon as meeting the service. The Oxford EIP service will use the findings to implement improvement recommendations.

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Theoretically Driven Research Project

Investigating the Role of Mental Imagery in Health Anxiety

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Word Count (excluding references, tables and figures): 5019

Proposed Journal: This report is intended for submission to the Journal of Anxiety Disorders and it has been formatted for publication accordingly (Appendix L). This journal has been chosen as it is high impact and relates to the field of anxiety disorders.

Internal Project Supervisors: Professor Paul Salkovskis and Dr Sarah Lack

My supervisors have read and provided feedback on this work and deems it suitable to submit for assessment.

Investigating the Role of Mental Imagery in Health Anxiety

Abstract

Background: Experiencing intrusive mental images related to health concerns is common in health anxiety, although experimental studies are needed to clarify their role.

Objective: The study aimed to investigate the effects of health catastrophising imagery compared to general threat imagery in increasing anxiety, threat perception beliefs, and behavioural responses, and whether the response is specific to health anxiety.

Method: 63 individuals, meeting criteria for health anxiety or OCD, and a comparison healthy control group were included. Semi-idiographic health catastrophising and general threat mental imagery were induced, and responses before and after were measured as ratings of anxiety, threat appraisals, and behavioural responses.

Results: Health catastrophising mental imagery resulted in significantly greater increase in anxiety in the highly health anxious group relative to general threat imagery, and this was specific to that group. Health anxiety scores were significantly correlated with the increase in anxiety in response to the health image but not to the general threat image. No significant differences were detected for threat appraisals and behavioural responses to imagery.

Discussion: The findings are consistent with the hypothesis that mental imagery with a health catastrophising focus can result in increased anxiety among highly health anxious individuals, and this effect is specific to health catastrophising mental images. Findings suggest that such imagery taps into the specific appraisals of those experiencing health anxiety.

Keywords: Health anxiety, Illness Anxiety Disorder, Mental Imagery

Introduction

The experience of health anxiety can be conceptualised as being on a continuum with those at the upper end of severity meeting clinical diagnosis (Warwick & Salkovskis, 1990). The hallmark feature of severe health anxiety, or more recently termed illness anxiety disorder or somatic symptom disorder, is excessive or disproportionate preoccupation with having a serious illness, in absence of or with only mild somatic symptoms that persist despite medical reassurance (American Psychiatric Association [APA], 2013). Severe and persistent health anxiety affects up to 5% of the adult population (Creed & Barsky, 2004), causing distress and impairment in social and occupational functioning (Sunderland et al., 2013) and increased financial costs due to higher medical care utilisation (Barsky et al., 2001).

According to the cognitive behavioural model of health anxiety (Salkovskis & Warwick, 2001; Warwick & Salkovskis, 1990), dysfunctional health related assumptions and beliefs are activated by salient triggers such as bodily sensations. The individual then becomes increasingly anxious and hypervigilant for any signs of illness, which due to selective attention are in turn misinterpreted as evidence of serious illness. As a result of preoccupation with such ideas the individual engages in maladaptive cognitive and behavioural responses, particularly safety-seeking behaviours such as seeking reassurance, bodily checks, rumination, and avoidance of illness and health stimuli. These in turn can maintain the negative appraisals and therefore health anxiety (Salkovskis & Warwick, 2001). In line with the cognitive behavioural model with other anxiety related problems, intrusive mental imagery around themes of health and illness is prevalent in severe health anxiety (Muse et al., 2010; Wells & Hackmann, 1993). Warwick and Salkovskis, (1990) proposed that mental imagery could impact on illness beliefs such as the estimated likelihood and seriousness of the feared illness both as triggers and as appraisals.

It has been suggested that mental imagery can play an important role in the aetiology and maintenance of several anxiety disorders (Holmes & Mathews, 2010), most likely as a manifestation and elaboration of threat appraisals. For example, in obsessive compulsive disorder (OCD) mental imagery on themes of contamination increases the belief about contamination (de Silva, 1986), and are associated with increased anxiety and compulsive washing (Speckens et al., 2007). In social anxiety disorder, negative self-imagery during social interaction increases anxiety symptoms (Hirsch et al., 2003).

Mental imagery may sometimes evoke stronger emotional responses than verbal thoughts (Holmes & Mathews, 2005). It has been proposed this is due to the direct activation in the brain systems involved in emotion regulation (Holmes & Mathews, 2010). Another way in which mental imagery strongly influence emotions is via the shared neural pathways between imagery and perceptual processing (Holmes & Mathews, 2010). In addition, mental image generation can draw on information from autobiographical memories and in doing so activate the emotions that were experienced during such past events, which makes it likely that the generated mental images contain the same emotions (Holmes & Mathews, 2010).

Intrusive and recurrent mental imagery in severe health anxiety has been noted as particularly prominent (Muse et al., 2010; Wells & Hackmann, 1993) with a rate of 78% reported in sample of 55 participants (Muse et al., 2010). The images are centred on themes of being told bad news of having a serious illness, suffering from a serious illness, death, and the impact of own death or serious illness on loved ones (Muse et al., 2010). Such imagery is distressing, mainly future oriented, and experienced from either field or observer perspective (Muse et al., 2010). Wells and Hackmann, (1993) also found that mental imagery in health anxiety is centred on themes of self, death, and consequences of illness, including metaphysical

beliefs. These images seem to be either memories of an actual event, such as prior experience of illness, or are associated to a memory of an earlier event in terms of the sensations, thoughts, and emotions experienced (Muse et al., 2010; Wells & Hackmann, 1993).

In response to intrusive mental imagery individuals with severe health anxiety engage in safety seeking behaviours such as reassurance seeking, checking bodily and health symptoms, avoidance, distraction, and rumination (Muse et al., 2010). However, it remains unknown whether such mental images directly induce anxiety and increase the likelihood of maladaptive cognitive and behavioural responses or are themselves a response to the health focussed anxiety. In a recent experimental study, individuals with high levels of health anxiety experienced higher anxiety and avoidance tendencies during imagery induction of COVID-19 illness scenarios compared to neutral imagery induction (Benke et al., 2022).

Thus far, research shows that mental imagery in health anxiety is prevalent and may be able to elicit anxiety, and that individuals may respond by engaging in maladaptive cognitive and behavioural responses (Benke et al., 2022; Muse et al., 2010; Wells & Hackmann, 1993). What is missing is evidence from experimental studies that those experiencing health anxiety react particularly strongly and specifically to negative health imagery, (as opposed to increased responsiveness to any negative imagery). The present study therefore used experimental methodology to investigate the direct effects of inducing personally relevant health catastrophising mental images on anxiety. Additionally, the extent to which they elicit increases in threat perception beliefs and behaviours that were hypothesised to maintain anxiety. The study crucially compared any effects of such mental images to that of personally relevant general threat mental images. Study participants were individuals with severe health anxiety, OCD, and community controls.

The primary hypothesis was that mental imagery focussed on personally relevant health catastrophising would increase anxiety experienced in highly health anxious individuals more than in the comparison groups, and that this will be relatively specific to health relevant mental images relative to personally relevant general threat imagery. The secondary hypothesis was that such imagery would also result in elevated threat perception in terms of perceived likelihood of illness, perceived awfulness, and ability to cope particularly in highly health anxious individuals and again specific to health relevant mental images**.** Finally, that highly health anxious individuals will respond to the images with behavioural strategies that could further increase or maintain health anxiety (avoidance and reassurance seeking)**.**

Method

Design

A mixed model design with a grouping variable (health anxiety, OCD, and, community controls) and 2 within-subject variables (response to health catastrophising mental image vs general threat mental image) was used.

Participants

Participants were recruited from three local NHS IAPT services, mental health charities and the wider community. Participants were included if they (1) were aged 18-years and above, (2) were fluent in English language, (3) and self-identified as either anxious or worried about health, or experienced difficulties with OCD, or had neither difficulty nor were seeking mental health treatment. Cut-off scores of 14 on the short health anxiety inventory (SHAI) confirmed self-identification with having health anxiety (Salkovskis et al., 2002), and 21 on the obsessive-compulsive inventory revised (OCI-R) confirmed self-identification with having OCD (Foa et al., 2002). Participants were excluded if they (1) self-identified as having drug and alcohol

dependency, (2) self-identified as having a learning disability or disorder of the mind that could interfere with the ability to provide informed consent, (3) self-identified as having suicidal intention.

Using power calculation, it was estimated that 25 participants per group would provide 90% power at 0.05 alpha level. A total of 67 participants met the eligibility criteria and provided consent to take part in the study. Four participants were unable to complete the full study activities due to having difficulties identifying mental imagery related to health catastrophising (n= 1) and positive future scenarios (n= 3). Therefore, 63 participants were included in the study, with 20 in the highly health anxious group, 22 in the OCD group, and 21 in the control sample. Majority of the participants in the highly health anxious (80%) and OCD group (63.6%) were recruited from the mental health charities and wider community.

Material

Short Health Anxiety Inventory (SHAI; Salkovskis et al., 2002)

The SHAI-is a 18-item self-reported measure of health anxiety. Items 1-14 assess worry about health and awareness of bodily sensations or changes to the body, whilst items 15-18 measure feared consequences of having an illness. Items are rated on a scale of 0 to 3, with a total sum of 54 and a cut-off score of 14 and above (on items 1-14) indicating severe health anxiety. The SHAI has good internal consistency (Cronbach α, 0.95) and test-retest reliability (r= 0.76) (Salkovskis et al., 2002). In this sample, the internal consistency was 0.95.

Obsessive Compulsive Inventory – Revised (OCI-R; Foa et al., 2002)

The OCI-R is a 18-item self-reported questionnaire that measures symptoms of OCD across 6 subscales including washing, checking, obsessing, neutralising, ordering, and hoarding. Items are rated on a scale of 0 to 4, with a total score ranging between 0 to 72. An optimal cut-of score of 21 or more differentiates between those with OCD and those without (Foa et al., 2002). The OCI-R has good internal consistency (Cronbach α = 0.90) and test-retest reliability (r = 0.82). In this sample, the internal consistency was 0.90.

Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001)

The PHQ-9 is a self-reported measure that consists of 9 items measuring symptoms of depression. Each item can be rated on a scale of 0 to 3 and has a total sum ranging from 0 to 27. The PHQ-9 has good internal consistency (alpha ranging from 0.86 - 0.89), and test re-test reliability (Cronbach α = 0.84) (Kroenke et al., 2001). In this sample, the internal consistency was 0.90.

Generalised Anxiety Disorder Questionnaire (GAD-7; Spitzer et al., 2006)

The GAD-7 is a 7-item self-reported measure of generalised anxiety. Items are rated on a scale of 0 to 3, with a total score ranging from 0 to 21. The GAD-7 has high internal consistency (Cronbach α = 0.92), and test-retest reliability (r = 0.83) (Spitzer et al., 2006). In this sample the internal consistency was also high (Cronbach α = 0.93).

Spontaneous Use of Mental Imagery Scale (SUIS; Reisberg et al., 2003)

The SUIS is a 12-item self-reported questionnaire that assess the spontaneous use of non-emotional mental imagery in daily life. Each item is rated on a scale of 1 to 5 resulting in a total score ranging from 12 to 60. The SUIS has an acceptable internal consistency (Cronbach α ranging from 0.72 – 0.76) (Nelis et al., 2019). In this sample, the internal consistency was 0.86.

The Illness Attitude Questionnaire (IAQ; Salkovskis, 1990)

This is a self-reported 30 item measure used to assess attitudes about illness, and it has two subscales including attitudes about health and anxiety about health. Lower mean scores indicate negative illness attitudes.

Visual Analogue Scales (VAS)

Visual Analogue Scales (VAS) anchored on a scale of 0 to 100 (0 representing not at all, and 100 representing extremely) were used to measure subjective anxiety, beliefs about threat perception (including estimated likelihood of the imagined event occurring, perceived awfulness, and ability to cope), and behavioural tendencies towards reassurance seeking and avoidance of mental image. VAS scales were also used to complete mental imagery manipulation checks (e.g., vividness of the image) and imagery characteristics (e.g., ease of image generation). The primary outcome variable was change in anxiety measured using the VAS, which was simply the response to the image minus the baseline rating.

Ethical Consideration

Full ethical approval was received from NHS Health Research Authority (HRA) and Health and Research Wales (HCRW) (IRAS 291384).

Recruitment

Participants from the IAPT services were invited by the researcher to take part in the study, and those recruited via mental health charities and the wider community responded to online advertisements. Some participants in the community were also recruited by word of mouth. Participants were screened against the eligibility criteria before providing informed consent. A suitable date and time was arranged to complete the study activities.

Study Activities

Study activities took place remotely due to the COVID-19 pandemic. On the day of the study participants first completed a package of questionnaires which included measures of demographics, SHAI, OCI-R, GAD-7, PHQ-9, IAQ, and SUIS. The mental imagery induction experimental procedure (Appendix J) involved the following parts:

Experimental Procedure Section 1: Mental Imagery Definition and Training. Mental imagery was defined to ensure that participants understood the distinction between mental imagery and verbal thoughts. The participants then took part in a neutral imagery induction task.

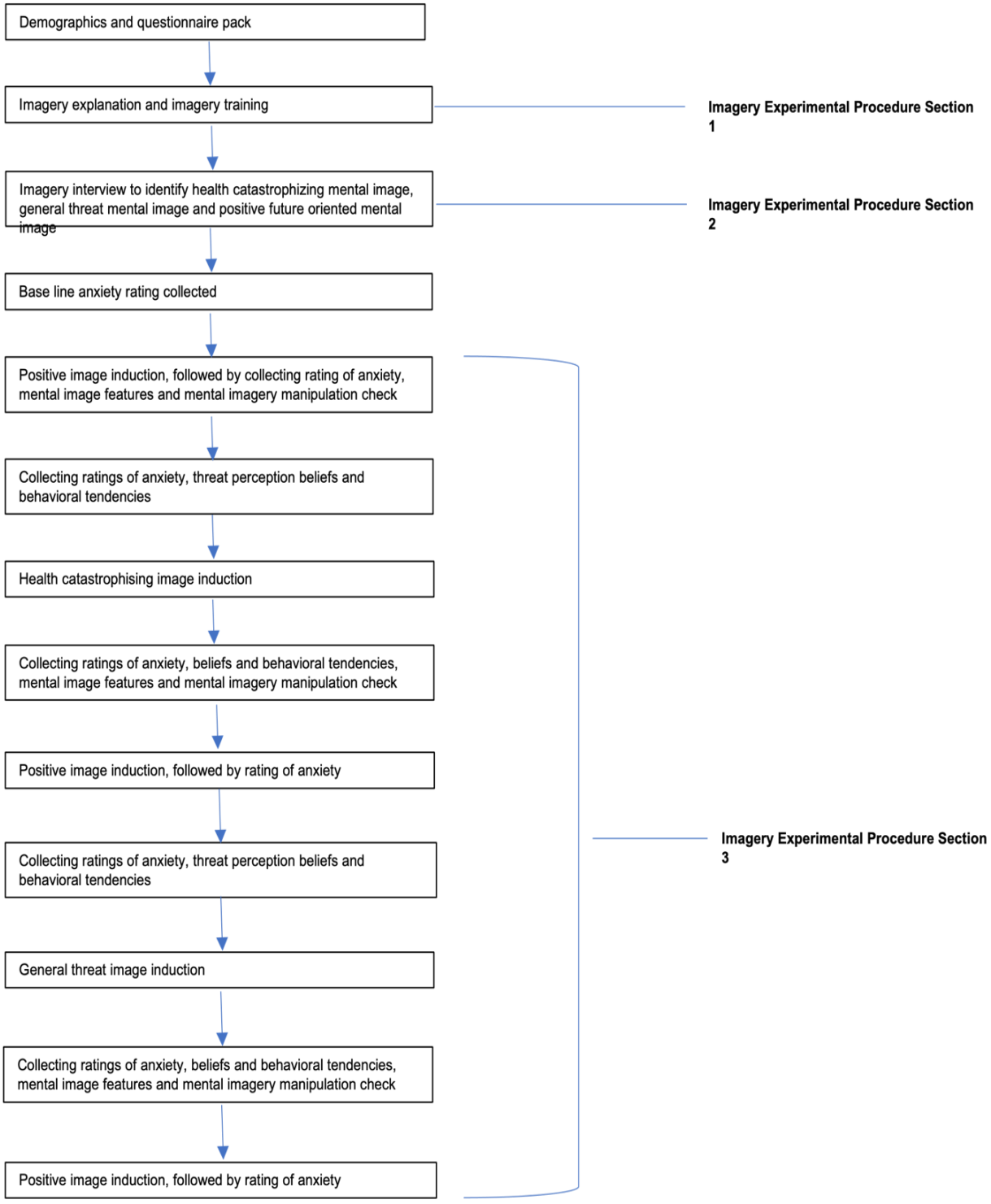
Experimental Procedure Section 2: Mental Imagery Interview. The mental imagery interview was adapted from previous imagery interviews (Hackmann et al., 2000; Hales et al., 2011) to identify the most distressing or important personally relevant health catastrophising and general threat mental images. When a participant reported to not having experienced such mental images, they were asked to create a mental image of their most feared illness and non-health related general worry. A positive future related mental image was also identified.

Experimental Procedure Section 3: Metal Imagery Induction Tasks. The mental imagery induction tasks included visualisation of each mental image for 60 seconds, during which prompting questions were asked to facilitate imagery induction (e.g., what do you see in your mind's eye, what do you hear, touch, smell, taste and feel). The imagery induction procedure involved: (a) positive mental image induction, (b) health catastrophising image induction, (c) positive image induction, (d) general threat image induction, (e) positive image induction. Before and after the health and general threat imagery inductions participants provided ratings for

anxiety, threat perception beliefs, and behavioural responses. Imagery manipulation checks were also completed following each image induction. All participants completed the procedure in the same order. Figure 1 displays the procedure of the study activities.

Figure 1

Imagery Experimental Procedure



Treatment of Data

A series of one-way analysis of variance (ANOVA; with LSD or Dunnett's T3 post hoc tests where the Levene's test indicated unequal variances between groups) were completed for the participants' characteristics, measures of psychopathology, and the imagery manipulation

checks. For the SHAI scores, the LSD was used for the comparison of the highly health anxious and OCD groups which met normality criteria and did not have unequal variances; however, the control group data were skewed and had unequal variances relative to the two clinical groups, so that comparisons used Dunnett's T3. Chi squared were performed for gender, ethnicity, education level, employment status, and relationship status. The comparison of group analysis for gender was ran without the categories of prefer not to say and other, and for education and employment level without the other category. Thus, for these statistics the Fisher-Freeman-Halton Exact test was used.

The mean change scores on self-reported ratings of anxiety, threat perception and behavioural tendencies were calculated using the following formula:
Self-reported rating during image induction – self-reported rated before the image induction.
Komongornov-Smirnov tests indicated this primary variable was normally distributed.

For changes in anxiety, threat perception (including likelihood of illness, perceived awfulness, and ability to cope), and changes in tendencies towards reassurance seeking and avoidance, separate 3X2 mixed model ANOVAs were completed with the participant group as the between-subject's variable (highly health anxious, OCD, control) and the image type as the within-subjects variable (health catastrophising, general threat). This was to examine characteristics of the induced mental imagery across groups.

When the 3X2 mixed model ANOVAs revealed significant interaction effects, simple main effects ANOVAs were carried out with appropriate multiple comparisons. In addition, a Pearson correlation for the changes to the anxiety (primary outcome measure) and severity of health anxiety (SHAI scores) was also carried out.

Results

Participant Characteristics

Table 1 displays the participant characteristics. A one-way ANOVA showed that the three groups did not significantly differ in terms of age, $F_{(2, 62)} = 0.96$, $p > 0.05$, and measure of general subjective use of imagery $F_{(2, 62)} = 1.66$, $p > 0.05$. The three groups were similar in terms of ratios of gender $X^2_{(2)} = 5.47$, $p > 0.05$, ethnicity $X^2_{(2)} = 1.28$, $p > 0.05$, relationship status $X^2_{(2)} = 0.34$, $p > 0.05$, and employment status $X^2_{(2)} = 1.61$, $p > 0.05$. However, the groups differed significantly on education level, $X^2_{(2)} = 6.10$, $p < 0.05$, with a smaller portion of the control group educated below university level, and a larger portion educated at university level or above.

Table 1

Participant Characteristics

	Highly health anxious group (n= 20)	**OCD group (n= 22)**	**Control group (n= 21)**	**Main effects of group**
Age	37.40 (11.24)	35.23 (13.98)	41.19 (16.90)	$F_{(2, 62)} = 0.96$, $p > 0.05$
SUIS	38.75 (10.19)	38.59 (7.82)	33.90 (11.15)	$F_{(2, 62)} = 1.66$, $p > 0.05$
Gender				$X^2_{(2)} = 5.47$, $p > 0.05$
Male	3	1	7	
Female	17	18	13	
Other	0	1	1	
Prefer not to say	0	2	2	
Ethnicity				$X^2_{(2)} = 1.28$, $p > 0.05$
Caucasian	12	16	12	
Non-Caucasian	8	6	9	
Relationship status				$X^2_{(2)} = 0.34$, $p > 0.05$
In relationship	12	15	13	
Single	8	7	8	
Education level				$X^2_{(2)} = 6.10$, $p < 0.05$
Below university level	7	5	1	
University level and above	12	15	19	
Other	1	2	1	
Employment				$X^2_{(2)} = 1.61$, $p > 0.05$
Employed or student	16	18	17	
Retired or unemployed	0	1	2	

Other	4	3	2	

Descriptive Psychopathology

One-way ANOVAs were completed for measures of psychopathology (Table 2). As expected, there were significant differences between groups on measures of SHAI, $F_{(2, 62)}$= 37.94, $p < 0.01$, OCI-R total, $F_{(2, 62)} = 36.81$, $p < 0.01$, PHQ-9, $F_{(2, 62)} = 5.83$, $p < 0.05$, GAD-7, $F_{(2, 62)} = 17.82$, $p < 0.01$, IAQ, $F_{(2, 62)} = 20.96$, $p < 0.01$, and general anxiety baseline, $F_{(2, 62)} = 4.58$, $p < 0.05$. Multiple comparisons indicated that the highly health anxious group scored significantly higher than the OCD and control group on the SHAI. The OCD group scored significantly higher than the highly health anxious and control group on the OCI-R. On measures of PHQ-9, GAD-7, and general anxiety baseline the two clinical groups were not significantly different from each other but as expected they scored significantly higher than the control group. The highly health anxious group scored significantly lower than the OCD and control groups on the IAQ, whilst the OCD group also had significantly lower score than the control group on this measure.

Table 2

Measures of Descriptive Psychopathology

	Highly health anxious group (n= 20)	**OCD group (n= 22)**	**Control group (n= 21)**	**Main effect of group**
S-HAI	22.75 (6.97) [a]	17.91 (6.38)[b]	7.52 (3.14)[c]	$F_{(2, 62)}$= 37.94, $p < 0.01$
OCI-R (Total)	16.45 (7.39)[a]	29.68 (9.96)[b]	8.33 (6.92)[c]	$F_{(2, 62)} = 36.81$, $p < 0.01$
Hoarding	3.30 (2.90)	4.59 (4.06)	2.43 (2.29)	$F_{(2, 62)}$= 2.51, $p > 0.05$
Checking	2.70 (1.87)[a]	5.09 (2.20)[b]	1.52 (1.94)[a]	$F_{(2, 62)}$= 17.57, $p < 0.05$
Ordering	2.30 (1.98)[a]	4.18 (2.81)[b]	1.90 (1.97)[a]	$F_{(2, 62)}$= 6.03, $p < 0.05$
Neutralising	1.15 (1.81)	2.55 (2.32)[a]	0.52 (1.36)[b]	$F_{(2, 62)}$= 6.50, $p < 0.05$

Washing	2.10 (2.43)[a]	5.09 (3.77)[b]	0.76 (0.10)[a]	$F_{(2, 62)}$= 14.78, $p < 0.01$
Obsession	4.90 (2.86)[a]	8.18 (2.87)[b]	1.19 (1.47)[c]	$F_{(2, 62)}$= 42.34, $p < 0.01$
PHQ-9	8.15 (6.17)[a]	9.73 (6.50)[a]	3.90 (4.35)[b]	$F_{(2, 62)} = 5.83$, $p < 0.05$
GAD-7	9.70 (4.28)[a]	10.95 (6.10)[a]	2.90 (3.22)[b]	$F_{(2, 62)} = 17.82$, $p < 0.01$
IAQ Total	3.67 (0.70)[a]	4.26 (0.81)[b]	6.13 (0.66)[c]	$F_{(2, 62)} = 20.96$, $p < 0.01$
Health Subscale Anxiety	3.62 (0.76)[a]	4.31 (0.85)[b]	5.06 (0.69)[c]	$F_{(2, 62)} = 18.01$, $p < 0.01$
Subscale	3.78 (0.79)[a]	4.13 (1.16)[a]	5.29 (0.83)[b]	$F_{(2, 62)} = 14.33$, $p < 0.01$
General anxiety baseline	39.25 (23.36)[a]	39.09 (21.30)[a]	21.19 (22.07)[b]	$F_{(2, 62)} = 4.58$, $p < 0.05$
Mean change during the health catastrophising image induction				
Anxiety	64.05 (24.49)[a]	46.95 (30.02)[b]	26.19 (27.11)[c]	$F_{(2, 62)} = 9.84$, $p < 0.01$
Estimated likelihood	7.25 (14.64)	6.82 (18.74)	7.14 (28.40)	
Awfulness	8.45 (18.02)	10.36 (14.07)	16.67 (31.75)	
Ability to cope	6.00 (15.61)	12.27 (21.53)	2.14 (19.40)	
Reassurance seeking	8.75 (34.75)	19.00 (24.42)	4.76 (21.99)	
Avoidance	21.00 (30.89)	21.59 (30.45)	20.48 (44.52)	
Mean change during the general threat image induction				
Anxiety	51.15 (24.41)	51.77 (26.81)	46.81 (31.20)	$F_{(2, 62)} = 0.20$, $p > 0.05$
Estimated likelihood	12.50 (26.23)	10.23 (21.46)	5.52 (23.54)	
Awfulness	10.75 (23.24)	3.68 (26.37)	15.23 (27.13)	
Ability to cope	2.00 (14.90)	8.86 (17.92)	-3.00 (20.49)	
Reassurance seeking	19.00 (36.73)	17.95 (25.20)	10.62 (26.78)	
Avoidance	11.45 (34.88)	22.73 (27.50)	21.67 (42.93)	
Baselines for pre health catastrophising image induction				
Anxiety	10.50 (12.66)	18.68 (16.14)[a]	4.28 (8.11)[b]	$F_{(2, 62)} = 6.85$, $p < 0.05$
Estimated likelihood	59.00 (24.90)[a]	47.95 (25.71)[a]	29.29 (27.90)[b]	$F_{(2, 62)} = 6.76$, $p < 0.05$
Awfulness	80.25 (19.90)[a]	65.23 (27.41)[a]	36.90 (27.13)[b]	$F_{(2, 62)} = 15.77$, $p < 0.01$
Ability to cope	63.25 (29.08)[a]	51.36 (25.41)[a]	20.71 (22.15)[b]	$F_{(2, 62)} = 15.17$, $p < 0.01$
Reassurance seeking	40.75 (28.16)[a]	30.82 (27.16)[a]	5.00 (7.75)[b]	$F_{(2, 62)} = 13.32$, $p < 0.01$
Avoidance	56.25 (37.38)[a]	41.36 (35.50)[a]	10.24 (22.50)[b]	$F_{(2, 62)} = 10.82$, $p < 0.01$
Baselines for pre general threat image induction				
Anxiety				
Estimated likelihood	15.35 (11.85)[a]	19.55 (15.95)[a]	5.81 (11.82)[b]	$F_{(2, 62)} = 5.87$, $p < 0.05$
Awfulness	44.00 (27.08)	58.18 (24.57)	39.14 (30.71)	$F_{(2, 62)} = 2.79$, $p > 0.05$
Ability to cope	71.25 (27.19)	77.00 (29.31)	61.81 (29.68)	$F_{(2, 62)} = 1.52$, $p > 0.05$
Reassurance seeking	56.75 (32.82)	71.60 (28.26)[a]	39.76 (31.08)[b]	$F_{(2, 62)} = 5.78$, $p < 0.05$
Avoidance	34.25 (34.23)	34.55 (27.38)	23.67 (31.26)	$F_{(2, 62)} = 0.84$, $p > 0.05$
	66.00 (34.24)[a]	59.09 (32.46)[b]	27.62 (31.80)[c]	$F_{(2, 62)} = 8.08$, $p < 0.01$

Shared superscripts indicate no significant difference between groups based on LSD / Dunnett's T3 (significance > 0.05)

Imagery Induction Characteristics

Several ratings of the characteristics of the imagery during the induction were completed (Table 3). The most important of these was the rating of image vividness, and a one-way ANOVA indicated that there were no main effects of group during the health catastrophising

image induction, $F_{(2, 62)} = 1.10$, $p > 0.05$, and the general threat image induction, $F_{(2, 62)} = 0.42$, $p > 0.05$.

Table 3

Imagery Induction Characteristics

	Highly health anxious group (n= 20)	**OCD group (n= 22)**	**Control group (n= 21)**	**Main effect of group**
Image vividness				
Health catastrophising Image	76.80 (17.70)	81.59 (16.93)	71.19 (16.58)	$F_{(2, 62)} = 1.10$, $p > 0.05$
General threat Image	80.00 (15.56)	79.09 (15.48)	75.71 (16.83)	$F_{(2, 62)} = 0.42$, $p > 0.05$
Ease of image generation				
Health catastrophising Image	75.75 (22.38)	77.14 (23.43)	70.81 (25.06)	$F_{(2, 62)} = 0.43$, $p > 0.05$
General threat Image	80.00 (24.01)	81.00 (17.85)	76.05 (22.98)	$F_{(2, 62)} = 0.31$, $p > 0.05$
Ease of holding image in mind				
Health catastrophising Image	65.50 (28.09)	75.09 (24.45)	68.19 (28.17)	$F_{(2, 62)} = 0.72$, $p > 0.05$
General threat Image	76.00 (21.92)	73.18 (19.85)	62.86 (26.48)	$F_{(2, 62)} = 1.90$, $p > 0.05$
Image realness				
Health catastrophising Image	74.30 (23.67) [a]	76.82 (20.56)[a]	48.81 (31.66)[b]	$F_{(2, 62)} = 7.68$, $p < 0.01$
General threat Image	76.75 (23.19)	75.00 (19.40)	60.95 (29.52)	$F_{(2, 62)} = 2.64$, $p > 0.05$

Primary Outcome Variable: the Effect of Mental Imagery Induction on Anxiety

A mixed model ANOVA for participant group (highly health anxious, OCD, and control) and image type (health catastrophising image, and general threat image) showed no significant main effect for image type $F_{(1,60)} = 1.36$, $p > 0.05$ and a significant main effect for participant

group $F_{(2, 60)} = 4.19$, $p < 0.02$. This was modified by a significant interaction between image type and the participant group $F_{(2, 60)} = 7.13$, $p < 0.05$ (this interaction is shown in figure 2). Simple main effects ANOVAs for each image type indicated a significant main effect of group in the health catastrophising image induction $F_{(2,62)} = 9.94$, $p < 0.01$, (HA mean change in anxiety = 64.05, SD = 24.49; OCD mean change in anxiety = 46.95, SD = 30.02, control mean change in anxiety = 26.19, SD = 27.11). The main effect of group was not significant for the general threat image $F_{(2, 62)} = 0.20$, $p > 0.05$ (HA mean change in anxiety = 51.15, SD = 24.41, OCD mean change in anxiety = 51.77, SD = 26.81; control mean change in anxiety = 46.81, SD = 31.20). Multiple comparison showed that the mean change in anxiety following the health catastrophising image induction was significantly greater in the highly health anxious group than in the OCD ($p < 0.05$) and the control ($p < 0.01$). The mean change in anxiety for the OCD group was also higher than that in the control group ($p < 0.05$).

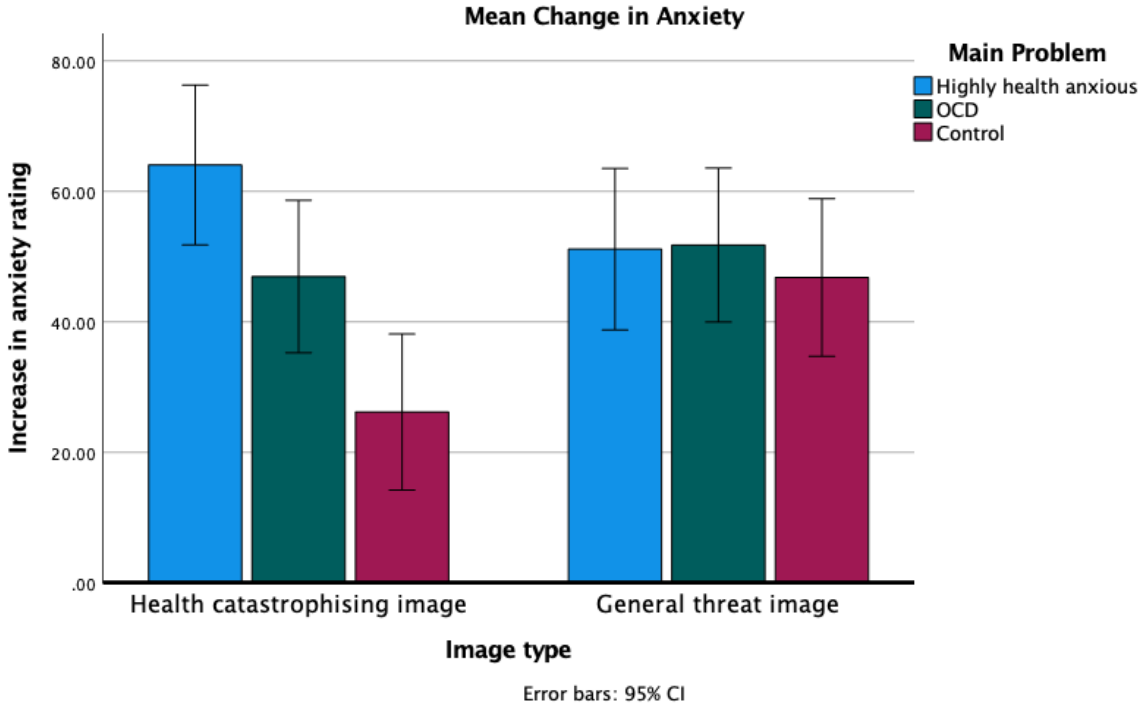
A mixed model ANOVA for participant group (highly health anxious, OCD, and control) and image type (health catastrophising image, and general threat image) was carried out for the baseline anxiety before each image induction. There was no significant main effect of image type $F_{(1,60)} = 3.52$, $p > 0.05$ or interaction $F_{(2, 60)} = 0.90$, $p > 0.05$ but there was a significant effect of participant group $F_{(2, 60)} = 7.3$, $p < 0.01$. Multiple comparisons indicated that the anxiety baselines for the two image inductions did not significantly differ in the highly health anxious and OCD groups ($p > 0.05$), but the two clinical groups had significantly higher baseline ratings that the control group ($p < 0.05$).

Given the high SHAI scores for the OCD group, the correlation between SHAI scores and the anxiety response to the health catastrophising image was calculated; this gave $r_{(63)} = 0.43$, $p < 0.01$. By contrast, the correlation between the SHAI and anxiety response to the general threat image was not significant, $r_{(63)} = -0.04$, $p > 0.05$. A partial correlation for the SHAI total

and the anxiety response to the health catastrophising image controlling for OCI-R total did not impact: $r_{(60)} = 0.42$, $p < 0.01$.

Figure 2

The Effects of Mental Imagery on Increase in Anxiety



The Effect of Mental Imagery Induction on Threat Appraisals

Separate mixed ANOVAs were performed for the mean change in estimated likelihood of the imagined event occurring, awfulness of the imagined event, and the ability to cope. In term of estimated likelihood there was no significant main effect of image type $F_{(1, 60)} = 0.33$, $p > 0.05$ and group $F_{(2, 60)} = 0.26$, $p > 0.05$, nor an interaction $F_{(2, 60)} = 0.25$, $p > 0.05$. Similarly for perceived awfulness there was no significant effect of image type $F_{(1, 60)} = 0.22$, $p > 0.05$, and group $F_{(2, 60)} = 1.42$, $p > 0.05$, or interaction $F_{(2, 60)} = 0.40$, $p > 0.05$. For ability to cope there was

no significant effect of image type $F_{(1, 60)} = 1.81$, $p > 0.01$ or significant interaction $F_{(2, 60)} = 0.03$, $p > 0.05$ but a significant effect of group $F_{(2, 60)} = 3.44$, $p < 0.05$.

The Effect of Mental Imagery on Urges to Seek Reassurance or Avoid

Mixed ANOVAs were performed, and for mean change in the urge to seek reassurance there was no significant effect of image type $F_{(1, 60)} = 1.10$, $p > 0.05$, or interaction $F_{(2, 60)} = 0.50$, $p > 0.05$, nor a significant effect of group $F_{(2, 60)} = 1.37$, $p > 0.05$. *For* the mean change in avoiding the mental image there was no significant effect of image type $F_{(1, 60)} = 0.17$, $p > 0.05$, or interaction $F_{(2, 60)} = 0.35$, $p > 0.05$. There was also no significant effect of group $F_{(2, 60)} = 0.29$, $p > 0.05$.

Discussion

This study tested the hypothesis that mental imagery with a health catastrophising focus would not only produce a greater increase in anxiety in highly health anxious individuals than in healthy controls and OCD as a clinical control group, but also that this would be specific to health relevant mental images as opposed to general threat images. That primary prediction was upheld. The data did not support the secondary hypothesis, *viz*, that similar patterns of specificity would be found for threat perception in relation to the image, partitioned into likelihood of illness, perceived awfulness, and ability to cope. There was also no evidence for specificity in urges to seek reassurance and avoid in response to imagery induction.

The results showed that compared to the general threat mental image and the OCD and control groups, when highly health anxious individuals held in mind health catastrophising mental imagery their anxiety showed a significant increase relative to general threat imagery. This finding was broadly consistent with the cognitive behavioural theory of health anxiety

(Salkovskis & Warwick, 2001; Warwick & Salkovskis, 1990) and previous research, in that mental imagery related to health concerns can produce significant levels of anxiety (Benke et al., 2022; Muse et al., 2010). The inclusion of comparator groups extended previous findings, as it suggested that the effects of health catastrophising mental imagery was specific and not due to general or trait sensitivity to anxiety and imagery abilities, as there were no significant effects of groups for these variables.

The study did not find differences in terms of increases in hypothesised mechanisms maintaining health anxiety, including perceived probability of illness occurring, awfulness of illness, ability to cope, and behavioural tendencies towards reassurance seeking and avoidance. The overall levels are high, consistent with the previous observation that highly health anxious individuals respond to intrusive health catastrophising mental imagery by engaging in reassurance seeking, avoidance, and distraction (Muse et al., 2010). There was no evidence of specificity however, and previous studies have simply considered the response to negative health imagery without a health focus. One previous study reported correlational data; that is, increased avoidance in response to COVID-19 illness imagery was positively correlated with scores on the modified SHAI but not for general threat imagery (Benke et al., 2022). The current study found relatively small changes in threat appraisals and behavioural tendencies in response to the health catastrophising mental imagery, but with a very high initial baseline (and significantly higher than the non-clinical group). For example, the highly health anxious group had a mean score of 80 out of 100 for awfulness and 63.25 out of 100 for ability to cope. It is therefore possible that changes in these variables were not found due to ceiling effect, and thus the use of the VAS is recognised as a key limitation of this study. It may also be that such responses generally occur in relation to general catastrophising imagery, which in the present study produced significant increases in anxiety in the OCD group.

Other limitations include a relatively small sample size consisting of primarily females and not using a diagnostic interview to confirm severe health anxiety and OCD. In addition, the health anxiety group had relatively high scores in the OCI-R total and the OCD group had scored highly on the SHAI. Although the participants identified their main problem as either HA or OCD, some individuals may have had difficulties with both problems. However, in terms of the observed effects of health catastrophising mental imagery on increased anxiety, we noted that the OCI-R did not account for the substantial correlation between increase in anxiety and the SHAI scores.

Extension and replication of the current study is required to investigate the effects of mental imagery on threat appraisals and behavioural responses. In future experimental studies the addition of clinically relevant mental images for other anxiety disorders such as OCD would provide further knowledge about the effects of mental imagery on symptoms and maintenance of anxiety disorders. The findings of this study have suggested that health catastrophising mental imagery was prominent and directly induced high levels of anxiety in highly health anxious individuals. Imagery rescripting might be used to identify and directly target the meaning of distressing health related mental images (Salkovskis et al., 2003).

Conclusion

Mental imagery with a health catastrophising focus induced anxiety to a greater extent in highly health anxious group than in anxious controls, and differences were greater than for a general threat image, suggesting that the image type was important. There were no specific effects of health catastrophising mental imagery on threat appraisals and behavioural responses,

although high initial levels and increases were noted for both groups with both types of imagery. The findings can be used to further enhance psychological treatment for health anxiety.

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Executive Summary

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Investigating the Role of Mental Imagery in Health Anxiety

Why was the study conducted?

Anxiety about health at some point in the lifespan is a common experience. However, for some people their anxiety becomes severe and remains, even when they are given medical reassurance. Therefore, persistent and severe anxiety about health can lead to a diagnosis of health anxiety, also known as illness anxiety disorder, resulting in significant distress and negatively impacting daily functioning. The cognitive behavioural model for CBT has suggested that health anxiety persists as the individual experiences unhelpful thoughts and beliefs about health and illness, which causes anxiety about having a serious illness (Salkovskis & Warwick, 2001; Warwick & Salkovskis, 1990). It has also been suggested that the individual can experience these thoughts in the form of mental images, which can further impact on their anxiety.

Mental images refer to thoughts that take place in the format of pictures and they can be multisensory in nature. Research has showed the mental images can cause stronger emotional responses than verbal thoughts (Holmes & Mathews, 2005). Therefore, mental imagery is important in understanding emotional disorders such as health anxiety. Research has shown that individuals with anxiety disorders, including health anxiety and obsessional compulsive disorder (OCD) experience unwanted negative mental images (Muse et al., 2010; Speckens et al., 2007).

Individuals with health anxiety experience mental images about health and illness scenarios, and these images cause anxiety (Muse et al., 2010). In addition, individuals respond to such mental images by engaging in behaviours that may maintain health anxiety, such as excessive bodily checks, reassurance seeking and avoidance (Muse et al., 2010).

Missing from the current research are experimental studies that explore whether such mental images directly increase anxiety, and impact on the beliefs about perceived threats and behavioural responses that are believed to maintain health anxiety. Therefore, this study aimed to investigate whether mental images centred on themes of health catastrophising would increase anxiety, perception about threat, and behavioural responses such as reassurance seeking and avoidance. It also aimed to understand whether such responses are specific to health anxiety. This is important as it will add to the current understanding of the role of mental images in health anxiety and can inform psychological treatment for supporting individuals with health anxiety.

What the study involved

Sixty-three participants were recruited from local NHS mental services, mental health charities and the wider community. The participants self-identified as having either health anxiety, difficulties with OCD nor having neither difficulty and not currently seeking mental health support. The study consisted of completing questionnaires related to anxiety and mood and an experimental task which involved bringing to mind a personally relevant health catastrophising mental image and a personally relevant general threat image. Before and after thinking about each mental image, the participants rated their levels of anxiety, perceived threat perceptions (including perceived awfulness, likelihood of imagined event happening, and ability to cope), and behavioural tendencies towards reassurance seeking and avoidance. After thinking about each image, the participants were also guided to bring to mind a positive image.

What the study found

Mental imagery with a health catastrophising focus, significantly increased anxiety in individuals with health anxiety, compared to individuals with OCD or those with neither

difficulty. This response was not found for the general threat mental image. Additionally, the increase in anxiety following the health catastrophising image was related to severity of health anxiety, meaning the higher health anxiety the greater the increase in anxiety following the health mental image. However, this pattern was not found for the general threat mental image.

There were no differences between groups and between mental images for responses in perceived threat and behavioural tendencies.

Conclusions

Health catastrophising mental images increase anxiety in individuals with high health anxiety and this response is specific to health anxiety.

What were the limitations

The limitations of this study included a small sample size consisting of mainly females. Self-identification with having health anxiety or OCD was confirmed using standardised questionnaires instead of diagnostic assessment tools. The OCD group in this sample also had relatively high scores on measures of health anxiety. It is possible that in this study changes on the measures were not sensitive to capturing any more subtle changes in perceived threat perceptions and behavioural responses given that the pre-mental imagery scores on these factors were already high.

What are the implications for clinical practice and research?

This study has shown that mental imagery with a health catastrophising focus is important in health anxiety as it results in increased anxiety among highly health anxious individuals. This knowledge can be used to further improve psychological interventions for health anxiety by including mental imagery techniques. This study has extended previous

research by showing that health catastrophising mental imagery increases anxiety in health anxious individuals more than general threat mental imagery, and that this response was specific to this group only.

Connecting Narrative

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When starting clinical training I felt excited and daunted by the idea of completing a research portfolio. Although I have always been interested in research, prior to clinical psychology training I had minimal experience in designing, completing, and disseminating research. It was important to me that I chose areas that were of interest and passion to me as I wanted to use the opportunity to start my 'career' in research in clinical psychology. When choosing topics for my research questions, I reflected on my clinical practice to inform my interests. I wanted all my three projects to directly answer questions around the themes of 'how can we further improve current clinical practice'. Although each of my research projects has focused on different areas and methodologies, the question of directly improving clinical practice is the link across all three research projects.

Systematic Review of Literature

I remember feeling overwhelmed when developing the questions for each research project. However, I remember that I found developing the question for my systematic review of the literature the most difficult. The process of 'choosing' an area of research to systematically review felt like a big and important task. I also found that narrowing down my interest in anxiety disorders to a topic and question of research was a much longer process than initially anticipated. Reading systematic reviews in areas of interest was helpful in guiding me to think more creatively about my own project. I found this project to be the most difficult to complete as I was learning the process of a how to systematically review research and yet completing and writing up the project simultaneously. Although it has been challenging, looking back I realise that this project has supported me to develop my research skills in critically reviewing literature and make conclusions about a group of research studies.

Service Improvement Project

I have found the process of designing the research projects to be the most exciting part of all my projects. Designing my service improvement project was particularly enjoyable as it involved several consultations with service users and the service itself. This project has helped me further understand the value of involving stakeholders in designing and implementing research from the bottom-up. The process of designing the questionnaire involved integration of the literature, the aims of the service, and feedback from the service users involved. It was important to me that this research was meaningful to the service and the findings could be used to implement feasible improvements. I was very pleased by the positive response from the service in deciding to implement the recommendations.

What I found most surprising in this project was the challenge associated with data collection. Some problems were not anticipated during the design of the project, one of these being that the service was only identifying a small proportion of carers. Therefore, to overcome issues related to data collection, I had to think creatively with my supervisors and the service leads. From this I have learned that not all problems can be identified at the design stage, and the process of trial and error is also valuable in informing findings and shaping future research designs. Had I had more time, I would have liked to also collect qualitative data to further enhance and enrich the findings from this study.

Theoretically Driven Research Project

The themes of ethical consideration and recruitment are key in any research project. The process of developing an experimental study that was ethically sound involved reading extensive literature, supervision, discussion with experts in imagery in clinical practice and research and piloting the procedure. Therefore, designing the experimental procedure for this project was

initially overwhelming but also a great learning opportunity. When designing the project, I had anticipated that recruitment and data collection was going to be challenging. I remember I was concerned that there would be less interest from participants to take part in experimental studies compared to say questionnaire studies. However, I was pleasantly surprised by the interest that my participants showed in contributing to research. I was grateful that I could recruit potential participants from the local IAPT services and during the process I became more aware of the value of NHS services in participating in research. Networking with the mental health charities was incredibly important, and an aspect that I very much enjoyed.

Although the process of recruitment was challenging, slow and uncertain, I have found it to be the most enjoyable aspect of the project. Upon reflection I realise that this is due to the nature of completing research that involved meeting with the participants. Throughout the project I received verbal and written feedback from the participants who expressed that participation in my research had helped them further understand the role of mental imagery in their emotional reactions. Some also expressed that they felt validated that they were asked about their experiences of mental imagery in relation to their future worries.

Hopes for continued involvement in research

Completing three research projects alongside clinical and placement demands during a global pandemic has been challenging. I am extremely proud of my work and my development in research skills including designing, applying for ethical approval, recruitment, and data collection, analysis and write up. I am hoping to publish all my research projects as peer reviewed journal articles and disseminate the findings to the participating NHS services, mental health charities, and all those in the community who participated in my research. I am hoping to

continue research in clinical psychology and contribute to further improving NHS services and clinical practice.

Acknowledgements

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I would like to thank my course tutor, Dr Myra Cooper, for her continuous support, words of encouragement, reflective conversations, and enthusiasm. I am so grateful for her kindness, genuine interest for my professional development, and always giving me time.

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I would like to offer my special thanks to the participants and service users who took time to take part in my research. Without them none of this would have been possible. I would

also like to thank the mental health charities and all those in the community who helped me advertise my research and supported recruitment for my theoretically driven research project.

I would like to express my thanks to my clinical supervisors for supporting my professional development over the past three years. I am grateful for their support, words of encouragement, advice, helpful feedback, and guidance.

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I would like to thank my family and friends for their support and encouragement during the past three years. I am grateful to my parents, Sohaila and Jalal for always believing in me, supporting me, and encouraging me to pursue my dreams. Thank you to my siblings, Alan, Sara, and Tara for being my biggest inspirations. I would especially like to thank my partner, Ramin for being by my side on this journey, believing in me, and helping me stay grounded. I could not have done this without him.

Appendices

Appendix A: Systematic Review - Data Extraction Tool for Study Characteristics

Study code	**Authors**	**Publication year and country**	**Study design**	**Participants** **1. Sample Size** **2. Female %** **3. Age M (SD)** **4. Population**	**Groups** **1. VF Interventions** **2. None VF comparators** **3. Participants**	**Format**	**Outcomes measured***
A	Chen, J.; McLean, J.E.; Kemps, E.	2018 Australia	Within-between subjects	1. 140 2. 75.7 3. 22.59 (6.57) 4. Non-clinical	1. CP+VF; CP+VF+CR; CP+VF+CR+AF 2. EXP	1-1	SAR; PSP; PCNE
B	(Warnock-Parkes et al., 2017)	2017	Within subjects	1. 47 2. 49 3. 32 (8.82) 4. Clinical	1. CP+VF	1-1	LSAS-SR; Self-reported rating of observable anxiety; feared social outcome; self-rating of performance
C	(Chen et al., 2015)	2015 United States	Within-between subjects	1. 421 2. 51.2 3. 19.7 (1.4) 4. Non-clinical	1. CP+VF CP+VF+AF VF 2. AF	1-1	SAR; msPRS; CBS

D	(Laposa & Rector, 2014)	2014 Canada	Within subjects	1. 93 2. 47 3. 36.54 (12.41) 4. Clinical	1. CP+VF	Group	SAR; Self rating of performance; ASC; FAQ
E	(Kanai et al., 2011)	2011 Japan	Within-between subjects	1. 25 2. 72 3. 19.6 (1.3) 4. Non-clinical	1. CP+VF+AF 2. EXP	1-1	SAR; Self-reported rating of observable anxiety; self-reported rating of fear of negative evaluation
F	(Rodebaugh et al., 2010)	2010 United states	Within-between subjects	1. 26 2. 38.4 3. 31.50 (10.90) 4. Clinical	1. CP+VF 2. EXP	1-1	BSAM; SPQ
G	(Orr & Moscovitch, 2010)	2010 Canada	Within-between subjects	1. 68 2. 51.5 3. 17-35* 4. Non-clinical	1. CP+VF; CP+VF +CR 2. EXP	1-1	PSP; SAR
H	(Chen et al., 2010)	2010 Japan	Within subjects	1. 52 2. 40.4 3. 31.3 (10.1) 4. Clinical	1. CP+VF+AF	Group	Self-reported performance rating; Feared outcome rating; mSPRS; AAR
I	(Furukawa et al., 2009)	2009 Japan	Within subjects	1. 45 2. 53.3 3. 18-52* 4. Clinical	1. CP+VF	Group	Self-reported observable anxiety; Self-reported performance rating; Self-reported feared outcome

J	(McManus et al., 2009)	2009 United Kingdom	Within subjects	1. 34 2. 44.1 3. 31.3 (-) 4. Clinical	1. CP+VF	1-1	Self-reported observable anxiety rating, Self-reported performance rating, Self-reported feared social outcome, SPWSS
K	(Smits et al., 2006)	2006 United States	Within-between subjects	1. 77 2. 57 3. 18-51* 4. Non-clinical	1. VF+CP; VF+AR 2. EXP	1-1	LSAS-SR
L	(Rodebaugh & Rapee, 2005)	2005 Australia	Within subjects	1. 87 2. 80.5 3. 22.46 (8.77) 4. Non-clinical	1. VF	1-1	PSP
M	(Rodebaugh, 2004)	2004 United states	Within-between subjects	1. 95 2. 66.3 3. NR 4. Non-clinical	1. CP+VF; NP+VF	1-1	BSAM; PSP
N	(Harvey et al., 2000)	2000 United Kingdom	Within-between subjects	1. 74 2. 73 3. 18.94 (0.7); 20.80 (7.14); 19.06 (0.66); 20.55 (6.01) 4. Non-Clinical	1. CP+VF; VF 2. - 3. Cognitive preparation / high social anxious; No cognitive preparation / high social anxious; Cognitive preparation / low social anxious; No cognitive preparation / low social anxious	1-1	Self-reported rating of coming across well; self-reported performance rating, behaviour composite score
O	(Rapee & Hayman, 1996)	1996 Australia	Study 2 Within subjects	4. 62 5. 85.5 6. 22.8 (8.6) 7. Non-clinical	1. VF 2. - 3. High social anxiety; low social anxiety	1-1	Measure of public speaking performance Self-reported rating of performance; SAR

			Study3 within-between subjects	1. 40 2. 75	1. VF 2. EXP	1-1	PSP
P	(Rodebaugh & Chambless, 2002)	2002 United States	Within-between subjects	1. 90 2. 66.7 3. NR 4. Non-clinical	VF VF of non-social task EXP	1-1	SEQ – coming across well SEQ- Behaviour composite
Q	(Kim et al., 2002)	2002 Sweden	Within-between subjects	1. 40 2. 85 3. 27.95 (6.90) 4. Non-clinical	CP+VF VF	1-1	SEQ – coming across well SEQ- Behaviour composite

Appendix B: Systematic Review – Data Extraction Tool for Results

Study Code	Outcomes measured	Pre M (SD) Cohen's d	Post M (SD) Cohen's d	Follow-up M (SD) Cohen's d	Key findings
Study A	SAR	CP+VF 27.20 (9.28) CP+VF+CR 26.63 (8.78) CP+VF+CR+AF 25.40 (9.06) EXP 29.03 (8.54)	CP+VF 23.94 (9.87) CP+VF+CR 19.86 (10.02) CP+VF+CR+AF 12.43 (9.25) EXP 25.77 (10.26)	CP+VF 23.03 (11.27) CP+VF+CR 22.14 (9.13) CP+VF+CR+AF 13.83 (8.62) EXP 24.70 (10.24)	Significant improvement post intervention and at follow-up for those who received CP+VF+CR+AF than the other groups. No other significant findings for other group comparisons
	PSP	CP+VF 27.49(11.31) CP+VF+CR 25.63 (9.25) CP+VF+CR+AF 26.57 (10.61) EXP 25.97(7.65)	CP+VF 35.83 (9.98) CP+VF+CR 34.82 (7.53) CP+VF+CR+AF 50.34 (9.12) EXP 29.04 (9.12)	CP+VF 39.54 (10.41) CP+VF+CR 39.06 (9.66) CP+VF+CR+AF 47.14 (10.74) EXP 35.43 (9.89)	Significant improvement post intervention and at follow-up for those who received CP+VF+CR+AF than all other conditions. Significant improvement post intervention for CP+VF+CR and CP+VF than EXP, but this pattern was not found at follow-up
	PCNE	CP+VF 18.77 (5.38) CP+VF+CR	CP+VF 15.89 (6.10) CP+VF+CR	CP+VF 15.40 (7.41) CP+VF+CR	Significant improvement post intervention and at follow-up for those who received CP+VF+CR+AF than all other conditions.

		18.14 (6.32) CP+VF+CR+AF 17.97 (6.19) EXP 17.37 (5.19)	14.43 (6.01) CP+VF+CR+AF 6.91 (5.93) EXP 16.69 (5.24)	13.49 (6.87) CP+VF+CR+AF 8.20 (6.24) EXP 15.54 (5.87)	
Study B	LSAS-SR	73.47 (20.85)	65.45 (22.74)	-	Significant reduction in LSAS scores between session 3 (Pre intervention) and session 4 (post intervention)
	Self-rating of performance	53.16 (13.75)	75.91 (14.65)	-	Significant improvement pre-post intervention
	Feared social outcome rating	47.99 (14.12)	14.60 (14.60)	-	Significant improvement pre-post intervention
	Self-rating of observable anxiety	55.14 (16.73)	22.89 (18.35)	-	Significant improvement pre-post intervention
Study C	SAR	CP+VF 62.27 (14.89) CP+VF+AF 72.00 (12.93) AF 74.00 (15.78) VF 72.00 (17.51)	CP+VF 64.55 (21.15) CP+VF+AF 41.00 (11.00) AF 50.00 (22.11) VF 63.00 (24.18)		Significant improvement in pre-post intervention in those who reived CP+VF+AF than those who received CP+VF or EXP. Significant improvement in pre-post intervention in those who reived AF than those who received CP+VF or EXP.
	msPRS	CP+VF 17.64 (4.65) CP+VF+AF 18.80 (2.74) AF 16.30 (1.77) Control	CP+VF 16.18 (4.58) CP+VF+AF 24.70 (3.83) AF 20.90 (3.63) Control		Significant improvement in pre-post intervention in those who reived CP+VF+AF than those who received CP+VF or EXP. Significant improvement in pre-post intervention in those who reived AF than those who received CP+VF or EXP.

		16.80 (2.97)	15.40 (3.53)		
	CBS	CP+VF 34.55 (9.08) CP+VF+AF 37.60 (7.82) AF 34.50 (6.77) Control 39.80 (4.56)	CP+VF 29.23 (12.14) CP+VF+AF 23.10 (6.56) AF 23.10 (6.67) Control 33.80 (7.93)		Significant improvement in pre-post intervention in those who reived CP+VF+AF than those who received CP+VF or EXP. Significant improvement in pre-post intervention in those who reived AF than those who received CP+VF.
D	SAR	First taping 73.16 (16.95) Second taping 70.44 (13.54)	First taping 47.77 (25.19) Second taping 42.43 (21.88)		Significant improvement in pre-post intervention for both first and second VF taping
	Self-rating of performance	First taping 6.59 (2.12) Second taping 7.22 (2.19)	First taping 8.63 (2.69) Second taping 9.10 (2.35)		Significant improvement in pre-post intervention for both first and second VF taping
	ASC – NE	First taping 345.13 (193.65) Second taping 260.46 (177.24)	First taping 247.76 (177.11) Second taping 208.08 (177.00)		Significant improvement in pre-post intervention for both first and second VF taping
	ASC – OB	First taping 326.45 (140.70) Second taping 253.77 (137.90)	First taping 238.40 (141.05) Second taping 188.12 (142.30		Significant improvement in pre-post intervention for both first and second VF taping
	FAQ – Self	14.42 (3.97)	13.09 (3.64)		Significant improvement in pre-post intervention
	FAQ – Other	9.92 (3.77)	9.50 (3.35)		No significant improvement
E	SAR	CP+VF+AF d=0.86	CP+VF+AF Vs EXP 1.26	CP+VF+AF Vs EXP 0.74	Significant improvement in anticipatory anxiety and anxiety during speech in those who received CP+VF+AF than EXP.

		EXP d= - 0.09			
	Self-reported rating of observable anxiety	CP+VF+AF 33 (7.6) EXP 23.4 (8.2)	CP+VF+AF 20.5 (7.4) EXP 20.8 (8.5)		Significant improvement in those who received CP+VF+AF than EXP.
	Self-reported rating of fear of negative evaluation	CP+VF+AF 33.1 (7.8) EXP 27.1 (9.1)	CP+VF+AF 20.0 (7.6) EXP 25.1 (10.2)		Significant improvement in those who received CP+VF+AF than EXP.
F	BSAM (Anticipatory anxiety)		CP+VF vs EXP d= 0.38		No significant differences between groups
	BSAM (Speech anxiety)		CP+VF vs EXP d= 0.23		No significant differences between groups
	SPQ				Significant improvement post intervention (t(20) = 3.75, p = 0.001), at re-rating of speech 1 t(11,81) = 2.58, p= 0.024) , but not significant reduction at follow up (new speech) $t(20) = 1.73$, $p = .099$ (d= 0.73)
G	SAR	CP+VF 57.67 (22.13) CP+VF +CR 57.39 (23.35) EXP 59.52 (21.96)	CP+VF 45.33 (26.30) CP+VF +CR 43.23 (25.44) EXP 57.31 (19.15)		Those who received CP+VF+ CR experienced lower anxiety post intervention than those who received EXP, but was not statistically significant p > 0.05
	PSP	CP+VF 36.24 (9.40) CP+VF +CR 36.50 (8.46) EXP 33.64 (10.71)	CP+VF 22.81 (10.18) CP+VF +CR 21.00 (7.34) EXP 31.60 (10.91)		Those who received CP +VF+ CR reported significantly more positive performance ratings than those who received EXP, p=.017

H	Self-reported performance rating	41.38 (27.13)	54.04 (27.53)		Moderate within group effect size found for pre-post intervention
	Feared outcome rating	63.55 (21.97)	28.66 (28.51)		Large within group effect size found for pre-post intervention
	mSPRS	17.96 (6.14)	21.00 (7.03)		Moderate to large withing group effect size for pre-post intervention found
	AAR	84.44 (17.65)	64.44 (20.28)		Large withing group effect size found for pre-post intervention
I	Self-reported observable anxiety	With SB and SFA 66.4 (23.2) Without SB and SFA 49.1 (25.4)	With SB and SFA 49.1 (25.4) Without SB and SFA 29.3 (28.0)		Significant improvement post intervention regardless of whether individuals dropped SB and SFA
	Self-reported performance rating	With SB and SFA 43.6 (25.8) Without SB and SFA 55.6 (23.9)	With SB and SFA 48.5 (24.0) Without SB and SFA 63.3 (25.8)		No significant improvement post intervention
	Self-reported feared outcome	With SB and SFA 62.4 (30.8) Without SB and SFA 44.2 (29.3)	With SB and SFA 34.4 (29.7) Without SB and SFA 21.7 (24.9)		Significant improvement post intervention regardless of whether individuals dropped SB and SFA
J	Self-reported observable anxiety rating	With SB and SFA 60.91 (21.41) Without SB and SFA 41.29 (25.82	With SB and SFA 33.76 (23.77) Without SB and SFA 41.29 (25.82)		Significant improvement post intervention regardless of whether individuals dropped SB and SFA

	Self-reported performance rating	With SB and SFA 36.45 (17.66) Without SB and SFA 53.83 (18.41)	With SB and SFA 54.67 (20.04) Without SB and SFA 64.67 (19.12)		Significant improvement post intervention regardless of whether individuals dropped SB and SFA
	Self-reported feared social outcome	With SB and SFA 55.72 (19.32) Without SB and SFA 38.19 (20.88)	With SB and SFA 25.26 (16.88) Without SB and SFA 17.37 (14.85)		Significant improvement post intervention regardless of whether individuals dropped SB and SFA
	SPWSS	4.58 (1.32)	4.00 (1.27)		Significant reduction SPWSS
K	LSAS-SR	VF+CP 73.44 (22.68) VF+AR 72.00 (24.23) EXP 71.56 (24.91)	VF+CP 55.22 (21.59) VF+AR 61.94 (27.16) EXP 52.50 (26.68)	VF+CP 55.14 (20.85) VF+AR 63.71 (23.44) EXP 51.69 (23.40)	Significant pre-post improvement in all groups $p < 0.05$ No significant between groups differences $p > 0.05$
L	PSP	30.09 (8.41)	24.83 (8.46)	25.61 (8.37)	Significant improvement pre-post intervention and from pre to follow-up
M	BSAM				Significant improvement at post intervention ($F(1, 92) = 17.93$, partial $g^2 = 0.16$, $p < 0.001$) and follow up for

					those who received CP+VF ($F(1,92)=4.55, partial g^2=0.05, p=0.04$)
	PSP				Significant improvement at post intervention ($F(1, 92) = 12.43$, partial $g^2 = 0.12$, $p = 0.001$) and follow up for those who received CP+VF ($t(51) = -2.22$, $d = 0.62$, $p = 0.03$)
N	Self-reported rating of coming across well	VF+CP (high SAD) 3.80 (2.19) VF+CP (low SAD) 4.76 (2.31) VF (high SAD) 4.40 (2.01) VF (low SAD) 4.59 (2.29)	VF+CP (high SAD) 6.10 (1.65) VF+CP (low SAD) 6.82 (1.51) VF (high SAD) 5.35 (1.42) VF (low SAD) 5.12 (1.65)		Those who received VF+CP showed significant improvement than those who received VF.
	Self-reported performance rating	VF+CP (high SAD) 5.10 (2.57) VF+CP (low SAD) 4.24 (3.03) VF (high SAD) 4.05 (2.31) VF (low SAD) 4.53 (3.08)	VF+CP (high SAD) 6.30 (2.05) VF+CP (low SAD) 6.88 (1.50) VF (high SAD) 5.30 (1.59) VF (low SAD) 5.29 (1.69)		Those who received VF+CP showed significant improvement than those who received VF.
	Behaviour composite score	VF+CP (high SAD) 4.60 (1.76) VF+CP (low SAD) 5.67 (1.05)	VF+CP (high SAD) 6.44 (1.48) VF+CP (low SAD) 7.37 (1.10)		Those who received VF+CP showed significant improvement than those who received VF.

		VF (high SAD) 4.74 (1.49) VF (low SAD) 5.70 (1.06)	VF (high SAD) 5.47 (1.33) VF (low SAD) 6.01 (1.39)		
O	Measure of public speaking performance	High social anxiety 37.6 (8.7) Low social anxiety 43.8 (7.6)	High social anxiety 41.8(8.5) Low social anxiety 47.4(8.3)		Significant improvement pre to post in both groups
	Self-reported rating of performance	VF 33.6 (6.5) EXP 36.8 (7.3)	VF 43.2 (8.4) EXP 39.0 (7.7)	VF 44.2 (7.9) EXP 40.4 (8.7)	Significant improvement for the VF group post intervention and at follow up
	SAR	VF 1.8 (I.I) EXP 4.4 (0.2)	VF 3.5 (I.4) EXP 3.8 (1.7)		No significant difference between groups
P	PSP	VF 33.33 (10.07) VF of non-social task 39.70 (11.15) EXP 36.00 (10.91)	VF 28.73 (8.88) VF of non-social task 36.83 (10.65) EXP 34.57 (11.45)	VF 26.17 (9.47) VF of non-social task 32.73 (12.71) EXP 28.20 (11.37	Significant improvement post intervention for VF group but not at follow up.
Q	SEQ – coming across well	CP+VF 2.75 (1.68) VF 4.15 (1.79	CP+VF 5.50 (2.04) VF 5.50 (1.57)	CP+VF 5.94 (1.83) VF 4.68 (2.14)	Significant improvement post intervention and follow-up for CP+VF group
	SEQ- Behaviour composite	CP+VF 3.94 (1.11)	CP+VF 5.63 (1.00)	CP+VF 6.25 (0.89)	No significant improvement post intervention but significant improvement at follow-up for CP+VF group

		VF 4.26 (1.23)	VF 5.38 (1.08)	VF 5.11 (1.08)	

Appendix C: Systematic Review – Quality Assessment Rating

	Study Codes																	
Criteria	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O Study 2	O Study 3	P	Q
Question / objective sufficiently described.	2	1	2	2	2	2	2	1	2	2	2	1	2	2	2	2	2	1
Study design evident and appropriate.	2	1	2	1	2	2	2	1	1	1	2	1	2	2	1	2	2	2
Method of subject/comparison group selection *or* source of information/input variables described and appropriate.	2	1	2	2	2	2	2	1	2	2	2	1	2	2	2	2	1	1
Subject (and comparison group, if applicable) characteristics sufficiently described.	2	1	2	1	2	2	2	2	2	2	2	2	1	2	2	2	1	2
If interventional and random allocation was possible, was it described.	2	na	1	na	1	1	1	na	na	na	1	na	2	1	na	1	1	1
If interventional and blinding of investigators was possible, was it reported.	0	na	0	na	0	1	1	na	na	na	1	na	1	1	na	1	1	1
If interventional and blinding of subjects was possible, was it reported.	0	Na	0	na	0	1	1	na	na	na	1	na	1	1	na	1	1	1

Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported.	2	2	2	2	2	1	2	1	2	2	2	2	2	1	1	1	2	2
Sample size appropriate.	2	2	1	2	2	1	2	2	2	2	1	1	1	2	1	1	2	1
Analytic methods described/justified and appropriate.	2	1	2	2	2	1	2	1	1	1	2	2	2	2	2	2	2	1
Some estimate of variance is reported for the main results.	2	2	1	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2
Controlled for confounding.	2	1	2	1	2	2	2	0	0	1	2	1	2	2	0	1	2	2
Results reported in sufficient detail.	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2
Conclusions supported by the results.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total score	.85	.72	.75	.82	.82	.79	.89	.59	.72	.86	.86	.77	.86	.86	.77	.79	.82	.79

Appendix D: Systematic Review – Full Search Terms

1. Ti= ((anxiet* OR anxious* OR phobia* OR phobic*) NEAR/2 (performance OR social*)) OR ab= ((anxiet* OR anxious* OR phobia* OR phobic*) NEAR/2 (performance OR social*))
2. Ti= (socioanxi* OR sociophobi*) OR Ab= (socioanxi* OR sociophobi*)
3. Ti= ((blush* OR sweat* OR trembl*) NEAR/3 (anxiet* OR anxious* OR chronic* OR excessiv* OR fear* OR severe)) OR Ab= ((blush* OR sweat* OR trembl*) NEAR/3 (anxiet* OR anxious* OR chronic* OR excessiv* OR fear* OR severe))
4. Ti= (hyperhidrosis OR hyperperspirat*) OR Ab= (hyperhidrosis OR hyperperspirat*)
5. Ti= (hyper NEAR (hidrosis OR perspirat*)) OR Ab= (hyper NEAR (hidrosis OR perspirat*))
6. Ti= ((mute* OR mutism) NEAR/2 (elective* OR selective*)) OR Ab= ((mute* OR mutism) NEAR/2 (elective* OR selective*))
7. Ti= (interpersonal NEAR/2 (aversion* OR aversiv* OR confiden* OR difficult* OR disorder* OR distress* OR fear*)) OR Ab= (interpersonal NEAR/2 (aversion* OR aversiv* OR confiden* OR difficult* OR disorder* OR distress* OR fear*))
8. Ti= ('inter personal' NEAR/2 (aversion* OR aversiv* OR confiden* OR difficult* OR disorder* OR distress* OR fear*)) OR Ab= (“inter personal” NEAR/2 (aversion* OR aversiv* OR confiden* OR difficult* OR disorder* OR distress* OR fear*)
9. Ti= ((social* OR socio*) NEAR/2 (aversion* OR aversiv* OR confiden* OR difficult* OR disorder* OR distress* OR fear*)) OR Ab= ((social* OR socio*) NEAR/2 (aversion* OR aversiv* OR confiden* OR difficult* OR disorder* OR distress* OR fear*)
10. Ti= (“negative evaluation” NEAR/3 (anxiet* OR anxious* OR distress* OR fear*)) OR Ab= ('negative evaluation' NEAR/3 (anxiet* OR anxious* OR distress* OR fear*))
11. Ti= (speak* NEAR/3 (anxiet* OR anxious* OR distress* OR fear*)) OR Ab= (speak* NEAR/3 (anxiet* OR anxious* OR distress* OR fear*))
12. Ti= (((personalit* OR phobi* OR social* OR socio*) NEAR/2 avoid*) OR “avoidant disorder”) OR Ab= (((personalit* OR phobi* OR social* OR socio*) NEAR/2 avoid*) OR “avoidant disorder”
13. Ti= (phobi* NEAR/2 neuros*) OR Ab= (phobi* NEAR/2 neuros*)
14. Ti= ((shy OR shyness) OR “specific phobia*”) OR Ab= ((shy OR shyness) OR “specific phobia*”)
15. TI= (‘phobic disorder*’) OR Ab= (“phobic disorder*”)
16. Ti= (‘Speech anxiety’) OR Ab= (“Speech anxiety”)
17. Ti= (‘performance anxiety’) OR Ab= (“performance anxiety”)
18. 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17
19. Ti= (videofeedback OR “video feedback” OR video-feedback) OR ab= (videofeedback OR ‘video feedback’ OR video-feedback)
20. (videotape* or "video tape*" or video-tape* or "video record*" or video-record*).ti. or

21. ((videotape* OR "video tape*" OR video-tape* OR "video record*" OR video-record* OR visual OR video) near/4 feedback))
22. 20 OR 21 OR 22
22. 18 AND 23

Appendix E: Systematic Review – Highlights for Journal

- Systematic review examining efficacy of video feedback (VF) in SAD.
- Video feedback improves self-perception in SAD.
- Limited evidence for improved anxiety in SAD.
- Adding audience feedback to VF enhances therapeutic effects.

Appendix F: Systematic Review – Author Guidelines

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• All tables (including titles, description, footnotes)
• Ensure all figure and table citations in the text match the files provided • Indicate clearly if color should be used for any figures in print *Graphical Abstracts / Highlights files* (where applicable)

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Examples: Reference to a journal publication: Van der Geer, J., Hanraads, J. A. J., & Lupton R. A. (2000). The art of writing a scientific article. *Journal of Scientific Communications,* 163, 51-59.

Reference to a book: Strunk, W., Jr., &White, E. B. (1979). *The elements of style.* (3rd ed.). New York: Macmillan, (Chapter 4).

Reference to a chapter in an edited book: Mettam, G. R., & Adams, L. B. (1994). How to prepare an electronic version of your article. In B.S. Jones, & R. Z. Smith (Eds.), *Introduction to the electronic age* (pp. 281-304). New York: E-Publishing Inc.

[dataset] Oguro, M., Imahiro, S., Saito, S., Nakashizuka, T. (2015). *Mortality data for Japanese oak wilt disease and surrounding forest compositions.* Mendeley Data, v1. http://dx.doi.org/10.17632/ xwj98nb39r.1

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Appendix G – Service Improvement Project – Carer Questionnaire

Improving delivery of carer information & support in Early Intervention in Psychosis Teams

We are interested to learn about your experiences of the Early Intervention in Psychosis Service (EIS). We would like to ask you some questions about your experience of receiving carer information and support in the EIS team. All answers are anonymous, and your replies will help us to understand how we can further improve our delivery of information and support for carers.

This questionnaire could take approximately 15 minutes to complete, but it could take longer depending on how much you need to think about your answers and provide feedback. It would be helpful if you could also provide written feedback in the text boxes in the survey. Please click SUBMIT once you have answered all the questions.

Thank you for taking your time to answer the questions

What is your relationship to the person receiving care from the early intervention service? Please select one answer.

- Partner / spouse
- Parent
- Sibling
- Friend
- Child
- Any other family member

How long has your loved one been under the care of the early intervention service: Please select one answer

- Less than 6 months
- 6 to 11 months
- 12 to 17 months
- 18 to 23 months
- 24 months or more

How involved are you with the care of your loved one with Psychosis in the early intervention service?

- I am extremely involved
- I am somewhat involved
- I am not very much involved
- I am not at all involved
- Other

What is your age group?

- 18 to 24
- 25 to 34

- 35 to 44
- 45 to 54
- 55 to 64
- 65 and over

Section A: The following questions will be asking about YOUR experience of receiving carer information in the Early Intervention in Psychosis Service (EIS). We want to know how the information was delivered to YOU and by whom, how the information made YOU feel and how helpful YOU found it.

What kind of information have you received from the EIS team? Please select all the answers that are applicable to you

Information about:	Not received	Received verbally *	Received in a letter*	Leaflet(s) (printed or digital) *	Links to websites *	Other (please specify)
Different types of diagnosis						
Psychosis and treatment for Psychosis						
The Early Intervention in Psychosis Service						
How to support individuals with psychosis						
Where to get help in a crisis						
The emotional impact of psychosis on carers and family						
Where to seek emotional support for yourself from other NHS services						
Support group for carers of individuals with psychosis						
The mental health act						
Confidentiality and data protection policy (i.e. legal reasons why a service can't tell you the specific details of your loved one's medical information)						

Recovery and support after the individual with psychosis is discharged from EIS						
Any other information please specify						

If you received any of the following information please indicate from whom in the Early Intervention for Psychosis did you mainly receive the following information

Information about:	Psychiatrist	Psychologist	Care Coordinator	Nurse	Occupational Therapist	I don't know who gave this information	Other
Different types of diagnosis							
Psychosis and treatment for Psychosis							
The Early Intervention in Psychosis Service							
How to support individuals with psychosis							
Where to get help in a crisis							
The emotional impact of psychosis on carers and family							
Where to seek emotional support for yourself from other NHS services							
Support group for carers of individuals with psychosis							
The mental health act							
Confidentiality and data protection policy (i.e. legal reasons why a service can't tell you the specific details of your loved one's medical information)							

Recovery and support after the individual with psychosis is discharged from EIS							
Any other information please specify							

If you received any of the following information during your time with early interception team, how did it make you feel? Please select all the answers that are applicable to you

Information about:	Overwhelmed	Confused	Relived	Supported	Hopeful	Neutral	Any other feelings (please specify)
Different types of diagnosis							
Psychosis and treatment for Psychosis							
The Early Intervention in Psychosis Service							
How to support individuals with psychosis							
Where to get help in a crisis							
The emotional impact of psychosis on carers and family							
Where to seek emotional support for yourself from other NHS services							
Support group for carers of individuals with psychosis							
The mental health act							
Confidentiality and data protection policy (i.e. legal reasons why a service can't tell you the specific details of your loved one's medical information)							

Recovery and ongoing support after the individual is discharged from EIP service							
Any other information please specify							

If you received any of the following information during your time with early interception team, we would like to know how helpful you found the information for carers that was provided to you? Please write your response on a scale of 0 to 5, where 0 represents not helpful at all, and 5 represents extremely helpful.

Information about:	**0 ---- 1 ---- 2 ---- 3 ---- 4 ---- 5** **(0= not at helpful) (5= Extremely helpful)**
Different types of diagnosis	
Psychosis and treatment for Psychosis	
The Early Intervention in Psychosis Service	
How to support individuals with psychosis	
Where to get help in a crisis	
The emotional impact of psychosis on carers and family	
Where to seek emotional support for yourself from other NHS services	
Support group for carers of individuals with psychosis	
The mental health act	
Confidentiality and data protection policy (i.e. legal reasons why a service can't tell you the specific details of your loved one's medical information)	
Recovery and ongoing support after the individual is discharged from EIP service	
Any other information please specify	

Section B: The next questions will be asking about your opinions regarding how we can improve the delivery of information to carers in the Early Intervention in Psychosis Services.

Information about:	As soon as referred to the service, which could also include before being referred to the service	At our first appointment with the service	After a few weeks of being in the service	At the first review of care and treatment (CPA) at 6-7 months	When discharged from the service	I don't want to receive this information	Other (Please specify)
Different types of diagnosis							
Psychosis and treatment for Psychosis							
The Early Intervention in Psychosis Service							
How to support individuals with psychosis							
Where to get help in a crisis							
The emotional impact of psychosis on carers and family							
Where to seek emotional support for yourself from other NHS services							
Support group for carers of individuals with psychosis							
The mental health act							

Confidentiality and data protection policy (i.e. legal reasons why a service can't tell you the specific details of your loved one's medical information)							
Recovery and ongoing support after the individual is discharged from EIP service							
Any other information please specify							

How would you like to receive this information?

Information about:	Verbally	Written in a carers' information pack	Written and then a chance to discuss verbally with a member of staff	Online (e.g. a website)	In a group with other carers	I don't have a preference	I don't want this information
Different types of diagnosis							
Psychosis and treatment for Psychosis							
The Early Intervention in Psychosis Service							
How to support individuals with psychosis							
Where to get help in a crisis							
The emotional impact of psychosis on carers and family							
Where to seek emotional support for yourself from other NHS services							

Support group for carers of individuals with psychosis							
The mental health act							
Confidentiality and data protection policy (i.e. legal reasons why a service can't tell you the specific details of your loved one's medical information)							
Recovery and support after the individual with psychosis is discharged from EIS							
Any other information please specify							

From whom in the service would you like to receive this information?

Information about:	Psychiatrist	Psychologist	Care Coordinator	Nurse	Occupational Therapist	I don't have a preference	I don't want this information
Different types of diagnosis							
Psychosis and treatment for Psychosis							
The Early Intervention in Psychosis Service							
How to support individuals with psychosis							
Where to get help in a crisis							
The emotional impact of psychosis on carers and family							
Where to seek emotional							

support for yourself from other NHS services							
Support group for carers of individuals with psychosis							
The mental health act							
Confidentiality and data protection policy (i.e. legal reasons why a service can't tell you the specific details of your loved one's medical information)							
Recovery and support after the individual with psychosis is discharged from EIS							
Any other information please specify							

If there are any other types of information that YOU would like to receive from the Early Intervention in Psychosis Service (EIS), could you please tell us.
In your answer, could you please state the type of information, at what point during the treatment, how and from whom you would like to receive the information. E.g. I would like to receive written information from our care coordinator about social activities in the community, and I would like this information when the person receiving care is discharged from the service.

Section C: The next questions ask about your experiences of carer support in the EIS team.

If you received any of the following support during your time with early interception team, we would like to know how helpful you found the support for carers that was provided to you? Please write your response on a scale of 0 to 5, where 0 represents not helpful at all, and 5 represents extremely helpful.

Type of support	**0 ---- 1 ---- 2 ---- 3 ---- 4---- 5** **(0= not at all helpful) (100= Extremely helpful)**
Emotional support via conversations with care coordinators	
Guidance and support in the process of signposting carers to seek professional emotional support for themselves from other NHS Services	
Carer Psychoeducation group (a group where information about psychosis, treatment and the service is provided)	
Behavioural Family Therapy	
A carer peer support group	
Signposted to relevant support resources e.g. booklets, websites	
Signposted to other relevant services and support in the community such as charities	
Other (please specify in the box)	

If you have received any other type of carer support from Early Intervention Service, that is not stated in the table above, please write in the text below. In your answer could you please write how helpful you found the support from 1 to 5, where 1 represents not helpful at all, and 5 represents extremely helpful.

Section D: The following questions will be asking about your preferences for receiving carer support during your time with early intervention service

Type of support	As soon as we come into contact with the service	After a few weeks of being in the service	Before discharged from the service	Multiple times - Throughout the time in the service	I do not need this support at any point during my time with the service
Emotional support via conversations with care coordinators					
Guidance and support in the process of signposting carers to seek emotional support for themselves from other NHS services					
Carer Psychoeducation group (a group where information about psychosis, treatment and the service is provided)					
Behavioural Family Therapy (BFT)					
A carer peer support group					
Guided to relevant support resources e.g. booklets, websites					
Linked to other relevant services and support in the community, such as charities					

Please write any other type of carer support YOU WOULD like to receive from the Early intervention in Psychosis Service, and at what point would YOU like to receive this support. E.g. I would like to be linked in with social groups in the community as soon as we come into contact with the Early Intervention Service.

Appendix H: Service Improvement Project – Audit Form

NHS
Oxford Health
NHS Foundation Trust

Quality Improvement/Clinical Audit Proposal Form

Please register your audit or service evaluation with your directorate Quality lead before you start your project who maintain a central database of all audit activity.

Title	Enhancing the provision of carer information and support in early intervention in psychosis teams: A service improvement project		
Directorate	**Oxfordshire and south west mental health**	**Team / Ward / Unit**	**Early Intervention in Psychosis (EIP) Oxford**
Name and Title of project lead(s)		**Bahar Pourghobad (Trainee Clinical Psychologist)** **Dr Louise Johns (Consultant Clinical Psychologist)** **Dr Emmeline Goodby (Clinical Psychologist)**	
Contact telephone number			
Contact email address		**Bahar.pourghobad@oxfordhealth.nhs.uk**	
Supervising Consultant / Service Manager		**Lucy Betts (Oxford EI Service Manager)**	
Proposed start date		**01/03/2021**	
Proposed finish date		**01/08/2021**	
This project is a:			
☒ First audit/ quality improvement		☐ Re-audit/ quality improvement If yes, date of last audit/ quality improvement _____	
What is the resource implication for carrying out project (estimate staff hours, designation, grade and cost)		Staff hours – We will ask care coordinators to give details of an online survey to carers of the patients on their caseload. We estimate this will take approximately 5 minutes per carer, with care coordinators contacting up to 10 carers. Care coordinators routinely have contact with carers and can	

	mention this survey during routine appointments. Care coordinators are band 5 to 6. We will also ask some care coordinators to provide input into the questions that we should be asking carers in the survey. Care coordinators can share their ideas via email or on the phone. This will take about 15minutes of their time. We will also consult with the Rethink family worker, who works in the Oxford team one day a week. As part of the service improvement, an assistant psychologist will assist the project leads in developing a carer information pack based on the feedback in the survey. The assistant psychologist is band 5.

Reason for audit or evaluation (tick all that are applicable)

☐ National priority	☐ Trust priority	☐ Directorate priority	☐ CCG priority
☒ NICE guidance	☐ SIRI recommendation	☒ Other (please state) Service Improvement Project in line with NICE guidance for psychosis and the Access and Waiting Times for First Episode Psychosis, and following peer review of the EIS team in Oxford.	

If NICE guidance, please state which guidelines: Psychosis and Schizophrenia in adults: prevention and management.

Background to Project

Caregivers, usually family members, provide an important role in supporting individuals with psychosis. Even though caregiving can be rewarding, the role can be demanding and stressful, and carers need information and support to adjust to the changing needs of their relative with psychosis. In addition, carers may also require information and support for their own emotional wellbeing, given the high levels of distress associated with the caregiving role (Boydell et al., 2014; Kuipers, Onwumere, & Bebbington, 2010; Patel, Chawla, Krynicki, Rankin, & Upthegrove, 2014).

NICE treatment guidance recommends provision of carer information and support (NICE, 2014), and early intervention in psychosis services are commissioned to provide this. The Early Intervention in Psychosis (EIP) service in Oxford provides carer information and support, however it was recently recognised by the service (via carer feedback) that carer information was mainly provided verbally and may be forgotten. Carers and family members can assist with service user recovery and reduce relapse rates in psychosis (Pharaoh et al., 2006), and, when new to mental health services, they may feel overwhelmed with information. Therefore, it is important to evaluate how the EIP service in Oxford Health is delivering carer information and support, how this is received by carers, and any unmet need. In order to improve carer education and support when their family member is accepted by the EIP team, a carers' pack will be co-produced with a group of carers and staff. In addition, recommendations will be made to the service about any further support option required to meet the needs of carers of individuals with psychosis.

Standard(s) for audit or quality improvement

(please list all the standards which will be assessed)

We are not conducting an audit against a standard, but the carer survey is based on the following guidance and standards:
NICE Guidelines – Psychosis and Schizophrenia in adults: prevention and management
Royal Colleges of Psychiatrists Standards for Early Intervention in Psychosis Services

Access and Waiting Time Standard for Early Intervention in Psychosis

Objectives of quality improvement project
This project aims to improve the implementation of carer education and support in the Trust's EIP service (Oxford EI Team). This will be achieved by:

- Gaining feedback from carers about their experiences of receiving carer information and support in the EIP teams
- Developing a carer information pack based on the findings of the survey
- Making additional recommendations to the EIP teams about implementing education and support to meet the needs of the carers they serve

Scope and Methodology for Project

Scope: The target audience for this audit will be a sample of carers of individuals with first episode of psychosis seeking treatment in the EIP service in Oxford, and care coordinators in the same services.

Methodology
Design: This Service Improvement Project will use a mixed methods design, with quantitative and qualitative data collected from carers about the implementation of carer education and support in EIP teams.

Sampling: Care coordinators will be asked to share the survey, as part of their routine contact with the carers on their caseload. The sampling will be purposive, as each care coordinators will share the survey with up to 10 carers from different backgrounds e.g. gender, relationship to the person with psychosis, length of time with the EIP team, ethnicity, and preferred spoken language. The survey can be completed securely online, therefore the care coordinators will share the link to the survey with carers, and all answers will be anonymised.

Data collection: Data will be collected from the surveys completed by carers in EIP teams. Those carers completing the survey will not be reimbursed for their time, as this survey is part of providing feedback to the service and their input will contribute to improvement in carer support in the teams. The survey will contain closed and open-ended questions, therefore both quantitative and qualitative data will be collected. The survey will be designed to take 20-30 minutes to complete.

The survey questions will be developed with care coordinators and carers in the service. The questions will cover topics such as demographics (e.g. gender, relationship to the person with psychosis, and length of duration with EIS team), their views about their experiences of carer information and support (e.g. what kind of information and support were they offered when they first entered the service, their perceived helpfulness about the information and support), and what further carer information and support they would like to receive from the EIP team, and the preferred delivery of carer information to meet their needs (e.g. carer pack of written information, audio, video, carer psychoeducation group). Those carers involved in developing the survey will be paid £10 per hour for their time, and there will no travel expenses as these conversations will take place via the phone or digitally. The care coordinators in the team will also be asked to share their input about the topics or questions that they view as important to include in the survey. They will be asked to share their ideas via email or over a telephone conversation.

Data analysis: Quantitative data collected from the carer survey will be analysed using descriptive statistics in SPSS. Qualitative Information from the survey will be analysed into themes, using NVivo software, to identify the key themes about feedback regarding carer information and support.

How will the findings be used: The findings from the survey will be used to inform what information should be included in a pack for carers, and its format, which will be co-produced with a small group of carers, the project leader and the psychologists in the EIP teams. In addition, the findings will also be shared with the team and recommendations will be made about further input and support for carers in EIS.

Burden on carers – The surveys will not gather any information beyond that collected in routine practice, as we are asking carers for feedback about their experiences with the service. However, there will be some burden on carers due to the time required to complete the survey which can take up to approximately 20-30 minutes.

Risk of harm to carers – There will be no risk of harm to the carers from the survey, and at the end of the survey carers will be reminded of advice lines and current support options. In addition, all carers will have the contact details of the care coordinator involved in supporting them and their relative with psychosis.

Publication of findings – The findings will be written as part of the project leader's completion of doctoral study in clinical psychology and may potentially be written for publication. In addition, the findings will be presented to the EIP teams.

How are you going to collect the data (tick all that are applicable)			
☐ Case notes (paper/ electronic)	☐ Observations	☒ Patient/ Staff Survey	☐ Other (please state)

Data Protection Act

Please tick to confirm "yes" you will comply with:

☒ All data collected will be anonymised ☐ No patient or staff identifiable data will be reported

Ethics Screening

Gather any information about a patient beyond that collected in routine patient care	☐ Yes ☒ No
Pose any risk for or burden on a patient beyond those of his/her routine patient care	☒ Yes ☐ No
Infringe on any patient's rights	☐ Yes ☒ No
Risk breaching any patient's confidentiality or privacy	☐ Yes ☒ No
Involve the use of any untested clinical or systems intervention	☐ Yes ☒ No
Do you intend to publish the findings?	☒ Yes ☐ No.
Does National Data Opt Out need to be applied to the resulting data set prior to analysis? ☐ Yes ☒ No	

Requested Support from the Quality and Audit Team (tick all that are applicable)	
☐ Design data collection tool	☐ Data collection
☐ Data analysis	☐ Report writing
☐ Power point presentation design	☒ None

Quality and Audit Team Contact Details	
Emma Lofthouse – Tel: 07500 784 326 Liz Cheal – Tel: 07900 657 607 (maternity leave until June 2021) Clinical.audit@oxfordhealth.nhs.uk	**Corporate Directorate (Quality & Audit Specialists)**
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Jelena Ampofo - Tel: 07787 002 849	**Mental Health Directorates**

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CRIS.Admin@oxfordhealth.nhs.uk	**Clinical Record Interactive Search (CRIS) Team**

Appendix I: Service Improvement Project – Author Guidelines

1. SUBMISSION

Thank you for your interest in *Early Intervention in Psychiatry*. Authors should kindly note that submission implies that the content has not been published or submitted for publication elsewhere except as a brief abstract in the proceedings of a scientific meeting or symposium.

Once the submission materials have been prepared in accordance with the Author Guidelines, manuscripts should be submitted online at **http://mc.manuscriptcentral.com/eip**

For any queries regarding submission, please contact **eip.eo@wiley.com.**

We look forward to your submission.

This journal accepts articles previously published on preprint servers.

Early Intervention in Psychiatry will consider for review articles previously available as preprints. You may also post the submitted version of a manuscript to a preprint server at any time. You are requested to update any pre-publication versions with a link to the final published article.

By submitting a manuscript to or reviewing for this publication, your name, email address, and affiliation, and other contact details the publication might require, will be used for the regular operations of the publication, including, when necessary, sharing with the publisher (Wiley) and partners for production and publication. The publication and the publisher recognize the importance of protecting the personal information collected from users in the operation of these services, and have practices in place to ensure that steps are taken to maintain the security, integrity, and privacy of the personal data collected and processed. You can learn more

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2. AIMS AND SCOPE

Early Intervention in Psychiatry publishes original research articles and reviews dealing with the early recognition, diagnosis and treatment across the full range of mental and substance use disorders, as well as the underlying epidemiological, biological, psychological and social mechanisms that influence the onset and early course of these disorders. The journal provides comprehensive coverage of early intervention for the full range of psychiatric disorders and mental health problems, including schizophrenia and other psychoses, mood and anxiety disorders, substance use disorders, eating disorders and personality disorders. Papers in any of the following fields are considered: diagnostic issues, psychopathology, clinical epidemiology, biological mechanisms, treatments and other forms of intervention, clinical trials, health services and economic research and mental health policy. Special features are also published, including hypotheses, controversies and snapshots of innovative service models.

In contrast with mainstream healthcare, early diagnosis and intervention has come late to the field of psychiatry. *Early Intervention in Psychiatry* creates a common forum for researchers and clinicians with an interest in the early phases of a wide range of disorders to share ideas, experience and data. This journal not only fills a gap, but also creates a new frontier in academic and clinical psychiatry.

3. MANUSCRIPT CATEGORIES AND REQUIREMENTS

Articles reporting original work that embodies scientific excellence in psychiatry and advances in clinical research (maximum word count for text 3000; abstract 250);

Reviews which synthesize important information on a topic of general interest to early intervention in psychiatry. (maximum word count for text 5000; abstract 250);

Brief Reports which present original research that makes a single point, or negative studies of important topics (maximum word count for text 1500; abstract 150);

Early Intervention in the Real World, a special features section which focuses on issues such as service descriptions and delivery, and clinical practice guidelines (maximum word count for text 3000; abstract 250);

Editorials or New Hypotheses. Please contact the editorial office before writing an Editorial or New Hypotheses article for the journal (maximum word count for text 1000);

4. PREPARING THE SUBMISSION

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Acknowledgments

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Book

Bradley-Johnson, S. (1994). *Psychoeducational assessment of students who are visually impaired or blind: Infancy through high school* (2nd ed.). Austin, TX: Pro-ed.

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Appendix J: Theoretically Driven Research Project – Imagery Experimental Procedure

Part 1. Image Generation

I am interested in the different types of thought that can run through our minds and the form these thoughts can take. Sometimes we think in the form of words and phrases ("verbal thoughts"), sometimes we think more in "mental images".

Definitions

Verbal thoughts: When we think in verbal thoughts, we think using verbal language of the sort we would use when we speak. A verbal thought about this interview might be, "What questions she is going to ask me", which would run through your mind as words.

Mental images: When we think in mental images, we imagine pictures in our mind's eye. A mental image about this interview might be picturing in your mind's eye what the room like with us sitting in it. Although mental images often take the form of pictures they can actually include any of the five senses. For example, you could hear the sound of us talking in your imagination. We can also have mental image images that are experienced as smell, taste or sensations. Images can be clear or unclear. When we talk about mental images we are referring to all of these types of 'imagining'.

Clarification And imagery training

Do you have any questions about the difference between verbal thoughts and mental images?

Let's practice what I mean by Imagery

Imagine holding a lemon…
Picture it as vividly as you can, what it looks like, the texture of the skin, whether there is any stem…
Whether the colour is the same across the whole lemon…is there any light or shade on it… is it a bright yellow, a little green, or maybe old and darker
Hold it close up, so you can see every feature…
What does it feel like to hold it… is it heavy in your hand, cool, firm?
What does the texture of the lemon feel like…dimply, smooth, maybe old and rough?
Feel the weight of the lemon in your hand… explore it's shape…
You throw it up in the air and catch it… you hear the sound it makes when it lands in your hands
Hold the lemon next to your nose. That fresh, tangy smell…
Now, imagine the lemon has been cut in half.
Touch the inside of the lemon, it feels wet and you can see beads of moisture on the segments glistening. You can feel the texture of the segments as you wipe your finger across.
Can you see any seeds or pith inside the lemon?
You hold the lemon half up to your nose. Smell the juice…
Take a glass in your other hand and gently squeeze the lemon into the glass. Feel how it squishes as you squeeze it. You apply gradually more pressure and can see and hear the juice trickling into the glass. It looks cloudy.
You lift the glass to your lips and take a very small sip of the juice, and swallow that, it has a fresh, acidic taste. You can feel it going down your throat. A cool, refreshing but slightly bitter sensation.
You squeeze the lemon into the glass again…
Now it squirts into your eye! It is stinging you!
Carefully observe the client for a reaction: do they wince or blink? If so, continue…

Did you notice that you winced then?
Reflection together around the vividness of the image, ways of "turning up the vividness" or making it seem more real.

The questions we are going to ask are about the mental images that pop up in your mind during times when you have anxious and worried about your health.

Below is a list of illnesses which people may be anxious and worried about getting. Please indicate, if you have ever had mental images or pictures popping up in your mind about yourself getting any of the following illnesses in the present or future. Please think about the last 6 months when answering the questions.

Did you have an image of getting any of the following illnesses	**Never**	**Sometimes**	**Often**
Brain Tumour	0	1	2
Heart attack /heart condition	0	1	2
Stroke	0	1	2
Brain disease	0	1	2
Cancer	0	1	2
HIV/AIDS	0	1	2
Multiple Sclerosis	0	1	2
Lung disease	0	1	2
Corona Virus	0	1	2
Serious Mental Health Illness (E.g. Psychosis)	0	1	2
Any other illness (please specify)	0	1	2

Please describe in as much detail as you can one of the images that you have experienced about any of the above physical conditions. Please choose the image that is most important/upsetting/frightening to you. Describe it as if you were a film director, and please tell me in as much detail as possible. Not just beginning or end. Please try to include answers to the following questions……

- What is the image of?
- How did this image make you feel?
- What did the image mean to you?
- What did it make you want to do?
- Anything else about this image?

How easy was it to think of this image?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all easy) (100= Extremely easy)

How much do you experience this mental image in your everyday life in the past 2 weeks?

Eliciting General threat imagery
We are now going to ask you to identify a mental image related to a current or future worry, but not one that is related to your health or someone else's health.

Below are examples of worries that people may think about. Please indicate if you have experienced mental images of any of these situations popping up in your mind. Please think about the last 6 months when answering the questions.

Did you have an image of any of the following situations	**Never**	**Sometimes**	**Often**
Your partner cheating on you	0	1	2
Getting fired from your job/ losing my job	0	1	2
Being a victim of assault	0	1	2
Being involved in a car accident	0	1	2
Losing sight of a child you are looking after at a busy place	0	1	2
Sudden accidental death of a loved one	0	1	2
Being made homeless	0	1	2

Any other future worries Please specify no	0	1	2

Please describe in as much detail as you can one of the images that you have experienced about any of the above situations. Please choose the image that is most important/upsetting/frightening to you. Describe it as if you were a film director, and please tell me in as much detail as possible. Not just beginning or end. Please try to include answers to the following questions……

- What is the image?
- How does it make you feel?
- What did it mean to you?
- What did it make you want to do?

How easy was it to think of this image?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all easy) (100= Extremely easy)

How much do you experience this image in your everyday life in the past 2 weeks?

Part 2 - Image Induction/exposure procedure

We are now interested in how different mental images make you feel when you think about them.

Positive Image Induction
We would like you to tell us about a positive mental image related to the future. This can be an image of anything that is positive and meaningful to you. It can be anytime in the future. For example, having a lunch with a friend tomorrow, going on holiday next year, going for a walk in the countryside etc.

What is the image? Describe it in few sentences?

How anxious are you feeling? (Base line 1) In general

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all) (100= Extremely)

Bring this image to mind and hold in your mind now (1 minute).

(Prompting questions: What can you see? Who is there? What are you doing? What can you hear/smell/taste/touch?)

How easy was it to bring this image to mind?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= Not easy at all) (100= Extremely easy)

How vivid was the image?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 -85--- 90 --- 100
(0= not at all vivid) (100= Extremely vivid)

How much of the time was the image in the fore front of your mind?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90---- 100
(0= not at all) (100= All of the time)

When you held the image in mind, how real did the image seem to you?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 --- 70 ---- 80 ---- 90 ---- 100
(0= not at all real) (100= Extremely real)

When you held the image in mind, how anxious were you feeling?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all anxious) (100= Extremely anxious)

How have you found this? Do you have any questions?

Worries about health image Induction

How anxious are you feeling?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all anxious) (100= Extremely anxious)

To what extent do you have the urge to seek reassurance about your health at this moment (e.g., getting reassurance from others, internet or other resources that nothing is wrong)?

0 --- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= No urge at all) (100= Extremely urged)

To what extent do you have the urge to get rid of images about your health at this moment?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= No urge at all) (100= Extremely urged)

How convinced are you that in the future you will develop your feared illness?

0 ---- 10 ---- 20 ---- 30 --- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all convinced) (100= Extremely convinced)

how awful does the image seem to you?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all awful) (100= Extremely awful)

How convinced are you that you will not be able to cope if you developed your feared illness?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all convinced) (100= Extremely convinced)

Can you bring back the image you identified earlier (Health worry image) to mind and hold in your mind now (1 minute).
(Prompting questions: What can you see? Who is there? What are you doing? What can you hear/smell/taste/touch?)

How easy was it to bring the image to mind?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 --- 70 ---- 80 ---- 90 ---- 100
(0= not at all easy) (100= Extremely easy)

How vivid was the image?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all vivid) (100= Extremely vivid)

How easy was it to hold the image in mind?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 --- 100
(0= not at all easy) (100= Extremely easy)

When you held the image in mind now, how real did the image seem?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 --- 100

(0= not at all real) (100= Extremely real)

When you held the image in mind, how awful did the image seem to you?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70----80 ---- 90 --- 100
(0= not at all awful) (100= Extremely awful)

When you held the image in mind, how anxious were you feeling?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---85- 90 ---- 100
(0= not at all anxious) (100= Extremely anxious)

When you held the image in mind, to what extent did you have the urge to seek reassurance about your health at this moment (e.g., getting reassurance from others, internet or other resources that nothing is wrong)?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= No urge at all) (100= Extremely urged)

When you held the image in mind now, to what extent did you have the urge to get rid of the image?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not urge at all) (100= Extremely urged)

When you held the image in mind, how convinced were you that this image will happen in the future?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all convinced) (100= Extremely convinced)

When you held the image in mind, how convinced were you that you will not be able to cope if this image was true?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all convinced) (100= Extremely convinced)

Bring back their positive image to mind and hold this image?

How anxious are you feeling now?

0 ---- 10 ---- 20 ---- 30 ----35 ----40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all) (100= Extremely)

Break (If needed)

General future worries image Induction
How anxious are you feeling?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all anxious) (100= Extremely anxious)

To what extent do you have the urge to seek reassurance about your feared situation at this moment (e.g., getting reassurance from others, internet or other resources that nothing is wrong)?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= no urge at all) (100= Extremely urged)

To what extent do you have the urge to get rid of any images about your feared future situation?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= no urge at all) (100= Extremely urged)

How convinced are you that your feared future situation will happen?

0 ---- 10 ---- 20 ---- 30 ---- 40 --- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all convinced) (100= Extremely convinced)

How awful does the image seem to you?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 --- 90 ----95---100
(0= not at all awful) (100= Extremely awful)

How convinced are you that you will not be able to cope if your feared future situation happened?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all convinced) (100= Extremely convinced)

Can you bring to mind the image that you identified/developed earlier about your feared future situation and hold in mind (1 minute). (Prompting question: What can you see in your mind's eye? What are you doing? Who is there? What can you hear/taste/smell/touch)

How easy was it to bring the image to mind?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80---- 90 ---- 100
(0= not at all easy) (100= Extremely easy)

How vivid was the image?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all vivid) (100= Extremely vivid)

How easy was it to hold the image in mind?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all easy) (100= Extremely easy)

When you were holding the image in mind, how real did the image seem?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ----95 --100
(0= not at all real) (100= Extremely real)

When you held the image in mind, how awful did the image seem to you?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all awful) (100= Extremely awful)

When you were holding the image in mind, how anxious were you feeling?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all anxious) (100= Extremely anxious)

When you were holding the image in mind, to what extent did you have the urge to seek reassurance about your feared situation (e.g., getting reassurance from others, internet or other resources that nothing is wrong)?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= no urge at all) (100= Extremely urged)

When you were holding the image in mind, to what extent did you have the urge to get rid of the image?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= no urge at all) (100= Extremely urged)

When you were holding the image in mind, how convinced were you that this event will happen in the future?

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 -- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all convinced) (100= Extremely convinced)

When you were holding the image in mind, how convinced were you that you will not be able to cope if this image was true?

0 ---- 10 ---- 20 ---- 30 ---- 40 --- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all convinced) (100= Extremely convinced)

Bring back your positive image to mind and hold it in mind.

0 ---- 10 ---- 20 ---- 30 ---- 40 ---- 50 --- 60 ---- 70 ---- 80 ---- 90 ---- 100
(0= not at all anxious) (100= Extremely anxious)

Do you have any questions about that?

Appendix K: Theoretically Driven Research Project – Ethical Approval

Ymchwil Iechyd a Gofal Cymru
Health and Care Research Wales

NHS
Health Research Authority

Ms Bahar Pourghobad
Oxford Institute of Clinical Psychology Training & Research
Isis Education Centre, Warneford Hospital
Headington, Oxfordshire
OX3 7JXN/A

Email: approvals@hra.nhs.uk
HCRW.approvals@wales.nhs.uk

11 October 2021

Dear Ms Pourghobad

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**An Investigation of Mental Imagery in Worries about Health**
IRAS project ID:	**291384**
REC reference:	**21/NW/0252**
Sponsor	**Oxford Health NHS Found**

I am pleased to confirm that **HRA and Health and Care Research Wales (HCRW) Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?
HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report (including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Please see IRAS Help for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations?
HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to obtain local agreement in accordance with their procedures.

What are my notification responsibilities during the study?

The standard conditions document "*After Ethical Review – guidance for sponsors and investigators*", issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information?
Please do not hesitate to contact me for assistance with this application. My contact details are below.

Your IRAS project ID is **291384**. Please quote this on all correspondence.

Yours sincerely,

Helen Poole

Approvals Specialist

Email: approvals@hra.nhs.uk

Copy to: *Ms Brandy Coote, Oxford Health NHS Found*

List of Documents

The final document set assessed and approved by HRA and HCRW Approval is listed below.

Document	*Version*	*Date*
Contract/Study Agreement template [Model NC PIC Agreement]	V1	05 July 2021
Copies of materials calling attention of potential participants to the research [Advertising material for research]	V2	22 September 2021
Interview schedules or topic guides for participants [Imagery Procedure]	V1	18 December 2020
Interview schedules or topic guides for participants [Mental Imagery in Worries about health]	V1	18 December 2020
IRAS Application Form [IRAS_Form_28072021]		28 July 2021
Letter from sponsor [PID 15396 Sponsorship Letter]	V1	12 July 2021
Letter from statistician [G power calculation]	V1	20 April 2021
Other [Participant Debrief Sheet for recruitment in NHS]	V1	22 September 2021
Other [Participant Debrief Sheet]	V1	22 September 2021
Other [Research Webpage for online advertising]	V1	22 September 2021
Other [Social Media /Twitter Post]	V1	22 September 2021
Other [Ethical Review Provisional Opinion Response Table]	V1	22 September 2021
Participant consent form [Participant consent form]	V2	22 September 2021
Participant information sheet (PIS) [Participant Information sheet]	V2	22 September 2021
Research protocol or project proposal [Mental Imagery in worries about health]	V1	05 May 2021
Summary CV for Chief Investigator (CI) [Bahar Pourghobad CV]	V1	19 July 2021
Summary CV for supervisor (student research) [Profesor Paul Salkovskis CV]	V1	02 January 2021
Summary CV for supervisor (student research) [Dr Sarah Lack CV]	V1	02 January 2021
Summary CV for supervisor (student research) [CV Abigail Wroe]	V1	02 January 2021
Validated questionnaire [Demographic and validated questionnaires]	V1	02 June 2021

Information to support study set up

The below provides all parties with information to support the arranging and confirming of capacity and capability with participating NHS organisations in England and Wales. This is intended to be an accurate reflection of the study at the time of issue of this letter.

Types of participating NHS organisation	Expectations related to confirmation of capacity and capability	Agreement to be used	Funding arrangements	Oversight expectations	HR Good Practice Resource Pack expectations
There are no NHS research sites in this study, only NHS Participant Identification Centres (PICs).	Organisations will not be required to formally confirm capacity and capability, and research procedures may begin 35 days after provision of the local information pack, provided the following conditions are met: - You have contacted participating NHS organisations (see below for details) - HRA and HCRW Approval has been issued - The NHS organisation has not provided a reason as to why they cannot participate - The NHS organisation has not requested additional time to confirm. You may start the research prior to the above deadline if HRA and HCRW Approval has been issued and the site positively confirms that the research may proceed. You should now provide the local information pack for your study to your participating NHS organisations. A current list of R&D contacts is accessible at the NHS R&D Forum website and these contacts MUST be used for this purpose. The password to access the R&D contact list is Redhouse1.	The applicant has indicated they will be using the standard Participating NHS Organisation to PIC agreement as advised by HRA and HCRW recommendation.	No external study funding has been sought	The Chief Investigator will be responsible for all study activities performed at PICs.	The sponsor has stated that local staff in participating organisations in England who have a contractual relationship with the organisation will undertake the expected activities. Therefore no honorary research contracts or letters of access are expected for this study.

Other information to aid study set-up and delivery

This details any other information that may be helpful to sponsors and participating NHS organisations in England and Wales in study set-up.
The applicant has indicated that they do not intend to apply for inclusion on the NIHR CRN Portfolio.

Appendix L: Theoretically Driven Research Project – Highlights for Journal

- Examined health catastrophising mental imagery in health anxiety.
- Health catastrophising imagery increases anxiety in health anxiety.
- Increased anxiety is correlated with severity of health anxiety.
- Health catastrophising imagery is important in health anxiety.

Appendix M: Theoretically Driven Research Project - Author Guidelines

Submission checklist

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:
• E-mail address
• Full postal address

All necessary files have been uploaded:
Manuscript:
• Include keywords
• All figures (include relevant captions)
• All tables (including titles, description, footnotes)
• Ensure all figure and table citations in the text match the files provided
• Indicate clearly if color should be used for any figures in print
Graphical Abstracts / Highlights files (where applicable)
Supplemental files (where applicable)

Further considerations
• Manuscript has been 'spell checked' and 'grammar checked'
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• Permission has been obtained for use of copyrighted material from other sources (including the Internet)
• Relevant declarations of interest have been made
• Journal policies detailed in this guide have been reviewed
• Referee suggestions and contact details provided, based on journal requirements

For further information, visit our Support Center. Manuscripts based on original research are limited to 6000 words of main text (i.e., not including cover page, Abstract, and references) and reviews, meta-analyses, and theoretical treatises will be limited to 8000 words of main text. Tables and figures will be limited to 5 each, regardless of manuscript type. Longer manuscripts may be considered on occasion where there is a strong and compelling rationale supported by editorial pre-approval.



Before You Begin

Ethics in publishing

Please see our information on Ethics in publishing.

Declaration of interest

All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file

(if double anonymized) or the manuscript file (if single anonymized). If there are no interests to declare then please state this: 'Declarations of interest: none'. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches. More information.

Submission declaration and verification

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Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Content should make no assumptions about the beliefs or commitments of any reader; contain nothing which might imply that one individual is superior to another on the grounds of age, gender, race, ethnicity, culture, sexual orientation, disability or health condition; and use inclusive language throughout. Authors should ensure that writing is free from bias, stereotypes, slang, reference to dominant culture and/or cultural assumptions. We advise to seek gender neutrality by using plural nouns ("clinicians, patients/clients") as default/wherever possible to avoid using "he, she," or "he/she." We recommend avoiding the use of descriptors that refer to personal attributes such as age, gender,

race, ethnicity, culture, sexual orientation, disability or health condition unless they are relevant and valid. When coding terminology is used, we recommend to avoid offensive or exclusionary terms such as "master", "slave", "blacklist" and "whitelist". We suggest using alternatives that are more appropriate and (self-) explanatory such as "primary", "secondary", "blocklist" and "allowlist". These guidelines are meant as a point of reference to help identify appropriate language but are by no means exhaustive or definitive.

Changes to authorship

Authors are expected to consider carefully the list and order of authors **before**submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only **before** the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the **corresponding author**: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.
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Additional Information

Editorial guidance

The *Journal of Anxiety Disorders* publishes articles of relevance to the epidemiology, psychopathology, etiology, assessment, treatment, and prevention of anxiety and related disorders in both child and adult populations. The format of the articles includes randomized controlled trials, single case clinical outcome studies, theoretical expositions, epidemiological studies, investigations of early mechanisms of risk, genetic and biomarker studies, neuroimaging studies, critical literature reviews, meta-analyses, and dissemination and implementation studies. We are also interested in evaluations of novel treatment delivery strategies, including the use of information technologies. Authors are encouraged to use methodologically rigorous sampling, structured or semistructured diagnostic interviews, randomization, therapist fidelity, and inter-rater reliability procedures where appropriate. Given limited journal space, we can accept only a

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Article structure

Subdivision - numbered sections
Divide your article into clearly defined and numbered sections. Subsections should be numbered 1.1 (then 1.1.1, 1.1.2, ...), 1.2, etc. (the abstract is not included in section numbering). Use this numbering also for internal cross-referencing: do not just refer to 'the text'. Any subsection may be given a brief heading. Each heading should appear on its own separate line.

Introduction
State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

Material and methods
Provide sufficient details to allow the work to be reproduced by an independent researcher. Methods that are already published should be summarized, and indicated by a reference. If quoting directly from a previously published method, use quotation marks and also cite the source. Any modifications to existing methods should also be described.

Theory/calculation
A Theory section should extend, not repeat, the background to the article already dealt with in the Introduction and lay the foundation for further work. In contrast, a Calculation section represents a practical development from a theoretical basis.

Results
Results should be clear and concise.

Discussion
This should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

Conclusions
The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

Appendices
If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

Essential title page information

• The title page must be the first page of the manuscript file.

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- *Author names and affiliations.* Where the family name may be ambiguous (e.g., a double name), please indicate this clearly. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name, and, if available, the e-mail address of each author.
- *Corresponding author.* Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. **Ensure that telephone and fax numbers (with country and area code) are provided in addition to the e-mail address and the complete postal address.**
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Highlights are mandatory for this journal as they help increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the examples here: example Highlights.

Highlights should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point).

Abstract

A concise and factual abstract is required. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself. The abstract should not exceed 200 words in length and should be submitted on a separate page following the title page.

Graphical abstract

Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view Example Graphical Abstracts on our information site.

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Keywords

Include a list of four to six keywords following the Abstract. Keywords should be selected from the APA list of index descriptors unless otherwise approved by the Editor.

Abbreviations

Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

Acknowledgements

Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

Formatting of funding sources

List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, it is recommended to include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Math formulae
Please submit math equations as editable text and not as images. Present simple formulae in line with normal text where possible and use the solidus (/) instead of a horizontal line for small fractional terms, e.g., X/Y. In principle, variables are to be presented in italics. Powers of e are often more conveniently denoted by exp. Number consecutively any equations that have to be displayed separately from the text (if referred to explicitly in the text).

Footnotes
Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors build footnotes into the text, and this feature may be used. Should this not be the case, indicate the position of footnotes in the text and present the footnotes themselves separately at the end of the article.

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General points
• Make sure you use uniform lettering and sizing of your original artwork.
• Preferred fonts: Arial (or Helvetica), Times New Roman (or Times), Symbol, Courier.
• Number the illustrations according to their sequence in the text.
• Use a logical naming convention for your artwork files.
• Indicate per figure if it is a single, 1.5 or 2-column fitting image.
• For Word submissions only, you may still provide figures and their captions, and tables within a single file at the revision stage.
• Please note that individual figure files larger than 10 MB must be provided in separate source files.

A detailed guide on electronic artwork is available.
You are urged to visit this site; some excerpts from the detailed information are given here.
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Please do not:
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• Supply files that are too low in resolution.
• Submit graphics that are disproportionately large for the content.

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Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

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Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

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