# Making friends with uncertainty: evaluation of a group intervention targeting intolerance of uncertainty in a Talking Therapies service

Layla Mofrad[1] , Danielle Hall[2], Ashley Tiplady[3] and Mark H. Freeston[4]

[1]Sunderland West Community Treatment Team, Houghton Day Unit, Hetton Road, Houghton le Spring, UK, [2]South Tyneside Community Treatment Team, Cumbria, Northumberland, Tyne and Wear Mental NHS Foundation Trust, Palmer Community Hospital, Wear Street, Jarrow, UK, [3]Newcastle upon Tyne Hospitals NHS Foundation Trust, Freeman Hospital, Freeman Road, High Heaton, Newcastle upon Tyne, UK and [4]School of Psychology, Newcastle University, Newcastle upon Tyne, UK

**Corresponding author:** Mark Freeston; Email: mark.freeston@newcastle.ac.uk

## Abstract

Co-morbid mental health diagnoses present challenges for services structured to provide disorder-specific models of treatment, such as NHS Talking Therapies services. Intolerance of uncertainty (IU) has been identified as both disorder specific and transdiagnostic, although little research explores transdiagnostic approaches to treatment of IU alone. A transdiagnostic cognitive behavioural therapy treatment targeting IU, the 'Making Friends with Uncertainty' (MFWU) group, was developed and piloted in a Talking Therapies primary care service in an earlier evaluation (Mofrad *et al.*, 2020). The aim of this study was to replicate and further evaluate the intervention. Twenty people presenting with a range of anxiety disorders started the intervention in two groups. The study used a single group, within-subjects quasi-experimental design, collecting data at eight points for routine outcome measures of anxiety, depression and functioning, and five points for measures of anxiety disorder-specific symptoms and IU. Intention-to-treat analyses showed improvement on a general measure of anxiety as well as improvement on the measure of IU. Significantly there was improvement on the disorder specific measures even though the intervention was aimed at the underlying process of IU, rather than the particular symptoms targeted by these measures. The MFWU group may be an efficient and effective way to deliver a highly specified transdiagnostic intervention for intolerance of uncertainty when people are treated in a mixed group format.

### Key learning aims

(1) To consider the effectiveness of a transdiagnostic group targeting IU.
(2) To develop understanding of a group intervention for building tolerance to uncertainty.
(3) To consider the impact of targeting IU on specific anxiety disorders.
(4) To offer a methodological framework for effectively evaluating a group intervention in routine practice.

## Introduction

Intolerance of uncertainty (IU) has been defined as 'an individual's dispositional incapacity to endure the aversive response triggered by the perceived absence of salient, key or sufficient

information, and sustained by the associated perception of uncertainty' (Carleton, 2016; p. 31) even in the absence of perceived threat or in potentially positive situations.

IU has been recognised as a transdiagnostic process for over a decade (e.g. Einstein, 2014). Meta-analyses have provided increasing support for moderate relationships between IU and symptoms of different disorders (e.g. McEvoy *et al.*, 2019), as well as substantial changes in IU resulting from various treatments which account for significant variance in outcome (e.g. Miller and McGuire, 2023). Miller and McGuire (2023) highlight that effects of treatment on IU correspond positively with improvements in severity of symptoms.

The case has been made that transdiagnostic treatments offer advantages in the treatment of anxiety disorders, including addressing co-morbidity with a single intervention, addressing non-standard presentations and advantages in dissemination (McManus *et al.*, 2010). However, the authors advise caution that such treatments benefit from research on diagnosis-specific treatments. A recent meta-analysis ($k = 18$, $n = 1006$) found that 'the tendency to find uncertainty distressing, consistently and significantly impairs threat extinction training' (Morriss *et al.*, 2021a; p. 174), suggesting IU may impact responses to standard anxiety interventions such as exposure and response prevention. Translational research has suggested that IU and IU-related symptoms can be reduced across a variety of mechanisms thought to support CBT (Li et al., 2021; Morriss *et al.*, 2021b; Oglesby *et al.*, 2017). A group intervention targeting IU could be an efficient and effective way to improve patient outcomes and provides a way of offering something highly specified yet broadly applicable (Mofrad *et al.*, 2020).

A transdiagnostic IU intervention had previously been developed and proof of concept was established in individual therapy using single case design research (Askey-Jones, 2018; Tiplady *et al.*, 2017). This was adapted by Mofrad *et al.* (2020) into a group protocol: the Making Friends with Uncertainty group (MFWUG). This treatment approach evolved from the Laval model and treatment of generalised anxiety disorder (GAD) (Robichaud and Dugas, 2006; Wilkinson *et al.*, 2011). The MFWUG focuses on increasing awareness of bodily sensations and giving participants an opportunity to experience uncertainty through games and playful exercises. Theoretical implications and hypothesis relating to specific mechanisms of interoception and somatic error theory have been explored in related work (Freeston and Komes, 2023).

An earlier article reported on the rationale, feasibility, acceptability and implications of the MFWUG (Mofrad *et al.*, 2020) based on the group being delivered in a Talking Therapies service in the North East of England two times and outcome data collected from all participants pre- and post-intervention. The purpose of this follow-up study is to replicate and evaluate the effectiveness of the MFWUG with personally salient measures (psychometric measures matched to their individual presenting problem), and a stronger design and analysis in a routine clinical setting.

### Planned course of intervention

It was proposed that first author (L.M.) would lead the delivery of three further Making Friends with Uncertainty (MFWU) groups with a co-facilitator. The first and second group were completed by February 2020; COVID-19 and UK lockdown followed in March 2020 and group interventions at the Talking Therapies service were suspended. Therefore, data from two groups are presented here.

## Method
### Design
The study used a single group, within-subjects quasi-experimental design, collecting data at eight points for routine outcome measures and five points for disorder-specific measures and the IUS-12 (see Table 1 for the measurement points). The inclusion of baseline pre-treatment, and post-treatment follow-up data points add to the credibility of the evaluation by reducing threats to

**Table 1.** Summary of the group protocol and measures collected

| Session number | Content | Measures collected |
|---|---|---|
| Pre-group individual session (1–2 weeks prior to session 1) | • Assessment<br>• Preparation for group<br>• IU psychoeducation | PHQ-9, GAD-7, WSAS, IU-12, relevant disorder specific measure |
| Session 1 (week 1) | • Introduction to IU<br>• Group set-up | PHQ-9, GAD-7, WSAS, IU-12, relevant disorder specific measure |
| Session 2 (week 2) | • Uncertainty in the body<br>• Certainty seeking behaviours<br>• Introduction to low stakes | PHQ-9, GAD-7, WSAS |
| Session 3 (week 3) | • Certainty seeking behaviours<br>• Low stakes exercises | PHQ-9, GAD-7, WSAS |
| Session 4 (week 4) | • Cost–benefit analysis of learning to tolerate uncertainty<br>• Increasing the stakes<br>• Low stakes exercises | PHQ-9, GAD-7, WSAS, IU-12, relevant disorder specific measure |
| Session 5 (week 6) | • Separating uncertainty and threat<br>• Low stakes exercises | PHQ-9, GAD-7, WSAS |
| Session 6 (week 8) | • Review of key learning<br>• Plans for post-group work<br>• Low stakes exercises | PHQ-9, GAD-7, WSAS, IU-12, relevant disorder specific measure |
| Follow-up (weeks 8–10) | • Review of goals<br>• Ending | PHQ-9, GAD-7, WSAS, IU-12, relevant disorder specific measure |

internal validity (Reichardt *et al.*, 2023) but are practical and feasible in routine settings, especially when frequent routine outcome monitoring is already in place (National Collaborating Centre for Mental Health, 2018).

## Participants

Referral criteria included people with any anxiety disorder, obsessive-compulsive disorder (OCD), or co-morbid anxiety presentation, able to self-manage risk in between sessions, and excluding those with post-traumatic stress disorder (PTSD). Once people opted in to the group, they were offered a pre-group individual appointment by telephone or in person to assess for suitability for a group intervention, identify which disorder specific measure would be most suitable, and to complete the first set of the appropriate measures. Some introductory ideas about uncertainty were introduced and psychoeducational material was provided at this point to start socialising people to IU and to help give a rationale for the intervention.

Over the 6-month period of the service evaluation, 28 people were referred to the group from initial assessment (see Fig. 1). Following review by the group facilitators prior to booking pre-intervention appointments, three participants were excluded because they had significant trauma histories or recent bereavement, and their issues with uncertainty seemed to stem from that. They were offered alternative treatment options instead. The treatment is informed from an evolutionary and developmental perspective (see Brosschot *et al.*, 2018; Freeston and Komes, 2023) with the key notion that uncertainty is fundamentally about the absence of safety rather than the presence of threat. Consequently, those with a history of trauma who may be in a heightened and chronic state of felt unsafety may find the experiential aspects of the group too uncomfortable.

Four people declined the intervention and chose to wait for individual therapy or did not attend the pre-group appointment; one person did not want to take part in the evaluation. Twenty people were offered the group intervention and were in a position to proceed and take part in the evaluation. Intention-to-treat analyses have therefore been reported for these 20 participants. There were eight participants in the first iteration of the group and 12 in the
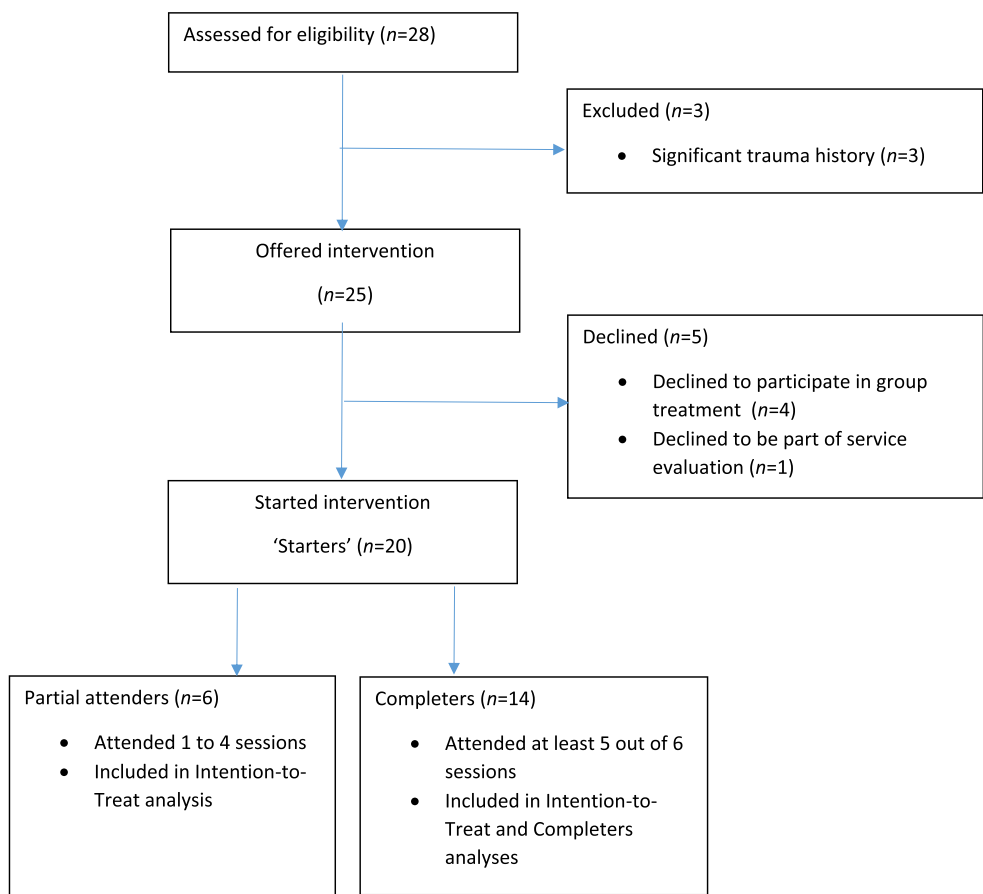
**Figure 1.** Consort flow diagram.

**Table 2.** Age distribution

| Age | Number of participants |
| --- | --- |
| 17–25 | 5 |
| 26–35 | 11 |
| 36–45 | 0 |
| 46–55 | 2 |
| 56–65 | 2 |

second. There were 13 people who presented with GAD, two people presented with social anxiety, one person with OCD, and four people presented with co-morbid anxiety presentations.

The participants were 14 women and six men ranging in age between 17 and 57 years ($M = 31.40$, $SD = 11.64$). See Table 2 for the age distribution; most were under 35. We did not collect data on ethnicity as part of this evaluation, but intend to do so in future work.

## Measures

All measures but one are routine outcome measures used in NHS Talking Therapies (formerly Improving Access to Psychological Services, IAPT). The first three are used in all cases, the

following five represent the Anxiety Disorder Specific Measures (National Collaborating Centre for Mental Health, 2018). The final measure related to the target of the treatment, namely, intolerance of uncertainty.

### Weekly routine outcome measures

Symptoms of depression were measured using the 9-item Patient Health Questionnaire (PHQ-9: Kroenke *et al.*, 2001). The PHQ-9 is the depression module of self-administered diagnostic instruments for common mental disorders. The questionnaire has good psychometric properties and has been extensively used in other studies (e.g. Moriarty *et al.*, 2015). Each item of the PHQ-9 is scored from 0 (not at all) to 3 (nearly every day), resulting in the possible maximum score of 27. The cut-offs of 5, 10, 15 and 20 are interpreted as mild, moderate, moderately severe and severe depression, respectively. Conforming to previous suggestions, we use the cut-off point of $\geq 10$ as caseness of depression.

The 7-item Generalized Anxiety Disorder (GAD-7) scale (Spitzer *et al.*, 2006) was used to measure the anxiety-related problems. This scale has good psychometric properties in both primary care (Ruiz *et al.*, 2011) and general population (Löwe *et al.*, 2008) settings. Each item of the GAD-7 is scored from 0 (not at all) to 3 (nearly every day), for a maximum score of 21. The cut-offs of 5, 10 and 15 are interpreted as mild, moderate and severe anxiety, respectively (Spitzer *et al.*, 2006). These categories are also used in IAPT to measure severity and here to interpret participant scores.

The Work and Social Adjustment Scale (WSAS; Mundt *et al.*, 2002) is a 5-item self-report screening tool. It measures impairment in functionality in day-to-day life areas such as work, home management, social leisure activities. Each item is rated between 0 ('not at all' having a problem in this area) to 8 ('very severely' impaired in this area) with a maximum score of 40. Cronbach's α for the measure ranges between .70 and .94 (Mundt *et al.*, 2002).

### Anxiety disorder specific measures

The Penn State Worry Questionnaire (PSWQ; Meyer *et al.*, 1990) is a 16-item self-report questionnaire that measures worry traits using a 5-point Likert scale of 1 (not at all typical of me) through to 5 (very typical of me). It is used to identify and measure the key symptom of GAD. A systematic review reported that Cronbach's alpha for the PSWQ ranges between 0.60 and 0.99 (Phillips, 2016).

The Social Phobia Inventory (SPIN; Connor *et al.*, 2000) is a widely used measure of social anxiety symptoms. It consists of 17 items each using a 5-point Likert scale from 0 (not at all) to 4 (extremely) to indicate agreement with statements relating to fear, avoidance and physiological symptoms. Cronbach's alpha for the measure ranges between .82 and .92 (Antony *et al.*, 2006; Connor *et al.*, 2000).

The Obsessive-Compulsive Inventory (OCI; Foa *et al.*, 1998) is a 42-item measure using a 5-point Likert scale from 0 (not at all) to 4 (extremely) assess level of distress caused by obsessions and compulsions across seven subscales. The OCI is reported to have good to excellent internal consistency; alpha coefficients for the full scale were demonstrated to be high (.86 to 0.95) across groups of participants with a diagnosis of OCD, general social phobia (GSP), PTSD and non-patient controls (Foa *et al.*, 1998).

The short 18-item version of the Health Anxiety Inventory (HAI) was used. This is a widely used self-reported questionnaire with high validity (Salkovskis *et al.*, 2002). There are four response options for each question with each scored from 0 to 3. The first 14 questions relate to the person's feelings over the last 6 months, and the final four relate to imagining what it would be like to have a serious illness. In their 2002 paper, Salkovskis *et al.* comment that 'the alpha coefficient of the short version (0.89) indicated a satisfactory level of internal consistency for the main scale across groups' (p. 850).

### Intolerance of uncertainty

To measure IU, the Intolerance of Uncertainty Short Scale (IUS-12; Carleton *et al.*, 2007) was used. It is a derivative of the original 27-item Intolerance of Uncertainty Scale (IUS; Freeston *et al.*, 1994). Participants rate 12 statements about uncertainty on a 5-point Likert scale from 1 (not at all characteristic of me) to 5 (entirely characteristic of me) to assess emotional, cognitive, and behavioural reactions to uncertain situations. Good internal consistency has been demonstrated ($\alpha = .85$; Carleton *et al.*, 2007). The total score was used rather than the prospective anxiety and inhibitory anxiety subscales (Carleton *et al.*, 2007). Visual inspection of data collected by Carleton *et al.* (2007) suggests a score of 35 as being the intersection between clinical and non-clinical samples, with people meeting the criteria for GAD, OCD, SAD, depression and panic disorder generally scoring higher than 35 on the IUS-12. This is consistent with 'criterion c' in the original Jacobson and Truax (1991) method of establishing a threshold for clinically significant change, but more accurate for non-symmetrical distributions. Therefore, a score of 35 or above has been used to demonstrate clinical levels of IU in this study (Jacobson and Truax, 1991).

All participants were asked to complete the PHQ-9, GAD-7, WSAS and IUS-12, and one or more appropriate disorder specific measure was used according to their primary presenting problem identified at assessment. Out of the 20 participants who completed treatment, there were four participants with co-morbid symptoms who completed two disorder specific measures.

The PHQ-9, GAD-7 and WSAS were administered at eight time points: pre-group individual appointment, at each group session and at individual follow-up. Specific anxiety disorder measures and the Intolerance of Uncertainty Scale (IUS-12) were administered at five time points: pre-group individual appointment, sessions 1, 4 and 6 of the group, and then individual follow-up after the group. This is illustrated in Table 1.

### Procedure

Approval was sought and granted from the Newcastle upon Tyne Hospitals NHS Foundation Trust Research and Development Department to conduct a service evaluation and for the use of the data. The project was registered with the trust research and clinical effectiveness systems.

### Consent

Participants gave consent to have their data collected and were informed about intention to publish. They were given an information sheet about the study which advised that consent could be withdrawn at any time. Participants signed a written statement to consent to take part.

### Structure of the Making Friends with Uncertainty Group

The group consisted of six 2-hour sessions and spread over 8 weeks, with the final two sessions occurring fortnightly. Individual follow-up sessions were offered around 2 weeks after the final session to review learning and impact of the intervention, plan discharge from the service, do signposting to other resources and complete a final set of measures.

The first part of the group focused on setting up and providing some level of certainty about how the group will run so that it feels safe enough to approach. Psychoeducation and exploration of bodily experiences of uncertainty was done in the first two sessions. Behavioural responses to uncertainty including under-engagement, over-engagement and 'Flip-flop' (Freeston *et al.*, 2020; for a review, see Sankar *et al.*, 2017) were described and reflected on. The concept of low and high stakes was introduced (Tiplady *et al.*, 2017) within a pyramid model from low stakes up to threat-based uncertainty, with lower stakes experiences involving lower levels of time, value and commitment. These low stakes uncertainties offer an opportunity to experience uncertainty, potentially re-appraise the feelings associated with it, and give participants a chance to change their relationship with it. Facilitators adopted a playful approach, and games and fun exercises

were used in every session as opportunities to experience safe uncertainty. Exercises that were used include Pop-Up Pirate, Jenga, 'What Is In The Bag', group random counting exercises and trying novel and unusual foods (Mofrad *et al.*, 2020).

## Analysis

Suitability for treatment was determined at the baseline session and participants were formally offered the intervention after that. Other practitioners referred to the group if they had a general sense that the IU treatment may be appropriate based on participants' presenting problems. At the baseline session factors such as history of trauma were considered which was an exclusion criteria. Emphasis on presenting problems and provisional diagnosis is typical of routine services such as NHS Talking Therapies.

Everyone who attended at least one session of the group was included in the analysis ($n = 20$). Therefore, intention-to-treat (ITT) analyses were conducted. Out of these 20 people, 14 completed at least five sessions, one person attended four sessions, three people attended three sessions, one person attended two sessions, and one person attended the pre-group appointment only. The 14 people who attended at least five of the six sessions were defined as 'completers' (regardless of which session was missed) and the six people who attended between one and four sessions were defined as 'starters'.

For the routine outcome measures (PHQ-9, GAD-7 and WSAS), the mean proportion of missing data was 26.25% (range = 87.50 and $SD = 29.50$). For the ADSM measures and the IUS-12, the mean proportion of missing data was 23.00% (range = 80.00 and $SD = 30.63$). To address missing data we used last observation carried forward ($n = 13$), and in five cases used next observation carried backwards including when a participant had missed the pre-group session, or when they had missed a group session and completed the IUS-12 or ADSM at the next session to catch up. Note these are conservative approaches as they assume no change has occurred when carried either forward or backward.

In order to directly compare the ADSMs across participants, standardised $Z$-scores were calculated using the means and standard deviations of the anxiety disorder specific measures from scores collected pre-treatment in the service. We used all available data on the service system to calculate these statistics. The data available was $n = 382$ for the PSWQ, $n = 161$ for the HAI, $n = 342$ for the OCI, and $n = 664$ for the SPIN.

Once $Z$-scores had been calculated for each ADSM the participant had completed, based on scores collected within the service, the mean of these $Z$-scores was calculated for each participant. This meant that for participants who only completed one ADSM, the scores on this measure throughout treatment were used to calculate their $Z$-scores, and for participants who completed more than one ADSM, the scores on these measures throughout treatment were used to calculate $Z$-scores which were then averaged into an overall $Z$-score. This was completed prior to using last observation carried forwards and backwards for all participants.

This method allowed us to standardise scores on the ADSMs relative to all people assessed in the service, equate scores across different measures and treat them as a single outcome variable across participants, namely, their presenting problem. The $Z$-scores were rescaled (linear transformations) to allow for easier interpretation with a pre-treatment mean of approximately 30 and $SD$ of 10. If participants completed more than one ADSM ($n = 4$) based on the presenting problem at the baseline session, both were treated for missing data and standardisation, then the mean of the two scores calculated was used in the analysis as the presenting problem.

Repeated measures analyses of variance (ANOVA) were conducted on all outcome measures. This was conducted with a five time-point analysis of the IUS-12 scores and standardised presenting problem scores (ADSM), and with an eight time-point analysis for the PHQ-9, GAD-7 and WSAS. All analyses reported are ITT. 'Group' was entered into this analysis to test for any differences between the two groups, but no specific hypotheses were specified. Significant time

**Table 3.** Mean (*M*) and standard deviation (*SD*) of scores at each time point after addressing missing data

| Measure | Pre | | S1 | | S2 | | S3 | | S4 | | S5 | | S6 | | Follow-up | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| PHQ-9 | 12.45 | 6.07 | 13.30 | 6.46 | 12.55 | 6.31 | 12.30 | 6.65 | 12.10 | 7.22 | 12.15 | 7.18 | 11.05 | 7.47 | 10.35 | 7.34 |
| GAD-7 | 12.35 | 4.51 | 12.80 | 5.33 | 11.65 | 4.82 | 11.35 | 5.26 | 11.20 | 5.57 | 10.75 | 6.02 | 10.00 | 6.36 | 9.60 | 5.73 |
| WSAS | 17.70 | 7.77 | 20.50 | 8.31 | 20.45 | 8.00 | 17.85 | 8.48 | 17.15 | 9.11 | 17.15 | 9.01 | 16.95 | 8.95 | 15.50 | 8.80 |
| IUS-12 | 43.25 | 7.13 | 42.80 | 8.00 | | | | | 39.10 | 9.95 | | | 38.35 | 9.42 | 35.50 | 9.38 |
| ADSM (*Z*-scores) | 24.55 | 8.13 | 23.83 | 8.13 | | | | | 20.80 | 9.17 | | | 18.35 | 9.92 | 18.88 | 8.83 |

effects were followed up by one degree of freedom contrasts between the first two (pre-treatment and session 1) and the last two time points (session 8 and follow-up). Any significant 'Time × Group' interactions would be investigated visually. Effect sizes for each effect are reported as partial eta squared ($\eta_p^2$), but for ease of interpretation a standardised mean difference (Cohen's *d* between first and last point) is also reported and interpreted according to convention (small = 0.2, medium = 0.5, large = 0.8; Cohen, 1988). As well as the ITT effect size, the effect sizes for starters and completers are reported. A significance level of 0.05 was used throughout. SPSS version 29 was used for all analyses.

## Results

The means and standard deviation for each time point for the intention-to-treat analysis are reported in Table 3.

### Missing data

Patterns of missing data for all outcome variables were tested using Little's (1988) test; none of the data was missing completely at random (all *p*-values >.40).

### Patient Health Questionnaire-9 (PHQ-9)

A repeated measures ANOVA indicated that Mauchly's test was significant for the main time effect ($p<.001$). Therefore, the assumption of sphericity was not met and Greenhouse-Geisser corrected significance values were used. There was no significant time effect ($F_{2.52,45.32} = 1.70$, $p = .19$, $\eta_p^2 = 0.09$). The within-subject contrast between the first two time points and the last two time points was not significant ($F_{1,18} = 2.68$, $p = .12$, $\eta_p^2 = 0.13$). There was no interaction between time and group ($F_{2.52,45.32} = 0.62$, $p = .58$, $\eta_p^2 = 0.03$). As shown in Fig. 2, there was a slight increase in scores between the pre-group and session 1, followed by a gradual decrease across other time points.

### Generalised Anxiety Disorder-7 (GAD-7)

A repeated measures ANOVA indicated that Mauchly's test was significant for the main time effect ($p<.001$). Therefore, the assumption of sphericity was not met and Greenhouse-Geisser corrected significance values were used. A significant effect of time was identified ($F_{2.22,39.92} = 3.36$, $p = .04$, $\eta_p^2 = 0.16$). The within-subject contrast between the first two time points and the last two time points was significant ($F_{1,18} = 5.80$, $p = .03$, $\eta_p^2 = 0.24$), indicating that anxiety scores decreased significantly over treatment. There was no interaction between time and group ($F_{2.22,39.92} = 1.26$, $p = 0.30$, $\eta_p^2 = 0.07$). As shown in Fig. 3, there was a small increase in scores between the pre-group session and session 1, following which scores gradually decreased.
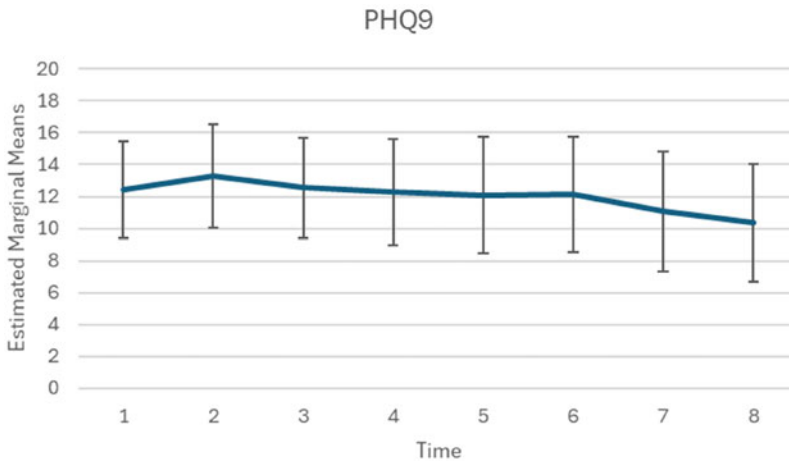
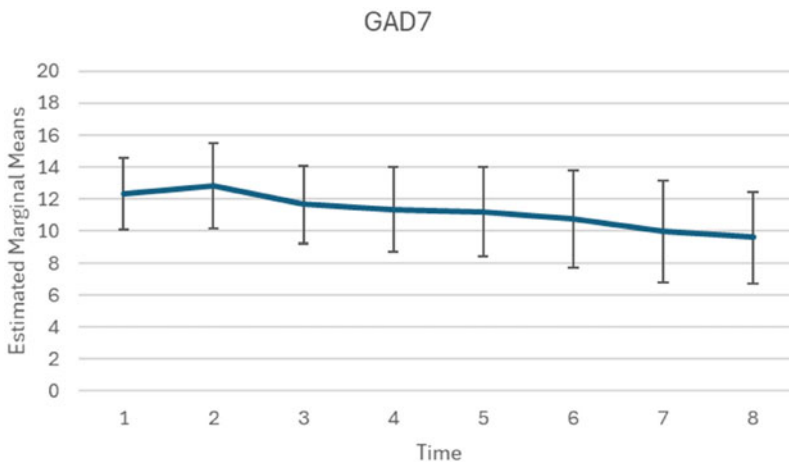**Figure 2.** Graph of scores on the Patient Health Questionnaire-9 (PHQ-9).



**Figure 3.** Graph of scores on the Generalized Anxiety Disorder (GAD-7) scale.

### Work and Social Adjustment Scale

A repeated measures ANOVA indicated that Mauchly's test was significant for the main time effect. Therefore, the assumption of sphericity was not met and Greenhouse-Geisser corrected significance values were used. Although the time effect was significant ($F_{2.68,48.24} = 3.17$, $p = .04$, $\eta_p^2 = 0.15$), the within subject contrast between the first two time points and the last two time points was not significant ($F_{1,18} = 2.28$, $p = .15$, $\eta_p^2 = 0.11$). There was no interaction between time and group ($F_{2.68,48.24} = 0.81$, $p = .48$, $\eta_p^2 = 0.04$). An increase was noted between the pre-group and session 1 as can be seen in Fig. 4. This parallels a smaller increase in the GAD-7 between the first two time points, as can be seen in Fig. 3.

### Intolerance of Uncertainty Scale (IUS-12)

A repeated measures ANOVA indicated that Mauchly's test was significant for the main time effect. Therefore, the assumption of sphericity was not met and Greenhouse-Geisser corrected significance values were used. A significant effect of time was identified ($F_{2.25,40.57} = 6.24$, $p = .003$,
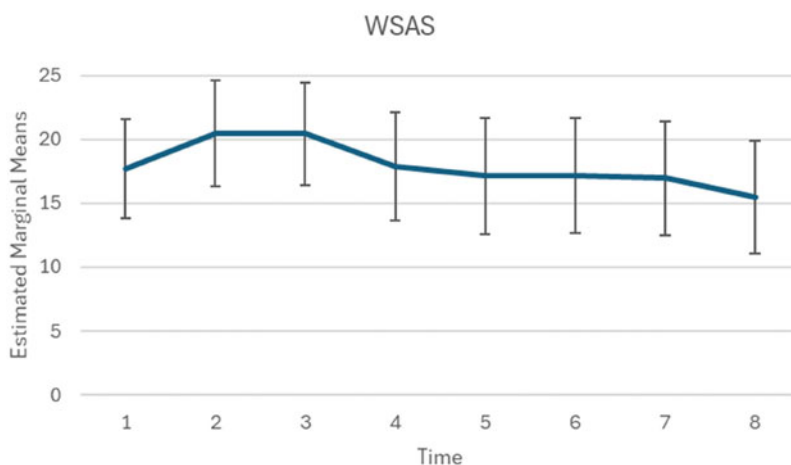
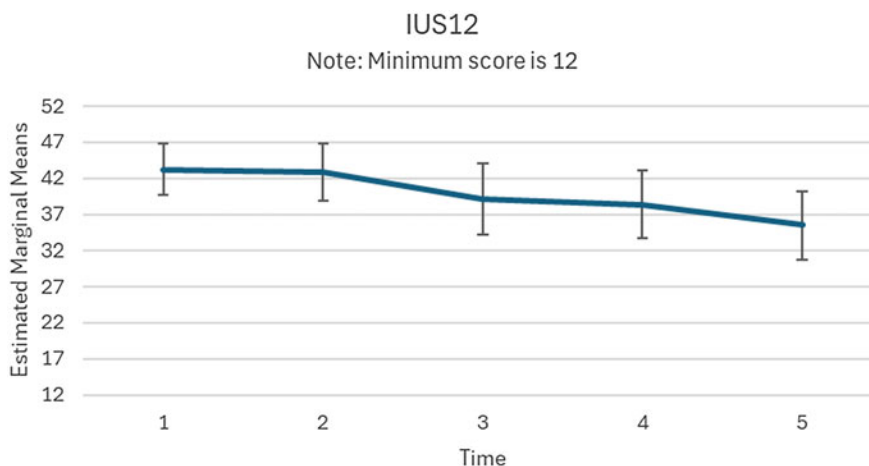**Figure 4.** Graph of scores on the Work and Social Adjustment Scale (WSAS).



**Figure 5.** Graph of scores on the Intolerance of Uncertainty Scale (IUS-12).

$\eta_p^2 = 0.26$) and the within-subject contrast between the first two time points and the last two time points was significant ($F_{1,18} = 9.16$, $p = .007$, $\eta_p^2 = 0.34$), indicating a significant decrease in IU during treatment. There was no interaction between time and group ($F_{2.25,40.57} = 1.69$, $p = .20$, $\eta_p^2 = 0.09$). Scores appear to gradually decrease across time points, as shown in Fig. 5.

### Anxiety Disorder Specific Measure (ADSM)

A repeated measures ANOVA indicated that Mauchly's test was significant for the main time effect. Therefore, the assumption of sphericity was not met and Greenhouse-Geisser corrected significance values were used. A significant effect of time was identified ($F_{1.78,32.03} = 7.21$, $p = .003$, $\eta_p^2 = 0.29$) and the within-subject contrast between the first two time points and the last two time points was significant ($F_{1,18} = 10.28$, $p = .005$, $\eta_p^2 = 0.36$). There was no interaction between time and group ($F_{1.78,32.03} = 0.99$, $p = .38$, $\eta_p^2 = 0.05$). Scores appear to gradually decrease across time points and there was a slight increase in between session 6 and follow-up as shown in Fig. 6.
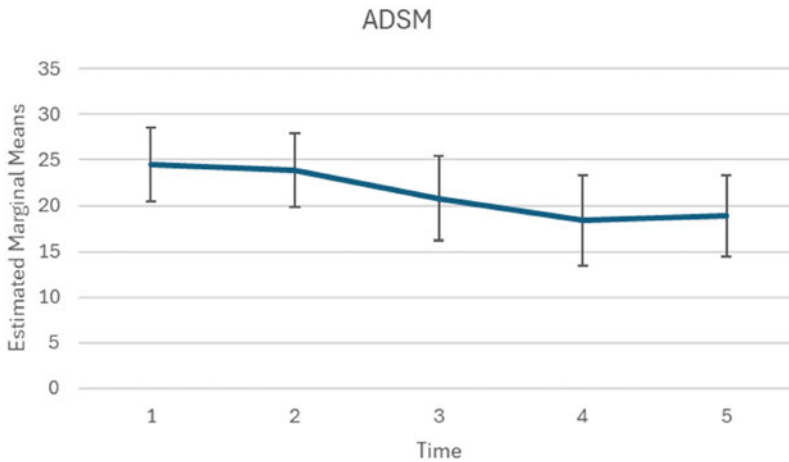
**Figure 6.** Graph of *Z*-scores on the Anxiety Disorder Specific Measures (ADSMs).

**Table 4.** Intention-to-treat effect sizes

| Measure | Cohen's *d* | Lower confidence interval | Upper confidence interval | Interpretation |
|---|---|---|---|---|
| Patient Health Questionnaire-9 | 0.375 | −0.084 | 0.824 | Small–medium |
| Generalized Anxiety Disorder-7 | 0.544 | 0.067 | 1.008 | Medium |
| Work and Social Adjustment Scale | 0.268 | −0.182 | 0.711 | Small |
| Intolerance of Uncertainty Scale-12 | 0.890 | 0.361 | 1.402 | Large |
| Anxiety Disorder Specific Measure | 0.792 | 0.280 | 1.289 | Large |

**Table 5.** IUS-12 and ADSM effect sizes separated by completer status

| Measure | Status | Cohen's *d* | Lower confidence interval | Upper confidence interval |
|---|---|---|---|---|
| IUS-12 | Started | 0.125 | −0.684 | 0.923 |
| | Completed | 1.289 | 0.558 | 1.993 |
| ADSM | Started | 0.031 | −0.771 | 0.830 |
| | Completed | 1.124 | 0.435 | 1.787 |

### Effect sizes

The ITT effect sizes for IUS-12 and ADSM were large, as shown in Table 4. While the point estimate of effect size is encouraging, it is important to note that the confidence intervals are wide. As shown in Table 5, when separating participants who started the intervention from those who completed it, the overall effect size was carried by those who completed the treatment. Furthermore, partial attenders did not benefit to the same extent. Finally, there was a significant positive correlation between the number of sessions attended and change in ADSM ($r_{18} = .474$, $p = .035$) and IU ($r_{18} = .452$, $p = .045$) scores at follow-up compared with pre-group; the more sessions attended, the greater the change.

### Discussion

Overall, results indicate that participants experienced a significant decrease in intolerance of uncertainty as well as a significant decrease in symptoms of their particular anxiety disorder symptoms. Results also indicate an improvement in functioning and reduction in generalised

anxiety symptoms. Based on intention-to-treat analyses, there was no significant change in depression, an overall decrease for anxiety (GAD-7) and functioning, but the contrasts between the first two and the last two points were not significant. However, for IU, there was a significant decrease over time and the planned contrast between the first two and the last two points indicate a significant decrease from baseline and pre-treatment (combined) to session 6 and follow-up (combined). Visual inspection suggests that IU had decreased by the mid-point. Importantly, the standardised scores for each person's ADSM (i.e. the symptoms of their presenting problem) also decreased significantly, even though these were not targeted in the sessions. Large effect sizes were observed for IU and the ADSM, although this was carried largely by the 14 completers. Finally, there were moderate to large correlations between number of sessions attended and decreases on IU and the ADSM, suggesting a dose–response effect. Overall, results indicate that a 6-session transdiagnostic group intervention targeting IU alone led to a significant decrease in peoples' personally salient symptoms related to their presenting problem.

We observed that change in ADSM and IU started to occur early in the group sessions and by the mid-point of the group. We suggest that understanding what uncertainty is and how it manifests in day-to-day life, being aware of the sensation and being able to identify it and learning about behavioural responses to uncertainty were the most important interventions in this time frame. It seemed that this learning and development of awareness in relation to uncertainty and body sensations, contributed to change even before exercises to build tolerance had commenced. However, the changes observed by mid-point with relatively less change in the second part of treatment may in part be an artefact of last observation carried forward.

### Group retention

Uptake (20 out of 25) who were ultimately offered the treatment, and retention (14 out of 20 completers) in this group, was similar to reports from other IAPT services (Fanous and Daniels, 2020). Some contributing factors may have been that a pre-group appointment was offered with one of the facilitators with the purpose of identifying which disorder specific questionnaire would be appropriate, provide some initial psychoeducation on uncertainty, offer a rationale for this group intervention, and collect the first set of data. This seemed particularly important for this group given that uncertainty is generally 'offline' or out of awareness for many people, and so it might not have been immediately obvious to participants why they were being offered this intervention. The pre-group sessions were also used to allow participants to see the venue, meet the facilitators, have the experience of travelling there and finding somewhere to park. It is possible that this helped in two ways. Firstly, it allowed participants to titrate their experience of the uncertainty of attending the group, making it feel more approachable and less unknown. Secondly, it may have provided some scaffolding (Vygotsky, 1978) and helped both client and therapist to locate their Zone of Proximal Development in terms of experiencing uncertainty; some participants required more scaffolding than others to experience and contribute to the group.

### Disorder specific impact of transdiagnostic intervention

The data collected here build on evidence from an earlier proof of concept paper (Mofrad *et al.*, 2020) and more strongly make the case for a MFWU transdiagnostic intervention. The double baseline design with mid-point and follow-up measures, together with the use of different disorder specific measures, supports the idea that uniquely targeting the transdiagnostic process of intolerance of uncertainty in a group of people with mixed presentations, has a clinically significant impact on their specific disorders.

This has significant implications for Talking Therapies services set up to use disorder specific models [Clark (2011)] in the face of prevalent co-morbidity. There is an opportunity to treat

people who present with co-morbid and mixed presentations, but also use group therapy to treat people with varying presentations together with a specific, targeted, single-strand intervention. Many Talking Therapies services use brief screening appointments to determine a suitable intervention, and early identification of the presenting disorder is often encouraged by systems used to evaluate services. Providing that clients are assessed as suitable for an anxiety disorder intervention, this intervention relieves the pressure of getting that early identification of exactly which disorder right first time.

### Play

Although not proven to be causal, there is a hypothesised link between adventurous play in children as a mechanism for reducing risk for childhood anxiety and learning about uncertainty (Dodd and Lester, 2021). Within the group, we aimed to facilitate experiential uncertainty exercises in a way which felt safe enough for people to engage with, and provided various activities with a playful approach. Definitions of playfulness include describing this as 'an individual differences variable that allows people to frame or reframe everyday situations' (Proyer, 2015, p. 93; as cited in Proyer, 2017), and increased playfulness has been suggested to predict liking of complexity and unusual situations (Proyer, 2017). We found that playful experiences in the group such as games and tasks with an element of surprise or unknown outcome (Mofrad *et al.*, 2020) allowed participants to interact with uncertainty and start to build tolerance, and suggest that exploring the role of play would be a helpful angle for future research.

### Limitations

The sample is small as only two groups were completed. Our analysis was designed to be as robust as possible given this context, but clearly further groups with the same design would strengthen the findings. It is important to go beyond the co-occurrence of change in IU and specific symptom measures, a pre-requisite to the notion that IU mediates transdiagnostic change, and a significantly large sample would be needed to demonstrate mediation (Kazdin, 2007).

This study has used a strong quasi-experimental design (double baseline, mid-point and short-term follow-up) that is possible in routine settings which use routine outcome measurement. This allows novel treatments to be evaluated within a service setting with minimal additional resource and no funding, and is one approach to effectiveness research that can contribute rigorous practice-based evidence. However, controlled studies are also required but given the current evidence of effectiveness, we suggest that this should be against attention or active controls.

There are some limitations to the data. It was an oversight not to collect data on ethnicity in this evaluation and we consider that doing so may have enhanced our understanding of the results. We intend to collect data on ethnicity in further developments of this work. Not every participant completed every session, and some data has been carried forward, although this is a conservative procedure if earlier data points are used as it assumes no change. This could affect the reliability of the results. In future groups we could emphasise the importance of attendance to the success of the intervention. Likewise, missed sessions could be followed up more proactively to collect data immediately after the session has been missed.

The fact that data was not missing completely at random is unsurprising. Attendance in therapy generally may have an 'at random' component (e.g. illness, life event, transport failure, etc.), but there are reasons why services have 'did not attend' (DNA) policies. In the absence of specific interventions, there is a general likelihood of prior/cumulative non-attendance leading to later non-attendance and eventual disengagement. There will be multiple and often interacting reasons for this. The last observation carried forward approach used in this study represents a trade-off. Under conditions of data not missing completely at random (i.e. NMCAR), other approaches (e.g. multiple imputation, full information maximum likelihood, etc.) are considered

superior (e.g. Lachin, 2016). However, many studies conducted in routine services report only completer data (rather than ITT) which represents a serious threat to validity and a high risk of over-interpreting results, especially where endpoint data may be a small (often unknown/unreported) proportion of start point data. We would suggest that any established ITT approach is probably better than completer analyses alone. Within the context of practice-based research accessible to practitioners, the last observation carried forward represents an intuitive approach in that the assumption is that, on average, no (further) change occurred since last observation. While it may be sub-optimal relative to other approaches and statistically biased in its assumptions about distribution of data at later time points, it remains within the reach of clinicians developing practice-based evidence in routine services. Thus the last observation carried forward approach used in this study to facilitate ITT analyses remains a limitation relative to more sophisticated approaches, but relative to completer only analyses, it is a strength.

The conditions across the two groups were not exactly the same in that different clinicians delivered the two groups. This possibly indicates that the outcomes are generalisable given that they were consistent across the two groups and therefore not specific to the clinicians delivering them. We did test group×time interaction effects, but they were not significant.

### Future directions

Further replication and adapting the protocol for remote delivery with some consideration to the activities, for example using online games that include an element of chance or surprise, would strengthen the evidence. Talking Therapies services have adapted considerably to remote working and this intervention is flexible enough to be included in these changes, providing that the experiential elements are retained.

As this work originated from the Laval model of GAD and its treatment (Robichaud and Dugas, 2006; Wilkinson *et al.*, 2011), it could be used to enhance and flesh out uncertainty interventions in the context of disorder specific treatment of GAD, although there are questions about whether multi-component treatments are the way forward for GAD (see Freeston, 2023). The role of play seems to be important and requires further investigation as to how experiences of play facilitate learning about uncertainty in adults.

Running parallel to the MFWU group intervention has been the development of the Uncertainty Distress Model (Freeston *et al.*, 2020) which is not specific to anxiety disorders, is trans-situational, and focuses on '*the subjective negative emotions experienced in response to the as yet unknown aspects of a given situation*'. The experiences and interventions described in the Uncertainty Distress Model have been exemplified by the COVID-19 pandemic, and research is ongoing to examine its trans-situational nature (for example applicability to climate change). Interventions described in the model are building safety, managing information, challenging over-estimation of threat, and building tolerance to uncertainty. The MFWU group can be seen as the detail and elaboration of the developing tolerance to IU intervention arm of this model.

### Conclusion

This initial evaluation suggests that the MFWU group may be an efficient and effective way to deliver a highly specified transdiagnostic intervention for intolerance of uncertainty when people are treated in a mixed group format. This presents an alternative to a more traditional threat-based and disorder-specific CBT approach and an opportunity for more efficient treatment delivery. The data suggest that not only did people experience improvement on the IUS-12, but they also experienced improvement on their own disorder specific measure. Finally, we have presented here a strong quasi-experimental design achievable in routine practice combined with a novel way to analyse data from a transdiagnostic group that considers both measurement of the unique process being targeted, but also consideration of individual presenting symptoms.

> **Key practice points**
>
> (1) This evaluation provides further evidence that there may be clinical value in running a transdiagnostic treatment group focused on building tolerance to uncertainty in Talking Therapies services, which usually offer disorder specific treatments.
> (2) Proposed methodology for evaluating groups and transdiagnostic groups.
> (3) Providing enough scaffolding and some certainties is important in the early sessions to facilitate access to the group and help it feel approachable.
> (4) Using play and a playful approach to tasks provides an opportunity for experiencing and interacting with uncertainty.

## Further reading

**Freeston, M., & Komes, J.** (2023). Revisiting uncertainty as a felt sense of unsafety: the somatic error theory of intolerance of uncertainty. *Journal of Behavior Therapy and Experimental Psychiatry*, *79*, 101827. https://doi.org/10.1016/j.jbtep.2022.101827

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