Centre for Academic Mental Health
Bristol Medical School
Canynge Hall
Bristol

Helen.bould@bristol.ac.uk

STUDY PROTOCOL

A feasibility study of a Virtual Reality café for people with eating disorders

Short title: Virtual Reality café for people with eating disorders

Research Reference Numbers

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KEY STUDY CONTACTS

Chief Investigator Dr Helen Bould
Centre for Academic Mental Health
Population Health Sciences
Bristol Medical School
University of Bristol
Canynge Hall
39 Whatley Road
Bristol
BS8 2PS
Email: helen.bould@bristol.ac.uk

Study Co-ordinator Dr Laura Chapman
Centre for Academic Mental Health
Population Health Sciences
Bristol Medical School
c/o School of Psychological Science
University of Bristol
12a Priory Rd
Bristol
BS8 1TU
Email: laura.chapman@bristol.ac.uk

Sponsor	University of Bristol Email: research-governance@bristol.ac.uk
Funder(s)	NIHR Advanced Fellowship (302271)
Key Protocol Contributors	Prof Angela Attwood Dr Lucy Biddle Prof Peter Blair Dr Gillian Combe (CAG) Mr James Downs (PPI) Prof Tamsin Ford Ms Alys Grant (PPI) Prof Paul Moran Dr Anne Stewart Prof Lucy Yardley Prof Ian Penton-Voak Dr Bernhard Spanlang
Advisory Groups	PPI Advisory Group Clinician Advisory Group (CAG)
R&D Department	Gloucestershire Health and Care NHS Foundation Trust Address: Fritchie Centre Charlton Lane Cheltenham GL53 9DZ Country: England Main Contact: Robert Mullen Main Email: Robert.mullen@ghc.nhs.uk Main Tel: 0300 4215946 Oxford Health NHS Foundation Trust Address: Warneford Hospital Sandford Road Littlemore Oxford Oxfordshire OX4 4XN Country: England Main Contact: TBC Main Email: TBC Main Tel: TBC
Local RDN	South West Central Email: swc.rrdn@nihr.ac.uk Tel: 0117 3421375

STUDY SUMMARY

Full Title of Study	A feasibility study of a Virtual Reality (VR) café for people with eating disorders
Short Trial Title	Virtual Reality café for people with eating disorders
Study Design	Feasibility testing (using mixed methods) a newly developed intervention
Study Participants	Aged 14-25 with any eating disorder currently receiving treatment
Planned Size of Sample (if applicable)	30
Planned Study Period	Site set up Jan 2026 – June 2026; Recruitment June 2026 – October 2027
Research Question/Aim(s)	Is it feasible to recruit, retain and follow-up people with eating disorders to receive a Virtual Reality café intervention in addition to their usual treatment? The aim of this study is to establish whether it is feasible to recruit and follow-up people with eating disorders to receive our newly-developed VR café intervention in addition to their normal treatment. We will assess: - Recruitment: how many patients are eligible, approached for consent and consent to participate? - Retention: how many of recruited participants complete the study - Completeness of outcome data - Which eating disorder diagnoses the potential participants we approach and recruit have, and how useful different groups find the intervention - At what stage of treatment participants join the study and how useful they find they intervention at different stages - What approached and recruited participants receive in terms of their Treatment as Usual, and how well the intervention fits with their usual treatment - The acceptability of receiving the intervention - How many sessions participants complete and which aspects of the intervention they use most - Which clinician(s) are best placed to support the delivery of the intervention - Whether our outcome measures are acceptable and relevant - Any adverse experiences in relation to the intervention

	We will collect both qualitative and quantitative data from participants and the clinicians supporting the delivery of the intervention to assess these outcomes.

FUNDING AND SUPPORT IN KIND

FUNDER(S) **(Names and contact details of ALL organisations providing funding and/or support in kind for this study)**	**FINANCIAL AND NON FINANCIAL SUPPORT GIVEN**
National Institute for Health Research (NIHR)	**Advanced Fellowship £2,068,972.00**

ROLE OF STUDY SPONSOR AND FUNDER

The University of Bristol is the sponsor for this study and has arranged Public Liability insurance to cover the legal liability of the University as Research Sponsor in the eventuality of harm to a research participant arising from management of the research by the University.

The University of Bristol holds Public Liability insurance to cover the legal liability of the University, for harm to participants arising from the design of the research, where the research protocol was designed by the University.

The University of Bristol's Public Liability insurance policy provides an indemnity to our employees for their potential liability for harm to participants during the conduct of the research.

The funder is the National Institute for Health Research NIHR Advanced Fellowship award.

The Sponsor (University of Bristol) will have overall responsibility for the initiation and management of the study, but on a day-to-day basis this responsibility will be delegated to the chief investigator, and study management team. The views expressed in the outputs will be those of the author(s) and not necessarily those of the NHS, the National Institute for Health Research or the Department of Health and Social Care.

BACKGROUND & RATIONALE

Eating disorders are serious illnesses, which commonly emerge during adolescence and early adulthood (1). They are associated with substantial physical and psychosocial impairment (2) and high mortality rates (3). Less than half of those affected fully recover (4), and in the context of a range of barriers to accessing eating disorder treatment (5) and considerable unmet need (6), new, accessible treatments are urgently needed. Virtual Reality (VR) is increasingly being explored in relation to its utility in the treatment of a range of mental illnesses; the medium offers novel opportunities to improve mental health treatment availability and consistency (7). Further, there is evidence that learning achieved through mastery of virtual simulations of challenging scenarios can be transferred to real life (7), and that VR treatments may be beneficial in the context of eating disorders (e.g.(8)).

In our previous qualitative work with people with personal experience of eating disorders, participants indicated that a 'VR café environment' within which people can practice challenging activities in relation to social eating, may be a useful treatment adjunct (9). Social impairment in relation to eating is frequently given as a reason for seeking treatment, and analysis of the Clinical Impairment Assessment (CIA) (10), frequently used to assess the impact of an eating disorder on someone's life, finds that items relating to social eating load most highly on the overall questionnaire.

We have previously described the challenges people with eating disorders experience in cafés, as well as the perspectives of parents/carers and clinicians on the challenges experienced in these environments (11). In these interviews and focus groups, we also elicited views to inform the design of a set of scenarios to practice in a VR café environment. Using the Person-based Approach described by Yardley et al (12), we used data from these interviews to specify the key components and initial design of our VR café (13), and our industry partners *Virtual Bodyworks* began its creation.

We then sought further detailed feedback from people with lived experience of eating disorders aged 14-25 on the content of aspects of the VR café intervention, such as what to include on the menus, and the scripts for the avatars. Once an initial version of the café had been created in VR, we carried out real-time user studies with people with lived experience of eating disorders, including think-aloud interviews (as described in the Person-based Approach (12)) and qualitative interviews. We also sought input from our clinician advisory panel, to further optimise the café scenarios. Through this process we have created a series of VR café scenarios within which participants can choose the level and type of challenge they want to face. They can choose how 'busy' and 'noisy' the virtual café is; whether they look at a menu with or without calorie information; whether the avatar who takes their order is 'friendly' or 'unfriendly'; and several different challenges in terms of the interaction with the avatar who takes their order.

We have also used the Person-based Approach to develop training materials for the clinician, to guide them in how to support someone with an eating disorder to get the most benefit from their VR café experience.

This study seeks to test whether it is feasible to recruit, retain and follow-up people with eating disorders to receive the VR café intervention in an NHS clinical setting, in addition to their usual treatment, and to explore how it is used in this setting and which patient groups find it useful.

A Patient and Public Involvement (PPI) group has been involved in the VR Café project from the very start, helping select the idea of a VR café as an intervention to develop and contributing to the funding application, the design of the research studies we have conducted, and to the design of the VR Café itself. The PPI group has also been involved in the design of this feasibility trial, and they have reviewed and provided feedback on the study documents, including this protocol. All members of the PPI group have personal experience of eating disorders.

Research Questions & Aims

Is it feasible to recruit, retain and follow-up participants with eating disorders to a study adding a Virtual Reality café intervention to their usual treatment?

The aim of this study is establish whether it is feasible to recruit, retain and follow-up participants with eating disorders to receive our newly-developed VR café intervention in addition to their normal treatment. We will also assess the feasibility of collecting outcome data and assess the completeness of these data.

We will assess:

- Recruitment: the number and proportion of patients who are potentially eligible, approached for consent, and consent to participate (routes via which participants were approached or contacted the relevant NHS research team will be documented)
- Retention: the number and proportion of participants completing the study
- Demographic, diagnosis and service use data on the individuals we recruit and what other treatment they receive

- The numbers of sessions of VR completed, and the pattern of use of the VR intervention
- The acceptability of the intervention, including via qualitative interviews
- Any adverse experiences in relation to the VR intervention

We will collect both qualitative and quantitative data from participants, parents of younger participants, and clinicians, as well as attempting to collect demographic and qualitative data from potential participants who decide not to participate.

We will also passively collect eye-tracking data to enable us to have a more detailed understanding of what participants attend to within the VR environment.

Study Design

Participants will be invited to participate (via routes detailed in "Participants & Recruitment", below), and consenting participants will be offered up to 6 VR café sessions as well as continuing their usual treatment. VR café sessions will be offered by up to 3 clinicians within the eating disorder team and by 1-2 members of the relevant NHS research team with experience of working in mental health.

We will collect quantitative and qualitative data as detailed in "Measures and materials" (below), and this will include collecting outcome measures in terms of symptoms, quality of life, and service use. These measures will guide the selection of the primary outcome measure to use in a full trial of the intervention.

Variations in study processes in relation to participants who are under 18 years of age are detailed on pages 11 and 12.

Study Site

The study will take place in Gloucestershire Health and Care NHS Foundation Trust and Oxford Health NHS Foundation Trust. The Gloucestershire Health and Care NHS Foundation Trust sites will be the Eating Disorder Team (Brownhills) and/or the Research Centre (Fritchie Centre), and the Oxford Health NHS Foundation Trust sites will be Marlborough House Inpatient Unit and/or the Research Centre (Warneford Hospital).

Clinician Support & Training

The VR intervention will involve sessions of up to an hour in length, in which the participant will use the VR café scenarios with support from the clinician. The clinician will work with the participant to plan, support and debrief from the VR café intervention. The intervention can be delivered either by the participant's own clinician within the Eating Disorder team (if they have been trained to do so), or by a member of the relevant NHS research team with experience of working in mental health, according to clinician availability and participant preference.

We will train up to 3 clinicians working in each Eating Disorder team, and 1-2 members of the NHS research team with mental health training in each Trust, in both the technical aspects of using the VR scenarios (how to use the VR headset; how to screen-cast the headset visuals to a laptop), and to offer support to the participant before, during and after they use the VR scenarios (supporting the setting of personal goals for what they want to gain from the sessions; planning which VR scenario to try in each session; offering appropriate support if needed during the VR scenario; and debriefing them following each VR scenario). This

training will take place in a small group during study set up, and will be delivered by PI Dr Helen Bould and Dr Laura Chapman. It will take around 4 hours. Clinicians will also have access to a booklet covering all aspects of this training, which they can refer to between and during sessions as needed. During the trial, clinicians will continue to receive their usual clinical supervision.

Participants and Recruitment

Participants will be recruited by the following routes:

- Posters in the Eating Disorders clinic waiting room(s), inviting patients, and parents of 14–15-year-old patients, to contact the relevant NHS research team if they would like to participate
- Information on the Eating Disorders team websites, inviting patients, and parents of 14–15-year-old patients, to contact the relevant NHS research team if they would like to participate
- Clinicians in the Eating Disorders teams identifying patients, and parents of 14-15-year-old patients who would be eligible and inviting them to participate. Those who decline will be asked if they are happy to share why they do not want to participate, and if they would be happy to be contacted by the NHS research team to find out about a study being run to learn more about why people decide not to take part.

Numbers of participants recruited via each pathway will be documented and a member of the relevant NHS research team will contact clinicians in their Trust's participating eating disorders team by email weekly to ask which of their patients they have approached to invite to participate, how many have agreed to participate, how many have declined to participate, and of those declining, how many have agreed to be contacted by the NHS research team about participating in an interview about why they have declined.

Participants will be thanked with a £20 Love2Shop voucher for each hour of time they spend on the study. Reasonable transport costs to attend additional appointments will also be reimbursed.

Inclusion criteria

- People aged 14-25 years with an eating disorder who find social eating challenging and who are currently receiving treatment in a participating NHS eating disorder service.
- People who consent to participate
- [For 14-15 year olds] people who assent to participate and for whom someone with parental responsibility consents to their participation

Exclusion criteria

- People who lack competence (14/15 year olds) or capacity (16+ year olds) to consent/assent to participate as assessed during the consent process
- People who are not able to travel to VR Café sessions
- People who are not fluent in spoken English
- Members of the project Patient and Public Involvement (PPI) group.

Sample size

We aim to recruit 30 patients in total.

Selection criteria

Participants will be approached by the clinical care team to participate based on their eligibility; some may also read about the study on the eating disorder team websites or in clinic waiting rooms.

Withdrawal of participants

Participants will be informed that they can withdraw from the study at any time.

Measures and Materials

Intervention: Virtual Reality café

We have created a VR café in which participants can make the following choices, as well as (with clinician support) setting themselves challenges in relation to what drink and food to order, giving multiple unique scenarios.

1. Choice of interaction
    a. Friendly waiter, straightforward interaction
    b. Friendly waiter, order unavailable
    c. Friendly waiter, commenting on appearance
    d. Friendly waiter, order unavailable, commenting on food choice
    e. Unfriendly waiter, straightforward interaction
    f. Unfriendly waiter, order unavailable
2. How busy the café is
    a. Quiet
    b. Mid
    c. Busy
3. Menu
    a. Drink menu only, with or without calorie information
    b. Food and drink menus, with or without calorie information

When they first try the VR café, participants also hear an audio explanation about the purpose of the VR café and how it works.

Alongside this, we have developed a document for clinicians, which explains the development of the VR café, its purpose, and the rationale for its use. This document details the available scenarios, and describes to clinicians how to support patients to get the most out of the VR café, including prompts for how to set goals and plan what to try, how to support participants during a session, and how to debrief them following the session.

Quantitative Measures

The main aim of this study is to assess the feasibility of using this novel intervention alongside treatment as usual within the NHS. We will therefore collect data on recruitment, retention, acceptability of the intervention and any adverse experiences, including by participant age, diagnosis, site, other treatment they are receiving, and route via which they were recruited.

We will also assess adherence to treatment and fidelity to the intervention. We have a low threshold for judging adherence to the intervention, as part of the feasibility work is to determine how many sessions are likely to be needed: for some individuals one session experiencing the VR café may be sufficient to enable them to meet their goals, whilst others may need many more sessions. Numbers of sessions delivered in this feasibility trial will inform the number offered in a subsequent randomised trial.

Sociodemographic Information

- Age
- Gender
- Ethnicity
- Highest/current level of education
- Living arrangements
- Current employment status

Feasibility of Recruitment & Retention

- Number of potentially eligible patients in the clinical setting(s)
- Number of patients approached to participate via each recruitment route (where applicable)
- Number of participants consenting to participate
- Number of potential participants declining to participate (and reasons given)
- Number of participants who consent to participate who remain in the trial at follow-up

Feasibility of Assessment Battery

- Number of participants completing all measures at baseline
- Number of participants completing all measures at the end of session 1, and at 6 week and 3-month follow-up

Feasibility of the Intervention, including Adherence and Fidelity

- Which clinician delivers the intervention (own clinician or member of the NHS research team with experience of working in mental health)
- Engagement metrics in relation to VR: participant goal-setting re which scenarios they want to try and how many times they want to try it; number (and which) VR sessions completed; time spent using VR; how often scenarios are repeated. Participants will be viewed as adhering to the intervention when they have completed at least one VR scenario. At the end of 6 sessions (the longest duration offered within the trial) participants and clinicians will be asked if they think further sessions would have been useful.
- Fidelity to the treatment will be measured by asking both the participant and the clinician to complete a brief measure at the end of each session, documenting whether they (1) set goals in relation to the VR scenario they would try, (2) tried one or more VR scenarios, and (3) discussed the experience of completing the scenario and reviewed their goals. They will need to have completed all three for the session to be judged to have been delivered as planned.
- Acceptability of the VR intervention to participants, through the proxy measures above, as well as by questions on satisfaction, perceived burden, ease of use and likelihood of recommending to others.
- Any adverse reactions to VR (e.g. motion sickness; stopping a session due to distress)

Questionnaire Measures (Appendix 1)

Measures in relation to cafés (at baseline, end of session 1, 6 weeks after first session, 12 weeks after first session)

- Anxiety & avoidance measures – how anxious are participants about going to & ordering in café's and how much do they avoid this
- Self-efficacy measure – how able do participants feel to undertake various tasks in a café setting
- Behavioural measures – how often do participants visit cafés

Measures in relation to their eating disorder, its impact on their life, and comorbidities (at baseline, 6 weeks after first session, 12 weeks after first session)

- EDEQ
- Short ARFID questionnaire
- CIA
- GAD7 (18 –25 year olds)
- PHQ9 (18 – 25 year olds)
- RCADS (<18 year olds)

Measures in relation to VR

- Simulator sickness questionnaire (baseline and end of each session)
- Sense of presence (end of first session)

Service Use Measures (gathered from Electronic Health Records encompassing the period from commencing the study to 3 month follow up)

- Recorded diagnosis, comorbidities and prescribed medication
- Nature of "treatment as usual" being received
- Number & timing of clinical contacts within the eating disorders team, by professional group, before and after consenting to study participation
- Number & timing of clinical contacts within the mental health trust, by professional group before and after consenting to study participation
- BMI/% Weight for Height at the point of (1) starting treatment, (2) joining the study and (3) at 3 month follow up (to help inform whether, for those for whom weight restoration is part of treatment, there is an optimum time during weight restoration to engage in this treatment)
- Number of GP contacts during study participation
- Number of contacts with other health professionals during study participation
- Number of A&E contacts during study participation
- Duration of admission [for inpatients] before and after consenting to study participation
- Legal status of admission [for inpatients] before and after consenting to study participation

Intervention Development work: Head, Hand and Eye-Tracking Data

The VR headsets used in this study include integrated eye-tracking technology as well as having the ability to track head and hand movements. With participants'/parents consent/assent, we will collect and store this data during VR café sessions. These data will allow us to analyse how individuals interact with the virtual environment and help us to improve how straightforward the café is to use. Eye-tracking data will allow us to analyse where participants look within the virtual environment, how long they focus on specific elements (e.g. menus, avatars of different sizes, surroundings including food), and how their gaze patterns change over time. This will help us better understand how people interact with the VR café and which features capture or hold their attention. The purpose of analysing this information is to inform future improvements to the design and content of the VR intervention.

Qualitative Measures

We will seek separate consent to conduct qualitative interviews with 10 participants who have participated in the study and 4 parents of 14-17-year-old participants. We will aim to also recruit 3-4 eligible individuals who declined to participate, though we anticipate that it may not be possible to do so.

We will also conduct qualitative interviews with the clinicians who deliver the VR intervention (anticipated N=4).

Interviews will be held soon after people complete their VR sessions; soon after decline to participate (those who decline); and at the end of the study (clinicians). Interviews will be semi-structured and will follow topic guides which will be reviewed by our PPI and clinician advisory groups. They will be conducted by a member of the University of Bristol research team. Written prompts based on the topic guide will be provided for individuals who wish to submit comments by e-mail instead of participating in an interview.

Participant topic guide

The topic guide for participants will seek to elicit negative as well as positive feedback on: the process of recruitment into the study; information they received prior to the intervention; their experience of using the VR café; their experience of the clinician support with the intervention; the quantitative measures they completed, whether these were appropriate, whether any additional measures should have been included; whether they feel the VR café scenarios were useful in supporting their recovery and in what ways; whether they experienced any negative impacts from the intervention; whether the intervention could usefully be integrated into clinical practice; positive and negative aspects of participating in the trial; how the trial could be improved for future participants; how they would feel about being invited to participate in a randomised trial where they might not receive the intervention.

Parent topic guide

The topic guide for parents of 14-17-year-old participants will seek to elicit negative as well as positive feedback on: the process of recruitment into the study; information they received prior to the intervention; their thoughts on their child's experience of using the VR café; their experience of their child's clinician's support with the intervention; whether they feel the VR café scenarios were useful in supporting their child's recovery and in what ways; whether their child experienced any negative impacts from the intervention; whether the intervention could usefully be integrated into clinical practice; positive and negative aspects of participating in the trial and how the trial could be improved for future participants; how they would feel about being invited to participate in a randomised trial where they might not receive the intervention .

Decliner topic guide

The topic guide for decliners will include questions on their reasons for not wishing to participate; any previous experience of using VR or receiving treatment for their eating disorder that has contributed to this; any changes that could have been made to the proposed study that might have led them to agree to participate (e.g. exploring barriers such as the need to travel to the research centre; additional time needed). We anticipate that this group will be challenging to recruit and in case it is not possible to recruit to this group will also keep notes on reasons given for declining to hear more about the study at the point at which they decline to participate. Written prompts based on the topic guide will also be provided for individuals who wish to submit comments by e-mail instead of participating in an interview.

Clinician topic guide

The topic guide for clinicians will include questions on their experience of facilitating the VR café (seeking to elicit negative as well as positive feedback); their experience of the clinician training and clinician support documents; whether they feel the VR café scenarios were useful in supporting recovery for any participants

they completed it with, and in what ways; whether they noticed any differences between participants who found the intervention useful and those who did not; whether any patients they worked with experienced any negative impacts from the intervention; whether the intervention could usefully be integrated into clinical practice; positive and negative aspects of participating in the trial and how the trial could be improved for future participants, how they would feel about being involved in delivering this intervention in a randomised trial where patients they recruited might not receive the intervention.

Procedures

Eligibility screening and consent

When an interested potential participant makes contact with a member of the relevant NHS research team in response to study publicity materials, or after invitation by their clinician, the relevant NHS research team will send them a digital copy of the Participant Information Leaflet and a consent form, and will arrange a video call with the participant to take place once they have had at least 48 hours to read and consider the information leaflet. In the consent call, eligibility to take part in the study will be checked, and eligible potential participants will be asked about their understanding of what the study involves. They will be given the opportunity to ask any questions they might have. Participants will also be asked if there are any adjustments they may require (such as regular breaks, physical access arrangements). Participants who are aged 16 or 17 will be strongly encouraged to inform their parent or guardian about the study, and will be asked if the NHS research team can send a parent information sheet to their parent or guardian. It will be made clear during the consent call that the 16-17 year old participant would still be able to participate in the study, even if they decide not to let their parent/carer know about the study, or if their parent/carer prefers them not to take part. Ineligible participants will be thanked for their interest in the study, and it will be explained to them why they are not able to participate in the study.

All participants will be required to return their completed consent form by email before they can participate.

If there are too many simultaneous interested participants for the study team to manage, the NHS research team will invite people to consent in the order in which they contacted the team. The exception to this will be where there are 14 & 15-year-olds in the group – these individuals will be prioritised for participation as we anticipate that they may be harder to recruit.

Variations in relation to 14- & 15-year-olds
For participants aged 14–15 years, we will seek parental consent in addition to the young person's assent before participation can begin. The parent/carer will be provided with a Parent/Carer version of the Participant Information Leaflet and consent form, and the young person will be provided with an age-appropriate Participant Information Leaflet and assent form. Both will be invited to the video consent call. The member of the research team conducting the consent call will ensure that both the parent/carer and the young person understand the nature and purpose of the study and their rights, including the right to withdraw at any time. Assent from the young person will only be sought after the parent/carer has provided written consent, and both must agree for the young person to participate. Participants who have their 16th birthday during their participation in the study will at that point be consented.

Baseline Data
On completion of the necessary form(s), participants will be sent an email link and asked to complete the baseline questionnaire measures; if these are not received, the relevant NHS research team will follow up by email and phone to encourage and support completion, on a maximum of 3 occasions.

Once baseline measures have been completed, the NHS research team will contact the participant's clinician to let them know that the participant has joined the trial.

VR Sessions

Participants will then begin their clinical sessions using the VR café. The clinician and the participant will be given a unique participant ID to use on each occasion when they use the VR headset, and this will allow the VR app to collect passive data on how many times and when they log in, which scenarios they complete (including all the choices they make in each scenario) and how long they spend in the VR scenarios. They will be offered up to 6 sessions over 6 weeks using the VR café, in addition to their normal treatment. In the first session, the clinician will support the participant to set goals in relation to their use of the VR café, including which scenarios they want to try out and how many times they want to try it, and what the aim of using the VR café is for them. Goals will be revisited at the start of each VR session, and the clinician and participant will agree together when they have completed the work. At the end of 6 sessions (the longest duration offered within the trial) participants and clinicians will be asked if they think further sessions would have been useful. Understanding whether and how the optimal number of sessions might vary between individuals, and whether it is possible to set an optimum number of sessions, is an important part of the feasibility work and will inform subsequent trials.

Follow up

End of first VR session
Immediately after the first VR session, a member of the relevant NHS research team will email the participant the end of session one treatment questionnaires to complete. They will follow up with the participant by email and phone (maximum of 3 attempts) if they do not complete the questionnaires.

Six weeks after first VR session (end of treatment)
At six weeks after their first VR session, a member of relevant the NHS research team will email the participant the end of treatment questionnaires to complete. They will follow up with the participant by email and phone (maximum of 3 attempts) if they do not complete the questionnaires.

Three months after first VR session

Three months after their first VR session, participants will be contacted by the NHS research team to complete follow up questionnaires. They will also be followed up by email and phone (maximum of 3 attempts) if they do not complete the questionnaires. At this point they will also receive debrief information.

Adverse events

The Principal Investigator will assess all adverse events for seriousness, causality and expectedness and they will be recorded and reported from the point completing the first VR session until the 3-month follow-up assessment or the point of withdrawal from the study. Hospitalisations for elective treatment of a pre-existing condition will not be reported as serious adverse events. All Quality events will be managed in accordance with the Sponsor's Quality Event Form.

Qualitative Study

General Procedure

We will purposively sample participants to invite to interview, aiming to ensure we speak to people of a range of ages, including at least 2 individuals aged <16 years, participants of different genders, participants from different IMD groups, and participants with different eating disorders.

Participants will be asked if they would like to participate in a qualitative interview about their experience of participating in the study, and sent a specific Participant Information Leaflet (PIL) about the qualitative study (specific separate participant & parent/carer information leaflets will be used for each group of qualitative participants). After giving them the opportunity to consider the PIL for at least 48 hours, a member of the NHS research team will send them a consent form and contact them to arrange a video consent call in line with the consent process described for the main feasibility trial.

Following their video consent call, if they choose to participate and return a signed consent form, their contact details will be passed to the study team in the University of Bristol, who will arrange a time to conduct the interview. Participants will be given the choice to complete the interview either via videoconferencing software Teams, or in person either at the University of Bristol, or at the Fritchie Centre in Cheltenham (for individuals participating via Gloucestershire Health and Care NHS Foundation Trust) or Warneford Hospital (for those recruited via Oxford Health NHS Foundation Trust). Participants will be informed that the audio from any interviews they participate in will be recorded using a digital recording device. Participants may not want to share negative impressions of their therapeutic work/clinician if they are worried this information will be shared with their clinician, and so the PIL will make clear that their interview will remain confidential.

Recordings will be deleted from the digital recording device once they have been uploaded for transcription. Reasonable travel expenses will be refunded where incurred, and participants will receive a £20 Love to Shop voucher to thank them for their time.

Variations in relation to consent processes for 14-15 year olds will again be in place, and will be in line with those described on P11 in relation to the main study.

Variations in relation to Participants

Participants will be invited to express interest in participating in these interviews at the end of their use of the VR intervention, when they are contacted to complete their end of treatment questionnaires.

Variations in relation to Parents

Parents of 14-17-year-old participants will be invited to express interest in participating in these interviews when their children are contacted to complete their end of treatment questionnaires. Parents of 16-17 year olds will only be invited if the 16-17 year old participant has confirmed that their parent is aware that they participated in the study.

Variations in relation to Decliners

A member of the NHS research team will contact clinicians in the eating disorders team within their NHS Trust by email weekly to ask which of their patients they have approached to invite to participate, how many have agreed to participate, how many have declined to participate, and of those declining, how many have

agreed to be contacted by the NHS research team about participating in an interview about why they have declined, and the contact details of those individuals.

We anticipate that this will be a very challenging group to recruit, and that we may not succeed in recruiting to this group. We will therefore also note the reasons potential participants give for not choosing to participate in the trial at the time at which they decline. The reasons given will be anonymised.

Variations in relation to Clinician group

At the end of their delivery of the VR intervention, staff who have delivered the intervention will be asked by the University of Bristol research team if they would like to participate in a qualitative interview about their experience, and sent a PIL about the qualitative study.

End of the study

The feasibility trial will end when all three-month follow-up questionnaire data has been collected. The qualitative study will end when all interview data has been collected.

Analysis Plan

Feasibility Metrics

We have chosen a pragmatic sample size of 30 to enable us to estimate rates, and generate confidence intervals around recruitment and retention to inform future trials (e.g. if we were able to retain 24 to follow up, that would give us a retention rate of 80% (95% CI 62.7% to 90.5%)). In Gloucestershire Health and Care NHS Foundation Trust, between 8 September 2024 and 7 September 2025, a total of 475 patients aged 14-25 with an eating disorder began treatment in the Eating Disorders team and would likely be eligible for our trial. Between 1 October 2024 and 30 September 2025, 19 young people with eating disorders were admitted to Marlborough House (Oxford Health NHS Foundation Trust) and would likely have been eligible to take part. Our recruitment target of 30 (6.1%) is low, and we will aim to recruit 4 participants per month.

Metrics in relation to feasibility will be analysed to present descriptive statistics in relation to all the measures collected (as described under "Measures and Materials", above), as means (95% Confidence Intervals) or medians (Interquartile Range), and frequencies and percentages for categorical data.

We will assess the feasibility and acceptability of the trial design by calculating proportion (and 95% CIs) of participants: (1) consenting; (2) completing baseline measures; (3) attending at least one VR session; (4) completing follow-up assessments.

Quantitative Measures

The purpose of collecting questionnaire data is to allow us to describe the participant sample, the acceptability, variability and possible effect sizes in relation to the measures chosen, and to plan which measures are likely to be most informative in subsequent randomised trials. We will present the quantitative measures described in "Measures and Materials" descriptively, by group, including the proportion with complete data, for both questionnaire and service use data.

Qualitative Analysis

Interview audio-recordings will be transcribed verbatim. Transcripts will be anonymised and participant names will be replaced with pseudonyms. We will conduct a thematic analysis to capture findings from this

work. The data will be analysed both inductively and deductively, using the framework method described by Gale et al. (14). Coding of the full dataset will be conducted by one University of Bristol researcher, with a proportion of the dataset additionally being independently coded by at least one other University of Bristol researcher. Themes and subthemes will be generated iteratively through discussion between members of the University of Bristol research team. Results will be written up for publication.

Alongside this, data in relation to the intervention itself will additionally be used to inform the ongoing iteration of the intervention, using the Person-based Approach to intervention development, by adding to our Table of Changes. Such additions and revisions will also be reviewed by the project PPI group, should there be a lack of consensus from the study participants. Other members of the research team (e.g. clinical advisors, researchers) may also be consulted to help find solutions to any disagreements, as appropriate.

Ethical Considerations and Informed Consent

Ethics approval will be sought from the National Research Ethics Service. The study will be conducted according to the revised Declaration of Helsinki (2013) and the 1996 ICH Guidelines for Good Clinical Practice E6(R2). The participants (and their parents/carers where relevant) will access the information leaflets electronically, explaining the nature, purpose, and risks of the study to the participant. There will be no time restriction on how long participants take to respond, with the exception that participants who respond after all study places have been filled and before the screening survey has been closed will not be able to take part in the study. Therefore, participants will be given sufficient time to read the information and consider any implications, and to raise any questions with the investigators prior to deciding whether to participate.

Additional Ethical Considerations

Participants may find reflecting on their own experience of having an eating disorder distressing, and/or the experience of trying out the VR café intervention for eating disorders challenging. At the beginning of the first VR session, the clinician will discuss this with the participant, and they will agree how the participant will let them know if they are finding it difficult and discuss together the plan for the next steps should this occur. They will make clear to the participant that they can choose to stop the VR intervention at any point. They can subsequently choose either to try another VR intervention, or to return on another day to try another intervention, or to stop the VR sessions altogether, and this will not impact on any other care they receive. Occurrences of distress within VR Café sessions will be reported for review by the PI as possible serious adverse events, and where indicated the clinician delivering the VR Café sessions would discuss with the participant's main clinician or the wider eating disorders team, as appropriate.

Additional Ethical Considerations in relation to qualitative interviews

Participants may find reflecting on their own experience of having an eating disorder and using the VR café in treatment distressing. At the beginning of the interview, the University of Bristol researcher will discuss this possibility with the participant, and will discuss the Standard Operating Procedure (SOP) which is in place to manage this eventuality. The SOP includes detailed plans around follow-up in case of any concerns about a participant or participant drop-out from an interview. If an interview is being conducted by a researcher without medical training, a psychiatrist will be available should the researcher have any concerns about a participant's wellbeing, and to follow up via telephone call in the event that an interviewee drops out of an interview early due to distress.

There is an additional participant burden in also taking part in a qualitative interview, and hence consent to participate in this aspect will be sought separately.

Data Management

The University of Bristol (UK) is data controller for the study. Data held at the University of Bristol will conform to the University of Bristol Data Security Policy, Caldicott Principles and in compliance with the GDPR as it applies in the UK, tailored by the Data Protection Act 2018. Patients will be allocated a unique study identification number within the NHS Trust research team, which will allow for pseudonymised management and analysis of study records and data.

Qualitative data

All audio recordings will be captured on an encrypted, passcode-protected digital audio-recorder and transcribed using a University of Bristol-approved transcription service, and then checked and amended by the researchers for accuracy. Although they will need to leave the network to be transferred to and from the transcription service, recordings and transcripts will otherwise be kept in electronic folders on the University of Bristol network. They will be transferred securely between the University and the transcription service, according to the information security guidance provided by the University of Bristol (http://www.bristol.ac.uk/infosec/data-security/transcription). The transcriptions will be anonymised, and participant names on the transcripts will be replaced with unique participant IDs chosen by the researchers. Any identifiable personal information that participants volunteer, such as their place of work/school, will also be anonymised. Transcripts will be stored securely on the University of Bristol server and the audio files will be deleted when transcription is complete.

Anonymised study data

All study data will be anonymised by a unique identifier, with the anonymisation key held securely by the relevant NHS Trust in case a participant wishes to withdraw. Original pseudonymised electronic data files will be stored on a secure University of Bristol network drive. At the end of the study, electronic study data will be transferred to a designated University of Bristol Research Data Storage Facility for long-term archiving. At the appropriate time the anonymised data will be made open using the University of Bristol Research Data Repository, available only to bona fide researchers on request.

Anonymised head, hand and eye-tracking data

This data will be uploaded to our industry partner, Virtual Bodyworks, Google Cloud storage (configured to use EU servers). All data are encrypted at rest and in transit, and access is restricted to authorised staff only. *Virtual Bodyworks*' cloud storage complies with the Google Cloud Data Processing Addendum, Google's Privacy Policy, and the requirements for appointment of a Data Protection Officer.

Following data cleaning, data relevant to the study questions will be transferred under encryption to the University of Bristol. All eye-tracking data will be linked to participants' unique study IDs and stored securely in line with the study's data protection procedures.

Non-anonymised data

Consent/assent forms for the feasibility trial will be stored by the appropriate NHS research Trust. All data relating to the feasibility trial will be pseudo-anonymised by the relevant NHS research teams before being passed to the University of Bristol. The only personal data held by the University of Bristol will be the names and contact details of those who agree to be contacted by the University to participate in the qualitative sub-study. The participant names, contact details, and participant identifier logs relating to the qualitative study will be stored electronically on a password protected University networked drive on a University of Bristol secure server. Only the study team will have access to these files. This information will be kept confidential and stored separately to research data. Consent forms for the qualitative study will be retained by Bristol Medical School for a period of 15 years after study completion. Participant contact details will be kept for one year after study completion, or until data are made open (whichever comes first), after which they will be destroyed.

Quality Control and Quality Assurance

The investigators will be responsible for data quality.

Publication Policy

The findings from this research study may be published in an appropriate scientific journal and made available open access, and may be presented at academic meetings and conferences. Any quotes pertaining to the qualitative data collected will be anonymised. Study data will be collected and held by the study investigators. The anonymised data in the form of transcripts will be made available for sharing via a University of Bristol online data repository at the end of the study, and will be only available to bona fide researchers as restricted data on request.

Conflicts of Interest

There are no conflicts of interest.

Abbreviations

95% CI	95% Confidence Intervals
A&E	Accident and Emergency
CIA	Clinical Impairment Assessment
DPA	Data Protection Act
EDEQ	Eating Disorders Examination - Questionnaire
GDPR	General Data Protection Regulation
GP	General Practitioner
IMD	Indices of Multiple Deprivation
PPI	Patient and Public Involvement
TAU	Treatment as Usual
VR	Virtual Reality

Figure 1. Study flow diagram

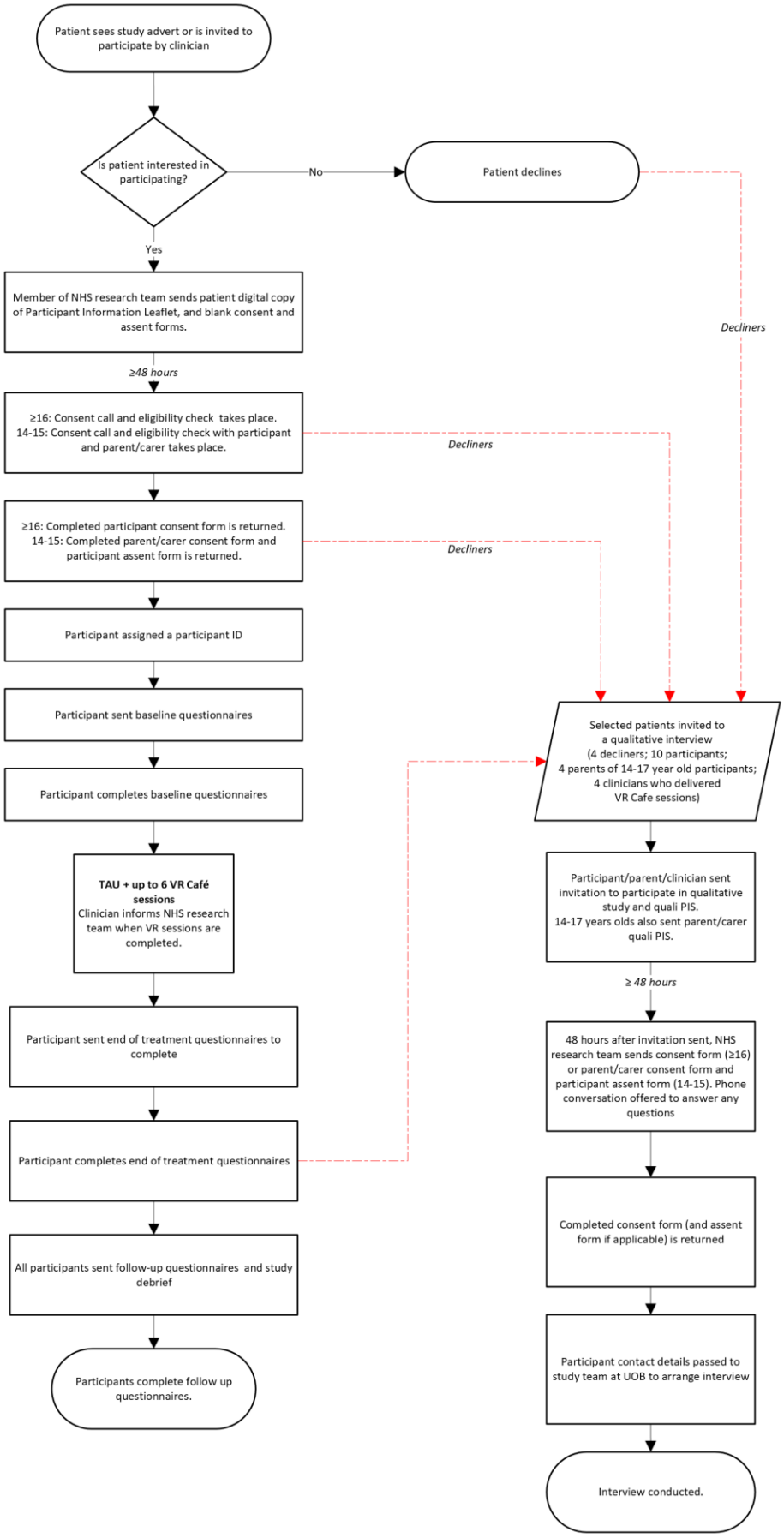
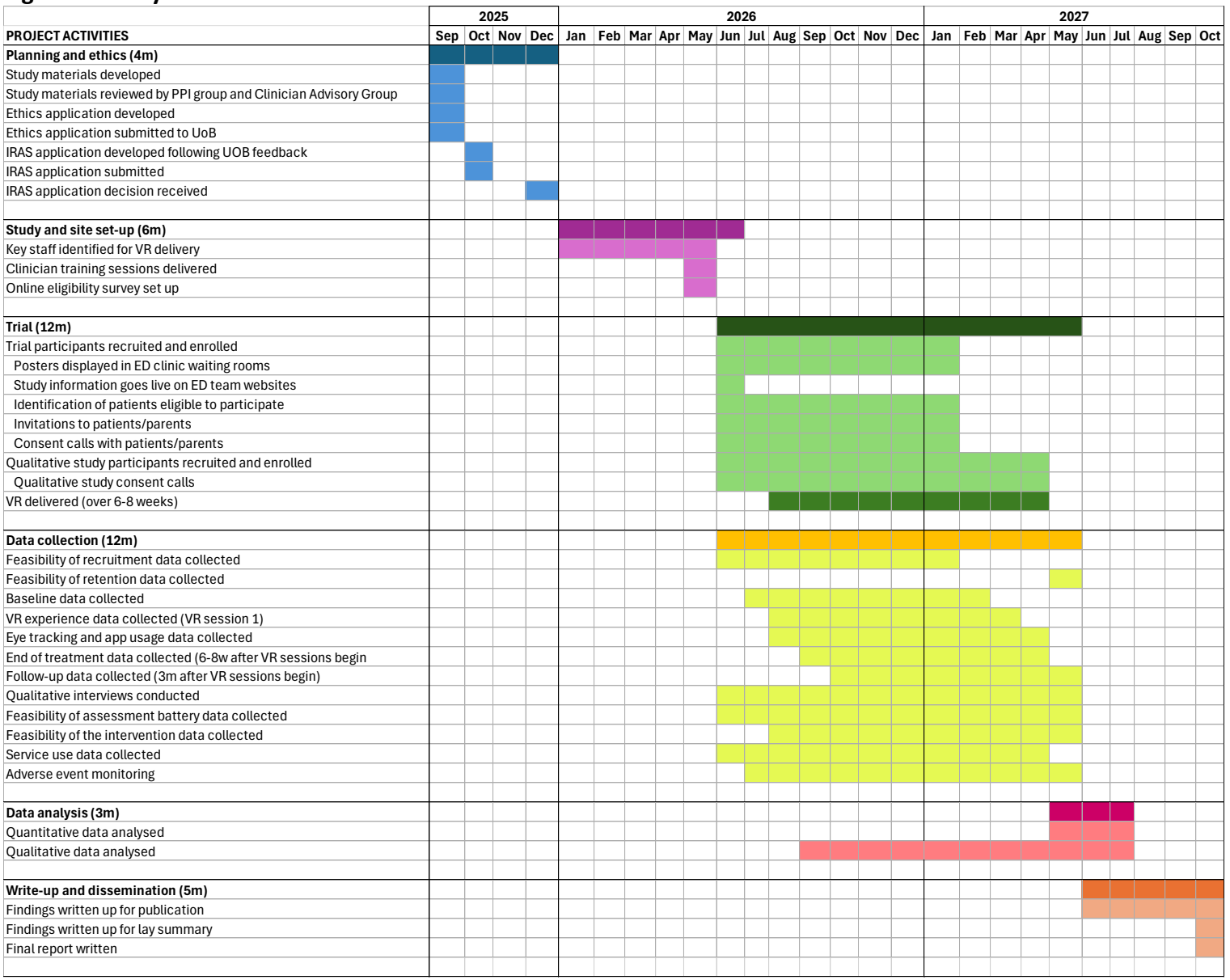


Figure 2. SPIRIT figure

	Enrolment	VR Café Sessions			Close-out
TIMEPOINT	*-t1*	*Session 1 (S1)*	*6 - 8 weeks post S1*	*3 months post S1*	
ENROLMENT					
Trial					
Informed consent	X				
Qualitative study					
Informed consent (decliners)	X				
Informed consent (participants; parents)			X		
Informed consent (clinicians)			X		
INTERVENTIONS					
TAU+VR		→	→		
ASSESSMENTS					
Measures in relation to cafes					
Anxiety and avoidance measures	X		X	X	
Self-efficacy measure	X		X	X	
Behavioural measures	X		X	X	
Measures in relation to ED and ED impact					
EDEQ	X		X	X	
Short ARFID questionnaire	X		X	X	
CIA	X		X	X	
GAD-7 (participants ≥18 years old)	X		X	X	
PHQ-9 (participants ≥18 years old)	X		X	X	
RCADS (participants 14-17 years old)	X		X	X	
Measures in relation to VR sessions					
Anxiety and avoidance measures		X			
Self-efficacy measure		X			
Behavioural measures		X			
Simulator sickness questionnaire		X			
Sense of presence		X			
Eye-tracking data		→	→		
Service use measures	→	→	→	→	
Feasibility of recruitment and retention	→	→	→		
Feasibility of assessment battery	X		X	X	
Feasibility of the intervention			X		
QUALITATIVE INTERVIEWS					
Decliners	X				
Participants; parents			X		
Clinicians			X		

Figure 3. Study Gantt Chart



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Appendix 1 – Questionnaire Measures

Measures in relation to cafés

Behaviours

Questions	**When asked**
When did you last go into a café? • With someone else • By yourself When did you last drink something other than water in a café? When did you last eat something in a café? I intend to visit a café in the next fortnight (0-10 scale, where 0 (no intention) & 10 (definite intention)	Baseline, End & at Follow up
I have visited a real café since I tried the VR café (Y/N) I have had something other than water to drink in a café since I tried the VR café (Y/N) I have had something to eat in a café since I tried the VR café (Y/N)	End and at Follow up

Self-Efficacy

(Based on Bandura's guide for constructing self-efficacy scales)

Questions	**When asked**
The statements below relate to situations that often come up when going to cafés and restaurants. For each situation, please rate how certain you are that you can do the things described below by picking the appropriate number. Rate your level of confidence by recording a number from 0 to 100 using the scale given below: 0 (Cannot do at all) 50 (Moderately can do) 100 (Highly certain can do) • Sit by yourself in a quiet café • Sit by yourself in a moderately busy café • Sit by yourself in a very busy café • Ask for a menu that doesn't have calorie information • Choose from a menu with calories • Choose from a menu without calories • Order a drink • Order something to eat • Choose something different to drink or eat if they don't have what you ordered	Baseline, end & follow up

• Manage situations when people comment about their appearance • Manage situations when people comment about your appearance • Manage situations when people comment about your order	

Avoidance

(Based on Mobility Inventory for Agoraphobia)

Questions	**When?**
Please indicate the degree to which you avoid the following places or situations because of discomfort or anxiety. Rate your amount of avoidance **when you are with a trusted companion** and **when you are alone**. Do this by using the following scale: 1 (never avoid); 2 (rarely avoid); 3 (avoid about half of the time); 4 (avoid most of the time); 5 (always avoid). • Sitting by yourself in an quiet café • Sitting by yourself in a moderately busy café • Sitting by yourself in a very busy café • Asking for a menu that doesn't have calorie information • Choosing from a menu with calories • Choosing from a menu without calories • Ordering a drink • Ordering something to eat	Baseline, End & at Follow up

Anxiety

(Based on Oxford Agoraphobic Avoidance Scale)

Questions	**When?**
For each scenario below: Do you feel you could do this right now? Yes, I could do this now No, I'd get too anxious How anxious would you feel doing each of the following: • Sitting by yourself in a quiet café • Sitting by yourself in a moderately busy café • Sitting by yourself in a very busy café • Asking for a menu that doesn't have calorie information • Choosing from a menu with calories • Choosing from a menu without calories • Ordering a drink • Ordering something to eat • Choosing something different to eat or drink if they don't have what you ordered • Being in a situation when people comment about their appearance • Being in a situation when people comment about your appearance	Baseline, End & at Follow up

• Being in a situation when people comment about your order	

Measures in relation to their eating disorder and its impact on their life

Eating Disorder measure: EDEQ

Questions	**When?**
Response options: No days; 1-5 days; 6-12 days; 13-15 days; 16-22 days; 23-27 days; Every day. Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only. On how many of the past 28 days… • Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)? • Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight? • Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)? • Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)? • Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight? • Have you had a definite desire to have a totally flat stomach? • Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)? • Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)? • Have you had a definite fear of losing control over eating? • Have you had a definite fear that you might gain weight? • Have you felt fat? • Have you had a strong desire to lose weight?	Baseline, End, Follow-up
Response options: Free-text • Over the past 28 days, how many times have you eaten what other people would regard as an unusually large amount of food (given the circumstances)? ○ On how many of these times did you have a sense of having lost control over your eating (at the time you were eating)?	

• Over the past 28 days, on how many days have such episodes of overeating occurred (i.e. you have eaten an unusually large amount of food and have had a sense of loss of control at the time)? • Over the past 28 days, how many times have you made yourself sick (vomit) as a means of controlling your shape or weight? • Over the past 28 days, how many times have you taken laxatives as a means of controlling your shape or weight? • Over the past 28 days, how many times have you exercised in a 'driven' or 'compulsive' way as a means of controlling your weight, shape or amount of fat, or to burn off calories?	
Response options: No days; 1-5 days; 6-12 days; 13-15 days; 16-22 days; 23-27 days; Every day. *Please note that for these questions the term 'binge eating' means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.* • Over the past 28 days, on how many days have you eaten in secret (i.e. furtively)?... Do not count episodes of binge eating. • On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight?... Do not count episodes of binge eating. • Over the past 28 days, how concerned have you been about other people seeing you eat?... Do not count episodes of binge eating.	
Response options: Not at all; Slightly; Moderately; Markedly Over the past 28 days… • Has your weight influenced how you think about (judge) yourself as a person? • Has your shape influenced how you think about (judge) yourself as a person? • How much would it have upset you if you had been asked to weight yourself once a week (no more, or less, often) for the next four weeks? • How dissatisfied have you been with your weight? • How dissatisfied have you been with your shape? • How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)? • How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?	

Short ARFID questionnaire

Item		Response format			
1	I have little interest in eating.	Never	Sometimes	Usually	Always
2	I avoid many foods because of their look, smell or temperature.	Never	Sometimes	Usually	Always
3	I feel afraid to eat things I have never tried before.	Never	Sometimes	Usually	Always
4	For me, eating is a chore.	Never	Sometimes	Usually	Always
5	I only eat specific foods and/or food brands.	Never	Sometimes	Usually	Always
6	I avoid many foods because I am afraid of having a physical reaction – for example, gagging, choking, being sick, stomach pain.	Never	Sometimes	Usually	Always
7	I easily forget to eat.	Never	Sometimes	Usually	Always
8	I avoid many foods because of their taste or texture.	Never	Sometimes	Usually	Always
9	I won't try a new food because I am afraid of having a physical reaction – for example, gagging, choking, being sick, stomach pain.	Never	Sometimes	Usually	Always
10	My eating has caused me health problems – for example, my weight or growth has been affected, or I have been told to take supplements or nutritional drinks.	Not at all	Only a little	Quite a lot	A great deal
11	My eating makes it hard to do the things other people my age do – for example, eating out, going on holidays or school trips.	Not at all	Only a little	Quite a lot	A great deal

Clinical Impairment Assessment (CIA)

Questions	**When?**
Response options: Not at all; A little; Quite a bit; A lot. Over the past 28 days, to what extent have your eating habits, exercising, or your feelings about your eating, shape or weight… • … made it difficult to concentrate? • … made you feel critical of yourself? • … stopped you going out with others? • … affected your work performance (if applicable)? • … made you forgetful? • … affected your ability to make everyday decisions? • … interfered with meals with family or friends? • … made you upset? • … made you feel ashamed of yourself? • … made it difficult to eat out with others? • … made you feel guilty? • … interfered with you doing things you used to enjoy? • … made you absent-minded? • … made you feel a failure? • … interfered with your relationships with others? • … made you worry?	Baseline, end of study, follow-up

GAD-7 Anxiety

Over the last two weeks, how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid, as if something awful might happen	0	1	2	3

Column totals _____ + _____ + _____ + _____ =

Total score _____

PHQ 9

PATIENT HEALTH QUESTIONNAIRE-9 (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems? *(Use "✔" to indicate your answer)*	**Not at all**	**Several days**	**More than half the days**	**Nearly every day**
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

FOR OFFICE CODING 0 + _____ + _____ + _____

=Total Score: _____

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	**Somewhat difficult**	**Very difficult**	**Extremely difficult**
☐	☐	☐	☐

Revised Children's Anxiety and Depression Scale (RCADS):

Please put a circle around the word that shows how often each of these things happens to you. There are no right or wrong answers.

	Item	**Response options**			
1	I worry about things	Never	Sometimes	Often	Always
2	I feel sad or empty	Never	Sometimes	Often	Always
3	When I have a problem, I get a funny feeling in my stomach	Never	Sometimes	Often	Always
4	I worry when I think I have done poorly at something	Never	Sometimes	Often	Always
5	I would feel afraid of being on my own at home	Never	Sometimes	Often	Always
6	Nothing is much fun anymore	Never	Sometimes	Often	Always
7	I feel scared when I have to take a test	Never	Sometimes	Often	Always
8	I feel worried when I think someone is angry with me	Never	Sometimes	Often	Always
9	I worry about being away from my parent	Never	Sometimes	Often	Always
10	I am bothered by bad or silly thoughts or pictures in my mind	Never	Sometimes	Often	Always
11	I have trouble sleeping	Never	Sometimes	Often	Always
12	I worry that I will do badly at my school work	Never	Sometimes	Often	Always
13	I worry that something awful will happen to someone in my family	Never	Sometimes	Often	Always
14	I suddenly feel as if I can't breathe when there is no reason for this	Never	Sometimes	Often	Always
15	I have problems with my appetite	Never	Sometimes	Often	Always
16	I have to keep checking that I have done things right (like the switch is off, or the door is locked)	Never	Sometimes	Often	Always
17	I feel scared if I have to sleep on my own	Never	Sometimes	Often	Always
18	I have trouble going to school in the mornings because I feel nervous or afraid	Never	Sometimes	Often	Always
19	I have no energy for things	Never	Sometimes	Often	Always
20	I worry I might look foolish	Never	Sometimes	Often	Always
21	I am tired a lot	Never	Sometimes	Often	Always
22	I worry that bad things will happen to me	Never	Sometimes	Often	Always
23	I can't seem to get bad or silly thoughts out of my head	Never	Sometimes	Often	Always

24	When I have a problem, my heart beats really fast	Never	Sometimes	Often	Always
25	I cannot think clearly	Never	Sometimes	Often	Always
26	I suddenly start to tremble or shake when there is no reason for this	Never	Sometimes	Often	Always
27	I worry that something bad will happen to me	Never	Sometimes	Often	Always
28	When I have a problem, I feel shaky	Never	Sometimes	Often	Always
29	I feel worthless	Never	Sometimes	Often	Always
30	I worry about making mistakes	Never	Sometimes	Often	Always
31	I have to think of special thoughts (like numbers or words) to stop bad things from happening	Never	Sometimes	Often	Always
32	I worry what other people think of me	Never	Sometimes	Often	Always
33	I am afraid of being in crowded places (like shopping centers, the movies, buses, busy playgrounds)	Never	Sometimes	Often	Always
34	All of a sudden I feel really scared for no reason at all	Never	Sometimes	Often	Always
35	I worry about what is going to happen	Never	Sometimes	Often	Always
36	I suddenly become dizzy or faint when there is no reason for this	Never	Sometimes	Often	Always
37	I think about death	Never	Sometimes	Often	Always
38	I feel afraid if I have to talk in front of my class	Never	Sometimes	Often	Always
39	My heart suddenly starts to beat too quickly for no reason	Never	Sometimes	Often	Always
40	I feel like I don’t want to move	Never	Sometimes	Often	Always
41	I worry that I will suddenly get a scared feeling when there is nothing to be afraid of	Never	Sometimes	Often	Always
42	I have to do some things over and over again (like washing my hands, cleaning or putting things in a certain order	Never	Sometimes	Often	Always
43	I feel afraid that I will make a fool of myself in front of people	Never	Sometimes	Often	Always
44	I have to do some things in just the right way to stop bad things from happening	Never	Sometimes	Often	Always
45	I worry when I go to bed at night	Never	Sometimes	Often	Always
46	I would feel scared if I had to stay away from home overnight	Never	Sometimes	Often	Always
47	I feel restless	Never	Sometimes	Often	Always

Measures in relation to VR

Simulator sickness questionnaire (baseline & end of each session)

SIMULATOR SICKNESS QUESTIONNAIRE

Kennedy, Lane, Berbaum, & Lilienthal (1993)***

Instructions : Circle how much each symptom below is affecting you right now.

1. General discomfort	None	Slight	Moderate	Severe
2. Fatigue	None	Slight	Moderate	Severe
3. Headache	None	Slight	Moderate	Severe
4. Eye strain	None	Slight	Moderate	Severe
5. Difficulty focusing	None	Slight	Moderate	Severe
6. Salivation increasing	None	Slight	Moderate	Severe
7. Sweating	None	Slight	Moderate	Severe
8. Nausea	None	Slight	Moderate	Severe
9. Difficulty concentrating	None	Slight	Moderate	Severe
10. « Fullness of the Head »	None	Slight	Moderate	Severe
11. Blurred vision	None	Slight	Moderate	Severe
12. Dizziness with eyes open	None	Slight	Moderate	Severe
13. Dizziness with eyes closed	None	Slight	Moderate	Severe
14. *Vertigo	None	Slight	Moderate	Severe
15. **Stomach awareness	None	Slight	Moderate	Severe
16. Burping	None	Slight	Moderate	Severe

* Vertigo is experienced as loss of orientation with respect to vertical upright.

** Stomach awareness is usually used to indicate a feeling of discomfort which is just short of nausea.

Sense of presence/place illusion (end of session 1)

These questions refer to the last 5 minutes of the experience:

1. Please rate your feeling of being in the virtual environment, from 1 to 7, where 7 represents your normal feeling of being in a physical place.
   Response options: 1 (Not like a physical place) to 7 (Like a physical place)

2. To what extent were there times when the virtual environment was reality for you?
   Response options: 1 (Never) to 7 (Almost all of the time)

3. When you think about the experience, does it feel more like images you saw, or a place you visited?
   Response options: 1 (Images I saw) to 7 (Place I visited)

4. During the experience, which was stronger, your feeling of being in the virtual environment or in the real laboratory?
   Response options: 1 (Real laboratory) to 7 (Virtual environment).