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# Examination of gaze behaviour in social anxiety disorder using a virtual reality eye-tracking paradigm: protocol for a case–control study

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## ABSTRACT

**Introduction** Social anxiety disorder (SAD) has an early onset, a high lifetime prevalence, and may be a risk factor for developing other mental disorders. Gaze behaviour is considered an aberrant feature of SAD. Eye-tracking, a novel technology device, enables recording eye movements in real time, making it a direct and objective measure of gaze behaviour. Virtual reality (VR) is a promising tool for assessment and diagnostic purposes. Developing an objective screening tool based on examination of gaze behaviour in SAD may potentially aid early detection. The objective of this current study is, therefore to examine gaze behaviour in SAD utilising VR.

**Methods and analysis** A case–control study design is employed in which a clinical sample of 29 individuals with SAD will be compared with a matched healthy control group of 29 individuals. In the VR-based eye-tracking paradigm, participants will be presented to stimuli consisting of high-res 360° 3D stereoscopic videos of three social-evaluative tasks designed to elicit social anxiety. The study will investigate between-group gaze behaviour differences during stimuli presentation.

**Ethics and dissemination** The study has been approved by the National Committee on Health Research Ethics for the Capital Region of Denmark (**H-22041443**). The study has been preregistered on OSF registries: https://doi.org/10.17605/OSF.IO/XCTAK

All participants will be provided with written and oral information. Informed consent is required for all the participants. Participation is voluntarily, and the participants can at any time terminate their participation without any consequences. Study results; positive, negative or inconclusive will be published in relevant scientific journals.

## STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The present study aims to examine gaze behaviour in three novel social evaluative environments using 360° videos in virtual reality (VR) on a clinical sample of social anxiety disorder (SAD).
⇒ Using 360° videos as stimuli may enhance the sense of presence because of the enhanced realism of the videos making it a paradigm with high ecological validity in VR compared with VR-constructed environments.
⇒ The chosen experimental tasks are novel and not previously used in research studies limiting the comparability with other studies.
⇒ The current study only comprises a clinical population of SAD participants which precludes investigating whether the gaze patterns are specific to SAD.

## INTRODUCTION

Social anxiety disorder (SAD) is characterised by a persistent and excessive fear or anxiety of being subject to scrutiny, criticism, rejection or humiliation in social and/or performance situations.[1] Lifetime prevalence is estimated at 12.1%[2] with higher prevalence among girls and women.[3 4] SAD has an early age of onset (mean 14.5 years) compared with other psychiatric disorders[5] as well as a high degree of comorbidity with other psychiatric disorders that are typically preceded by an SAD,[6–8] suggesting that SAD may be a predisposition and a risk factor for development of other psychiatric disorders.[9] In Denmark, anxiety disorders have an estimated lifetime prevalence between 13% and 29% and an incidence rate of approximately 17 000 new cases yearly.[10] In addition, anxiety disorders are associated with an increased mortality,[11] and economic burden of approximately 10 billion Danish Krone (DKK)[10] signifying the importance of early detection and early treatment of the disorder.

Early detection may prevent a chronic course of the disorder, the development of other psychiatric disorders, further burdens to the individual, impaired functioning and ultimately decrease the significant societal burden associated with the disorder.[6 7 12] Early detection of the disorder may be aided by developing an objective screening tool for SAD that comprises behavioural markers for the disorder specifically by examining gaze

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behaviour, which is considered to be aberrant in SAD.[1 13] Advances within virtual reality (VR) and eye-tracking technology are considered promising to improve early identification of SAD. This notion is corroborated by a growing body of research employing eye-tracking technologies to study attentional bias and gaze behaviour.[14 15] Eye-tracking is argued to enable a direct measure of visual attention as it allows recording overt eye movements directly and continuously in real time.[16]

## Gaze behaviour in SAD

Whereas in many species, direct gaze is perceived as threatening, evoking an aversive response, the opposite is thought to happen in humans, where eye contact is believed to modulate communication and social interaction processes.[13 17 18] Direct gaze perception is believed to play a pivotal role both in the development of the social cognition and in the social functioning of the individual.[18] Direct gaze perception is associated with enhanced self-awareness, increased memory for face identity in adults, increased positive appraisals of others and with activate prosocial behaviours.[18] Moreover, it is suggested that direct gaze causes affective reactions to the perceiver of the direct gaze,[19] indicating it has a high social significance. In SAD, gaze behaviour is thought to be aberrant with SAD individuals showing inadequate eye contact in social situations characterised by fear and avoidance of direct eye contact.[1 13] Theoretical models of SAD suggest that in social or performance-based situations, individuals with SAD tend to engage in avoidant behaviour by avoiding any potential real or perceived confrontation or negative evaluation from others. In situations where a total withdrawal from the situation is impossible, the avoidance may be subtle such as avoiding salient social stimuli (eg, avoidance of looking at faces, avoidance of gaze exchange, avoidance of eye contact). This avoidant behaviour is considered a safety behaviour; a maladaptive strategy that perpetuates the anxiety and, thus, serves as a maintenance factor of the disorder.[20 21] The visual avoidance of faces has indeed been confirmed in many studies[22]; however, most studies have used paradigms (typically free viewing paradigms consisting of viewing photographs) that are considered to lack ecological validity.[23] Additionally, many studies have used samples from the community as opposed to clinical samples of SAD. However, gaze behaviour findings from community may not generalise to the clinical populations of SAD.[22 23]

Moreover, SAD individuals may have a selective attention to threat.[21] In the so-called vigilance-avoidance hypothesis, it is theorised that SAD individuals may tend to have a selective attention to threat by initially paying attention to any external indicators of negative social evaluation followed by avoidance of such external indicators, which in turn perpetuates anxiety symptoms.[24 25] The empirical evidence in this area is mixed with some studies demonstrating a maintenance of attention to threatening stimuli, while others show avoidance.[14] The mixed results are argued to be due to methodological diversity in the experimental tasks used to study the selective attention to threat.[23] Some authors have, therefore, studied hyperscanning, another aspect that is considered to indicate hypervigilance. A hyperscanning strategy defined as a vigilant strategy characterised by an excessive scanning of the environment typically for threat detection[26 27] has indeed been confirmed in some studies making it a promising aspect of SAD to be further investigated.[26–29]

Thus, a considerable amount of research on gaze behaviour has used paradigms that may lack ecological validity.[23 30] This has led to the necessity of designing experiments as social interaction and/or performance-based tasks that resemble real-life situations. In these so-called 'social evaluative tasks', the participant is required to perform a real-life task with a risk of negative social evaluation (eg, performing a speech in front of a prerecorded audience)[23] thus enhancing the ecological validity of the paradigm.

## Assessing gaze behaviour in SAD using VR

Virtual reality (VR) has shown good potential in psychotherapeutic intervention but has been used to a lesser degree for assessment or diagnostic purposes.[31 32] Empirical findings using VR in SAD have demonstrated that social fear can be successfully induced in VR environments,[33–35] indicating its usefulness for conducting ecologically valid experiments. A sense of presence, that is, the experience of being present in a mediated environment and not in a physical environment,[36] has been argued to be paramount for experiments conducted in VR. However, some studies have demonstrated that gaze behaviour in VR and in prerecorded videos may be experienced differently than in real life by having lesser physiological reactions in the VR and prerecorded videos compared to face-to-face interactions, suggesting that findings from studies conducted in VR may not necessarily apply to the real life.[37 38] To date, a small number of studies have used VR to examine gaze behaviour in SAD.[39–44] These studies report that compared with healthy control groups, individuals with SAD or individuals with social anxiety symptoms show an avoidant gaze behaviour in social and performance situations. Studies utilising immersive 360° video environments in VR are still scarce. 360° video environments in VR may enhance the sense of presence due to their immersive and realistic presentation[45] and it can be hypothesised that it may be superior to animated environments in VR in terms of ecological validity although a study comparing the two has not yet been conducted. Holmberg *et al* have demonstrated that anxiety in SAD can be successfully triggered by 360° videos of real-life situations in VR.[46] In addition, Rubin *et al* conducted the first study to assess gaze behaviour in participants with social anxiety symptoms using 360° stimuli (a public speaking task) in VR. The study showed that compared with a healthy control group, individuals with social anxiety symptoms showed a pattern of avoidance of social threat,[47] thus demonstrating good potential of utilising 360° stimuli as a highly ecological environment



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for conducting research on gaze behaviour in SAD as well as using it for attention guidance training in SAD.[48] We aim to extend these preliminary findings by including three novel naturalistic social evaluative tasks using 360° stimuli in VR in a clinical sample of SAD. The three tasks capture both the social and performance aspect of SAD and we believe that the tasks are relatable and recognisable to the participants since the tasks resemble everyday situations in VR.

### Objectives

The current study aims to identify eye gaze patterns in SAD using VR across three different social and performance real-life situations and, thus, extend the existing literature on the utility of VR for assessment purposes in SAD.

In line with previous findings on gaze avoidance,[44 49 50] we hypothesise that (1) compared with a healthy control group (HCG), SAD participants will exhibit fewer number of fixations and less fixation duration (dwell time) on social areas (faces and body regions) of the participants presented in the three VR tasks.

In line with previous findings,[26–28] we hypothesise that (2) SAD participants will show a hyperscanning strategy indicated by increased total length of scan path compared with the HCG across the three VR tasks.

In line with the vigilance-avoidance model,[24] we also hypothesise that (3) SAD individuals will exhibit shorter time to first fixations on social stimuli compared with HCG across the three VR tasks.

Additionally, we will examine the interaction of the tasks on gaze behaviour, (4) hypothesising that both SAD participants and HCG participants will show greater avoidance and hyperscanning in task C compared with tasks A and B, given that task C contains an objective threat for negative evaluation.

## METHODS

### Study design

The proposed study is a case–control study including a clinical sample of 29 individuals with SAD and a matched healthy control group of 29 individuals. A VR-based eye-tracking paradigm will be employed in which gaze behaviour as indicated by eye movements will be examined using the integrated eye tracker in the VR headset. Stimuli will be presented as 360° 3D videos in VR.

### Setting

The experimental study will be carried out by VIRTU research group at the Copenhagen Research Centre for Mental Health CORE, at Mental Health Center Copenhagen, Copenhagen University Hospital, Denmark. The inclusion period will start in January 2023 and is expected to last approximately 9 months.

**Table 1** Overview of inclusion and exclusion criteria for the SAD participants and healthy control group (HCG) participants

| *Inclusion criteria for the SAD group* | *Inclusion criteria for the HCG group* |
|---|---|
| ► Fulfilling diagnostic criteria for social anxiety disorder ICD: F40.1<br>► Age 18–75<br>► Sufficient knowledge of the Danish language<br>► Informed consent | ► Age 18–75<br>► Sufficient knowledge of the Danish language<br>► Informed consent |
| ***Exclusion criteria for the SAD group*** | ***Exclusion criteria for the HCG group*** |
| ► Psychotic disorders, autism spectrum disorders and personality disorders<br>► A diagnosis of alcohol or drug dependence (ICD: F10-19, 20–26)<br>► Significantly impaired vision hindering engagement in VR experiences<br>► Epilepsy | ► Any psychiatric diagnoses including alcohol and drug dependence<br>► Significantly impaired vision hindering engagement in VR experiences<br>► Epilepsy |

HCG, healthy control group; SAD, social anxiety disorder; VR, virtual reality.

### Participants

The study will include a total of 58 participants comprising 29 individuals with an SAD diagnosis (ICD: F 40.1) referred to psychiatric clinics in the Capital Region of Denmark and 29 HCG individuals that will be recruited from the community, using ads at relevant institutions or via the research recruitment service www.forsoegsperson.dk.

Participants from the HCG will be matched to the SAD sample (1:1) on age (±2 years) and gender (see table 1). For the social anxiety levels among the HCG, participants with a score above 30 on Liebowitz Social Anxiety Scale (LSAS) will be excluded from the study as this cut-off will exclude participants with subclinical levels of SAD.[51]

### Patient and public involvement

A panel of patients have been involved in developing the stimuli material. The stimuli material was originally developed to be used for exposure purposes in the So-REAL study: a randomised control trial, evaluating a VR-based intervention for SAD. The videos have been developed by a team consisting of clinicians, a panel of patients with SAD in collaboration with the VR production company KHORA-VR. The videos consist of various real-life social and performance environments, typically feared by patients with SAD. Actors were paid to deliver the content in the different videos. The process of the development of the videos consisted of regular meetings between clinicians, patients and the VR production company. The



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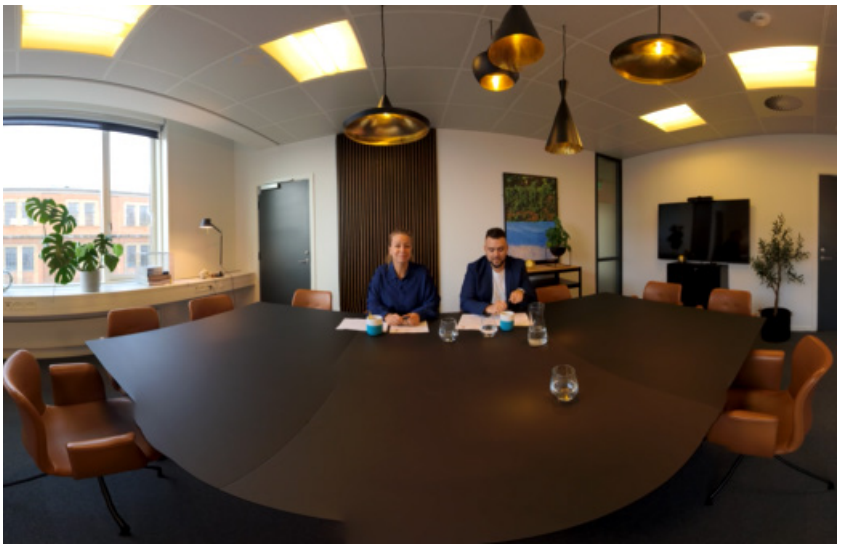

**Figure 1** Demonstration of the VR job interview situation. VR, virtual reality.

experience of the patients (level of anxiety provoked by the videos, the validity of the videos) seeing the videos were considered for further development of the videos. In the final stage, the videos were tested by two clinicians in a group therapy format. This led to further feedback from the clinicians and patients on the videos and their use for exposure purposes in group therapy. The process of development lasted approximately 16 months producing 12 real-life situations for SAD.[52]

### The experimental tasks

All participants will be presented to high-resolution 360° stereoscopic videos in high-end VR head mounted display (HMD).

The three experimental tasks are:

Task A is a job interview situation that we conceptualise as a performance task. In the video, a male and a female interviewer ask a variety of job-related questions. After each question, a 'listening loop' of 30 s follows allowing the participant to answer while the two interviewers appear to listen. The participant will be instructed to act as if this was a real job interview and to respond to the questions. The job interview includes questions such as: 'Can you tell us something about yourself', what is your motivation for applying for this job', 'how can you contribute to this job?'. The attitude of both interviewers is welcoming and warm (see figure 1).

Task B is a social interaction situation comprising small talk/discussion in a canteen while eating lunch in a work setting. The participant is joined by four colleagues: two male and two female colleagues. The participant is instructed to act as if this was a real interaction. No direct questions are made to the participant and as such the participant is not required to verbally engage in the conversation but will be free to do so. The atmosphere is welcoming and warm. The colleagues look sporadically at the participant and smile at times (see figure 2).

Task C is conceptualised as a performance task, where there is an objective threat for being negatively evaluated. The participant is instructed to verbally engage in the video. The participant is asked to do a presentation together with a colleague in front of a group of people. The task starts with the colleague introducing himself to the audience and asks the participant to present him/herself to the audience. The colleague must, however, leave the room after a phone call he receives, leaving the participant alone in the room. In addition, the computer in which the participant is to use for a power point presentation stops working and as such the participant must carry out the presentation without the support of power point. The atmosphere gets a bit tense, and the group of people appear to be impatient. However, the task ends before the participant must do a presentation (see figure 3).

### Apparatus

To collect gaze data, eye movements will be tracked using eye-tracking integrated in the HTC VIVE Pro Eye HMD. Eye movements are tracked at 120 Hz (binocular). The integrated eye tracker has a trackable field of 110°, an accuracy of 0.5°–1.1° and a calibration of 5-point. A powerful gaming computer will serve as an interface between the eye-tracking software and the HMD.

### Data preparation

The Imotions software will be used to collect, calculate and analyse gaze-based data.[53 54] Analysis will be carried out on predefined areas of interest (AOI) as well as on raw gaze-based data. In the current study, AOI will be predefined and categorised as social stimuli and non-social stimuli. The social stimuli comprising of face regions and body regions will be predefined and categorised separately while the non-social stimuli (the background) will be predefined and categorised as the rest of stimuli expect faces and body regions (see figure 4). An I-VT (Velocity-Threshold Identification) filter will be used to analyse the raw eye-tracking data and to classify fixations and saccades by comparing the speed of the



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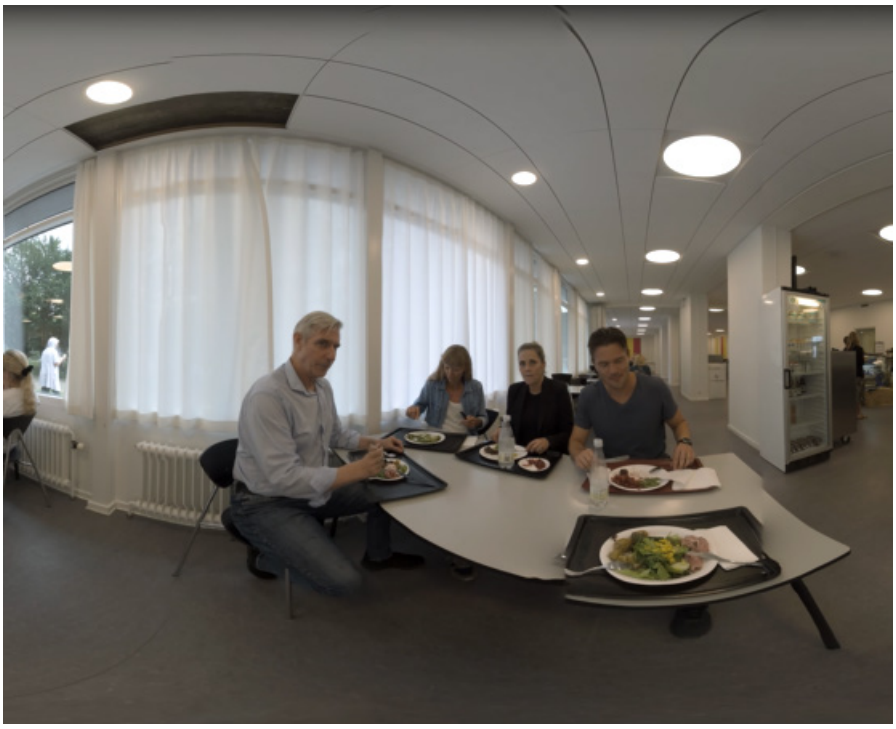

**Figure 2** Demonstration of the VR social interaction situation. VR, virtual reality.

eye's movements to a velocity threshold. The velocity threshold will be of 100°/s and a minimum fixation of 100 ms. Thus, the I-VT filter classifies a fixation if the eye moves slower than this threshold, whereas if the eye moves faster than this threshold, the I-VT filter classifies it as a saccade. The total fixation time will be calculated as the sum of all fixations within an AOI.

### Procedure

Eligible participants from the SAD and HCG will be invited to the VR lab, where they will undergo a clinical assessment conducted by experienced psychologists followed by completion of psychometric questionnaires (see online supplemental file 1). Prior to beginning the experiment, participants will be given verbal instructions about the nature of the experimental tasks. Each experimental task lasts approximately 2 to 2.5 min. After each experimental task, a pause of 10 s follows. The order of the tasks presented to the participants is randomised by the Imotion software. As stated earlier, participants will be instructed to answer the questions of the interviewers in task A, whereas in task B, the verbal communication is not mandatory. In task C, the participants are as well instructed to verbally engage with the people in the task. Before beginning the experiment, participants will also be calibrated to the HMD. To minimise distractions from the surroundings, the

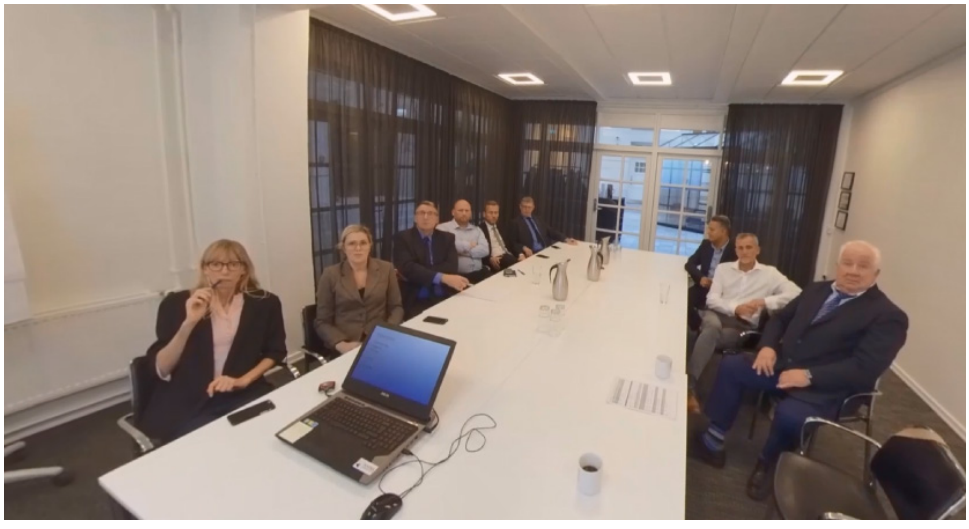

**Figure 3** Demonstration of the VR presentation situation. VR, virtual reality.



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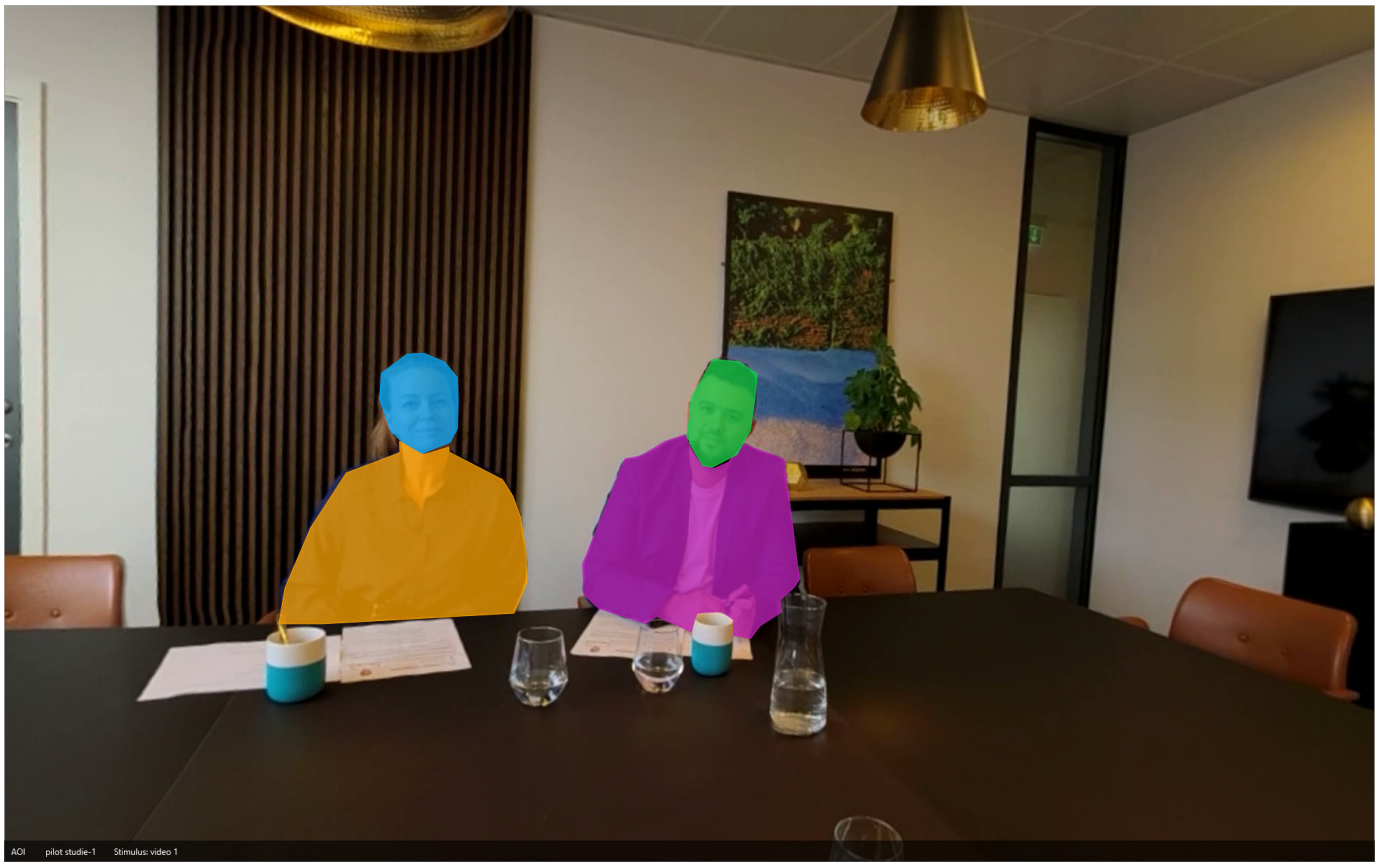


**Figure 4** Demonstration of a predefined and categorised area of interest (AOI).

researcher will leave the room, when the VR tasks are being performed.

After the completion of the experimental tasks, the participants are asked to fill in a presence scale questionnaire, using the Multimodal Presence Scale (MPS), which measures the level of the experience of presence in VR.[36] Subjective distress will be measured before the experimental tasks and after completion of the experimental tasks using Subjective Units of Distress Scale (SUDS).[55] At the end of the experiment, participants will be thoroughly debriefed and thanked for the participation.

## Assessment battery

Participants from both groups will undergo an assessment consisting of the listed measurements.

- Mini International Neuropsychiatric Interview (MINI), V.7.0 for Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). Psychometric analyses of the MINI have demonstrated acceptable test–retest and inter-rater reliability.[56 57] MINI will be used to screen for diagnosis and rule out psychiatric diagnoses in the HCG.
- Personal and Social Performance Scale (PSP) will be used to measure the social functioning of the participant.[58]
- LSAS will be used to measure symptom severity of SAD. LSAS assesses 24 situations typically feared by individuals with SAD, rated on anxiety and avoidance, divided into subscales of performance anxiety and social situations. It has acceptable psychometric properties.[59] The LSAS will be used as a diagnosis supplement to MINI.
- The experience of presence in VR is measured using MPS developed and validated by Makransky *et al*.[36] This scale consists of 15 items measuring aspects of the physical presence, social presence and self-presence using a 5-point Likert Scale (1=completely disagree, 2=disagree, 3=neither disagree nor agree, 4=agree, 5=strongly disagree).[36]
- Fear of Negative Evaluation using the Brief Version of the Fear of Negative Evaluation Scale (FNES).[60]
- SUDS[55] will be used to rate the state anxiety pre and post the experimental tasks.

## Outcome measures

The outcome measures are eye movement data derived from the eye-tracking and consist of the following: fixation-based parameters: total fixation duration (dwell time) in milliseconds, total number of fixations and mean fixation time measured on AOI. These parameters indicate high and low levels of gaze avoidance. Raw data parameters: scan path length, mean distance between fixations, time to first fixation and length of first fixation on social stimuli are indices that indicate hypervigilance and hyperscanning. Exploratory outcomes are association between eye movement data and LSAS, PSP, Presence in VR, and FNES.



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### Sample size calculation

Our primary hypothesis concerns differences in the number of fixations in SAD subjects compared with HCG. In a previous study of[49 49] the HCG had a mean score of 56.7 (SD=5.1) on the number of fixations. We set the minimal clinically important difference to a true difference in the experimental and control means to 0.75 SD (=3.8). Corresponding to an expected mean score of 52.9 in patients with SAD. We calculated effect sizes revealing that 29 subjects are required in each group to detect the expected difference in a t-test with 80% power at the 0.05 significance level using a two-sided hypothesis.

### Statistical methods

Data will be analysed using Stastical Package for the Social Sciences (SPSS). The analysis of data will be conducted using a mixed design Analysis of Variance(ANOVA) combining between-subject's and within-subject's analysis. Initially, a one-way ANOVA will be conducted to assess group (SAD vs HCG) differences on psychometric measures (LSAS, FNES, PSP, MPS and SUDS). Means, SD and F-scores will be reported.

To examine gaze behaviour, three ANOVAs will be conducted with group (SAD vs HCG) as the between-subject factor and AOI (face vs body) as the within-subjects factor for each task (tasks A, B and C).

To examine whether there is a difference in gaze behaviour between task A, B and C, a two-way Multivariate analysis of variance (MANOVA) will be conducted with task as a within-subject factor and group (SAD group vs HC group) as a between-subject factor. Order of task presentation will be included as a between-subject control variable. Eye-tracking metrics (the number of fixations and the total fixation duration and the mean duration of fixations on social areas, total scan path length and mean distance between fixations) are the dependent variables.

Furthermore, exploratory analyses using a repeated measure ANOVA will be conducted on SUDS score with group (SAD vs HCG) as a between-subject factor and time (pre vs postexperimental task) as a within-subject factor.

Exploratory analyses using Pearson correlational analyses will also be carried out on the SAD group assessing eye movement data and psychometric measures (LSAS, FNES, PSP, MPS).

All statistical tests of significance will be two-tailed, with significance level set at $p<0.05$. Missing data will be handled by multiple imputations.

### Ethics and dissemination

The study will be conducted in accordance with the Helsinki Declaration. The study has been approved by the National Committee on Health Research Ethics for the Capital Region of Denmark (*H-22041443*). All participants will receive participant information 48 hours prior to the conduct of the study. Any adverse events will be monitored and recorded throughout the study period and reported to the Committee on Health Research Ethics of the Capital Region Denmark. VR may cause cyber sickness to some people, which corresponds to motion sickness. Given that VR is in general well tolerated, we do not expect any adverse events to happen.[61] Participation is voluntary, and the participants can at any time terminate their participation without any consequences. Study results; positive, negative or inconclusive will be published in relevant scientific journals.

## DISCUSSION

The proposed study aims to examine gaze behaviour differences in a clinical sample of SAD compared with an HCG using a VR eye-tracking paradigm. Determining behavioural markers may have important clinical implications, not only for enhancing the understanding of the aetiology of SAD but also by attempting to develop an objective screening tool that may aid the assessment of SAD. Thus, the results from this study may provide the foundation for conducting subsequent studies evaluating VR-based eye-tracking as an objective, automated screening tool for SAD. However, aberrant gaze behaviour has also been found in other mental disorders such as autism.[62] As the current study only comprises a clinical population of SAD participants, it precludes investigating whether the gaze patterns are specific to SAD. This may be explored further in future studies.

Whereas studies using VR as a tool in psychotherapeutic intervention is growing,[31] the use of VR for assessment or diagnostic purposes is still scarce. Conducting experimental research with VR-based paradigms may add further evidence on the usefulness of VR as an assessment tool capturing aspects of psychopathology. The potential of establishing a specific gaze pattern in SAD using VR may also have treatment-related implications by informing targets for interventions that may involve exposure of gaze avoidance and/or selective attention to threat.

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**Contributors** FZ is the first author of the manuscript. FZ has contributed with the conceptualisation, writing the research protocol, statistical analysis and writing this first draft of the manuscript under supervision of LBG and LC. LC has contributed with the conceptualisation, sample size calculation and statistical analysis. MN is the initiator of the project. LBG is a major contributor in supervising and revising the manuscript. BTA has contributed with the conceptualisation and the practical setup of the study. All authors have read, revised and approved the final manuscript.

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**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

**Patient consent for publication** Not applicable.

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**Author note** The individuals depicted in Figure 1-4 are not patients, but actors and were taken with the participants' knowledge.

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# Stamark

| | |
|---|---|
| Record ID | _____ |
| inklusionsite | ◯ So-REAL<br>◯ Nannasgade<br>◯ Stolpegård<br>◯ Angstforening<br>◯ Forsøgsperson.dk<br>◯ Andet |
| Fornavn | _____ |
| Efternavn | _____ |
| CPR Nummer | _____ |
| Fødselsdato | _____ |
| Køn | ◯ Kvinde<br>◯ Mand<br>◯ Andet køn |
| Etnicitet | ◯ Høj indkomstlande<br>◯ Lav/mellem indkomstlande<br>◯ Ønsker ikke oplyst |
| Hvilket land? | _____ |
| **Kontaktinformation** | |
| Telefon nr | _____ |
| Email adresse | _____ |
| Adresse | _____ |

## Civilstatus

| | |
|---|---|
| Civil status | ◯ Gift<br>◯ Samlevende<br>◯ Registreret ægteskab<br>◯ Kæreste<br>◯ Enlig<br>◯ Fraskilt<br>◯ Andet |

## Beskæftigelse og uddannelse

| | |
|---|---|
| Beskæftigelse og uddannelse | ◯ Arbejder fuldtid<br>◯ Arbejder deltid<br>◯ Sygmeldt<br>◯ Ledig<br>◯ Pension/Førtidspension<br>◯ Studerende/lærling/elev<br>◯ Hjemmegående<br>◯ Andet |
| Hvilken uddannelse er du i gang med? | ◯ Grundskoleuddannelse (folkeskole, realskole)<br>◯ Erhvervsuddannelse (EUD)<br>◯ Gymnasial uddannelse (gymnasium, hf, højere handelseksamen eller htx)<br>◯ Kort videregående uddannelse (op til to år)<br>◯ Mellemlang videregående uddannelse (to til fire et halvt år)<br>◯ Lang videregående uddannelse ( fem år eller mere)<br>◯ Andet |
| Hvad er det højeste uddannelsesniveau, som du har gennemført? | ◯ Grundskoleuddannelse (folkeskole, realskole)<br>◯ Erhvervsuddannelse (EUD)<br>◯ Gymnasial uddannelse (gymnasium, hf, højere handelseksamen eller htx)<br>◯ Kort videregående uddannelse (op til to år)<br>◯ Mellemlang videregående uddannelse (to til fire et halvt år)<br>◯ Lang videregående uddannelse ( fem år eller mere)<br>◯ Andet |
| Hvad er den højeste opnåede uddannelse blandt dine forældre? | ◯ Grundskoleuddannelse (folkeskole, realskole)<br>◯ Erhvervsuddannelse (EUD)<br>◯ Gymnasial uddannelse (gymnasium, hf, højere handelseksamen eller htx)<br>◯ Kort videregående uddannelse (op til to år)<br>◯ Mellemlang videregående uddannelse (to til fire et halvt år)<br>◯ Lang videregående uddannelse ( fem år eller mere)<br>◯ Andet |

## Psykiatrisk historie

| | |
|---|---|
| Har du tidligere været i behandling for en psykiatrisk lidelse? | ◯ Yes<br>◯ No |
| Hvilke psykiatriske lidelser har du tidligere været i behandling for? | ☐ Depression<br>☐ Angst<br>☐ Stress<br>☐ ADHD<br>☐ Mani/hypomani<br>☐ Spiseforstyrrelse<br>☐ Personlighedsforstyrrelse<br>☐ Udviklingsforstyrrelse<br>☐ Psykose<br>☐ Misbrug<br>☐ Andet |
| Hvilken type behandling har du modtaget? | ☐ Medicinsk<br>☐ Terapeutisk<br>☐ Andet |
| Hvor har du modtaget behandling? | ☐ Egen læge<br>☐ Privatpraktiserende psykolog<br>☐ Privatpraktiserende psykiater<br>☐ Psykiatrisk hospital / Psykoterapeutisk Klinik<br>☐ Andet |
| Er du aktuelt i behandling for en psykiatrisk lidelse? | ◯ Yes<br>◯ No |
| Hvilken psykiatrisk lidelse er du i behandling for? | ☐ Depression<br>☐ Angst<br>☐ Stress<br>☐ ADHD<br>☐ Mani/hypomani<br>☐ Spiseforstyrrelse<br>☐ Personlighedsforstyrrelse<br>☐ Udviklingsforstyrrelse<br>☐ Psykose<br>☐ Misbrug<br>☐ Andet |
| Hvilken type behandling modtager du? | ☐ Medicinsk<br>☐ Terapeutisk<br>☐ Andet |
| Hvor modtager du behandling? | ☐ Egen læge<br>☐ Privatpraktiserende psykolog<br>☐ Privatpraktiserende psykiater<br>☐ Psykiatrisk hospital / Psykoterapeutisk Klinik<br>☐ Andet |
| Alder ved symptomdebut på social angst? | ◯ Før 10 årsalderen<br>◯ I alderen10-15 år<br>◯ I alderen 15-20 år<br>◯ I alderen 20-25 år<br>◯ I alderen 25-30 år<br>◯ I alderen 30-35 år<br>◯ Efter 35 år<br>◯ Har ikke social angst |

| | |
|---|---|
| Alder ved første gang du opsøgte behandling for social angst? | _____ |
| Uddyb ovenstående | _____ |

**Virtual Reality og IT erfaring**

| | |
|---|---|
| Angiv venligt dit niveau af IT færdigheder | ◯ 1 (Begynder)<br>◯ 2<br>◯ 3<br>◯ 4<br>◯ 5<br>◯ 6<br>◯ 7 (Ekspert) |
| Hvad er din erfaring med Virtual Reality? | ◯ 1 (Ingen erfaring)<br>◯ 2<br>◯ 3<br>◯ 4<br>◯ 5<br>◯ 6<br>◯ 7 (Meget erfaring) |
| Hvor mange timer om ugen bruger du på at spille computerspil? (Gælder også spil på mobil eller spilkonsol eller andre lign. medier) | ◯ Spiller ikke<br>◯ 0 - 1 time<br>◯ 1 - 3 timer<br>◯ 3 - 5 timer<br>◯ 5 - 7 timer<br>◯ 7 - 9 timer<br>◯ Mere end 9 timer |

# Deltagelse i den eksperimentelle undersøgelse

| | |
|---|---|
| Dato for deltagelse i den eksperimentelle undersøgelse | _____ |
| Har deltager givet samtykke til at deltage i projektet? | ◯ Yes<br>◯ No |
| Samtykkeerklæring (Upload) | |
| Ønsker deltager at blive informeret om forskningsprojektets resultater? | ◯ Yes<br>◯ No |

# Gruppefordeling (SAD-HCG)

| | |
|---|---|
| I hvilken gruppe tilhører deltageren? | ◯ SAD gruppe<br>◯ HCG gruppe |

# Medicin

| | |
|---|---|
| Har du nogensinde taget medicin imod psykisk lidelse? | ◯ Yes<br>◯ No |
| Hvilken type? | ◯ 1. Benzodiazepiner<br>◯ 2. Antidepressiva<br>◯ 3. Stemningsstabiliserende (inkl. lithium)<br>◯ 4. Sovemedicin andet end benzodiazepiner<br>◯ 5. ADHD medicin<br>◯ Andet |
| Hvor længe har du været medicinfri? | ◯ ikke medicinfri<br>◯ 0-3 mdr<br>◯ 3-6 mdr<br>◯ 6 mdr-1 år<br>◯ 1-2 år<br>◯ over 2 år |
| Tager du aktuelt medicin imod psykisk lidelse? | ◯ Yes<br>◯ No |
| Hvilken type? | ◯ 1. Benzodiazepiner<br>◯ 2. Antidepressiva<br>◯ 3. Stemningsstabiliserende (inkl. lithium)<br>◯ 4. Sovemedicin andet end benzodiazepiner<br>◯ 5. ADHD medicin<br>◯ Andet |
| Hvilken dosis? | _____ |
| Hvor længe har du taget medicin? | ◯ 0-3 mdr<br>◯ 3-6 mdr<br>◯ 6 mdr-1 år<br>◯ 1-2 år<br>◯ over 2 år |

# Misbrug

| **Alkohol** | |
|---|---|
| Antal genstande alkohol inden for den seneste uge: | _____ |
| Har du taget hash eller øvrige psykoaktive stoffer inden for det seneste år | ◯ Yes<br>◯ No |
| Uddyb | _____ |

# Mini International Neuropsychiatric Interview (MINI)

| | |
|---|---|
| Har pt. socialfobi? | ◯ Yes<br>◯ No<br>(HUSK: Hvis pt. har både socialfobi og agorafobi, så skal den primære diagnose angives i ja/nej felterne, mens den sekundære skal angives under "sekundær diagnose" ) |
| Sekundær diagnose | _____ |
| Tertiær diagnose | _____ |
| Kvaternær diagnose | _____ |

# Lsaskliniker

| | |
|---|---|
| Tale i telefon i det offentlige rum. | |
| Deltage i mindre grupper. | |
| Spise offentlige steder. | |
| Indtage drikkevarer sammen med andre på offentlige steder. | |
| Tale med folk som har autoritet. | |
| Spille teater, optræde eller holde holde tale foran et publikum. | |
| Tage til en fest. | |
| Arbejde, mens andre ser på det. | |
| Skrive, mens andre ser på det. | |
| Ringe til en person, som du ikke kender særlig godt. | |
| Tale med folk, som du kender ikke særlig godt. | |
| Møde nye mennesker. | |
| Bruge et offentligt toilet. | |
| Træde ind i et rum, hvor alle allerede har indtaget deres plads. | |
| Være centrum for opmærksomhed. | |
| Sige noget ved et møde. | |
| Tage en prøve. | |

| | |
|---|---|
| Udtrykke uenighed eller kritik overfor folk du ikke kender særlig godt. | _____ |
| Have øjenkontakt med folk du ikke kender særlig godt. | _____ |
| Fremlægge for en gruppe. | _____ |
| Forsøge at flirte med nogen. | _____ |
| Returnere varer i en butik. | _____ |
| Holde en fest. | _____ |
| Modstå en meget insisterende sælger. | _____ |
| Samlet angst score. | _____ |

# Lsaskliniker Undgelse

| | |
|---|---|
| Tale i telefon i det offentlige rum. | |
| Deltage i mindre grupper. | |
| Spise offentlige steder. | |
| Indtage drikkevarer sammen med andre på offentlige steder. | |
| Tale med folk som har autoritet. | |
| Spille teater, optræde eller holde holde tale foran et publikum. | |
| Tage til en fest. | |
| Arbejde, mens andre ser på det. | |
| Skrive, mens andre ser på det. | |
| Ringe til en person, som du ikke kender særlig godt. | |
| Tale med folk, som du kender ikke særlig godt. | |
| Møde nye mennesker. | |
| Bruge et offentligt toilet. | |
| Træde ind i et rum, hvor alle allerede har indtaget deres plads. | |
| Være centrum for opmærksomhed. | |
| Sige noget ved et møde. | |
| Tage en prøve. | |

| | |
|---|---|
| Udtrykke uenighed eller kritik overfor folk du ikke kender særlig godt. | _____ |
| Have øjenkontakt med folk du ikke kender særlig godt. | _____ |
| Fremlægge for en gruppe. | _____ |
| Forsøge at flirte med nogen. | _____ |
| Returnere varer i en butik. | _____ |
| Holde en fest. | _____ |
| Modstå en meget insisterende sælger. | _____ |
| Samlet undgåelses score. | _____ |
| Samlet Liebowitz score. | _____ |
| I hvilket LSAS interval ligger patienten? | ◯ 0-95<br>◯ 96+ |

# Personal And Social Performance Scale

Det kan være en hjælp for intervieweren at gå frem efter de følgende spørgsmål med henblik på bedre at kunne præcisere sværhedsgraden indenfor de 4 domæner og samtidig sikre en ensartethed fra gang til gang.Tidsrammen i denne guide er den sidste måned. Hvis besøgene er sjældnere rates stadig for funktionsniveau indenfor den sidste måned.Spørgsmålene skrevet med fed skrift, er kernespørgsmål indenfor de enkelte områder.Spørgsmålene skrevet med kursiv er forslag til opfølgende spørgsmål, der kan bruges til at uddybe de svar, patienten har givet på kernespørgsmålene.

## INDLEDNING:

Jeg vil nu stille dig en række spørgsmål, der handler om din dagligdag med særligt fokus på tiden indenfor den sidste måned. Kan du fortælle mig, hvordan det er gået i den sidste måned? Indledningen sigter mod lidt generelle oplysninger om, hvordan patienten har haft det, hvor tilfreds han/hun er, om der er sket noget særligt og forereder patienten på de specifikke spørgsmål.

## a) SOCIALT NYTTIGE AKTIVITETER INKLUSIVE ARBEJDE, UDDANNELSE OG AKTIVITETER

Hvad har du brugt tiden på i den sidste måned?Har du haft arbejde?Hvis ja: Hvor meget arbejder du? Har du passet dit arbejde?Har du lavet frivilligt arbejde?Hvis ja: Hvor ofte skal du møde? Har du passet det?Har du deltaget i undervisning eller haft andre faste aktiviteter?Hvis ja: Hvor ofte? Har du passet det? Skal du opfordres til det?Hvad laver du i din fritid?Læser du avis, bruger du computer og går på nettet? Har du en hobby?Har du lavet nogen former for husarbejde i den sidste måned? (Lavet mad, gjort rent osv.)Hvis ja: Hvor meget? Hvor ofte? Skal du opfordres til det?Hvis relevant:Har du børn?Hvis ja: Går de i skole/daginstitution? Hvem passer dem? Passer du dem alene?

## b) PERSONLIGE OG SOCIALE RELATIONER

Har du familie?Hvis ja: Forældre, søskende, andre?Har du venner? Er der nogen du anser for nære venner? Kæreste?Hvis ja: Kan du uddybe det? Hvad betyder det for dig at have venner?Hvis nej: Er det noget ud savner?

## c) EGENOMSORG

Kan du fortælle mig, hvordan det i den sidste måned er gået med at sørge for dig selv?Hvor bor du? Hvordan bor du? Hvor stor er din lejlighed? Værelse? Tilfreds med din bolig?Hvor mange måltider spiser du om dagen? Hvad spiser du? Laver du selv mad? Køber ind?Har du brug for, at der er nogen, der minder dig om det eller hjælper dig med det?Hvor ofte går du i bad? Vasker hår? Børster tænder?Har du brug for, at der er nogen der minder dig om det eller hjælper dig med det?GÅr du til tandlæge?HVis ja: Hvor ofte?Hvor ofte tager du rent tøj på? Vasker tøj?Har du brug for, at der er nogen, der minder dig om det eller hjælper dig med det?Tager du medicin? Tager du den selv? Som aftalt?Har du brug for, at der er nogen, der minder dig om det eller hjælper dig med det?Passer du aftaler? F.eks. i ambulatoriet, hos din læge, tandlæge?Hvis nej: Hvorfor ikke?Søger du læge, hvis du føler dig sløj? Eller hvis der er andet i vejen?Hvis nej: Hvorfor ikke?Hvem styrer din økonomi? Har du gæld?Føler du dig generelt tryg eller utryg og hvordan færdes du rundt?Bruger du offentlig transport? Cykel?

## d) FORSTYRRENDE OG AGGRESSIV ADFÆRD

Har du haft let ved at blive irriteret den sidste måned?Har du hævet stemmen eller råbt ad nogen?Hvis ja: Kan du uddybe det?Har du skændtes med nogen?Har du bandet ad nogen eller talt grimt til dem?Hvis ja: Kan du uddybe det?Har du med vilje ødelagt noget?Hvis ja: Kan du fortælle mere om det?Har du slået i møblerne eller banket på væggen?Været støjende, larmet, spillet høj musik, gået (trampet) rundt i lejligheden?Hvad med slagsmål? Har du været i klammeri med nogen?Har du troet nogen med vold?Har du forsøgt at bruge vold mod nogen?Hvis ja: Kan du fortælle mere om det?

**(1)**

Notér patientens niveau af dysfunktion indenfor den seneste måned for de 4 hovedområder nedenfor. De nedenstående funktionskriterier skal bruges til at bestemme niveauet af dysfunktion. Bemærk at der er nogle fælles kriterier for områder a-c og andre kriterier specifikke for område d.

| | Fraværende | Mild | Tydelig | Markant | Alvorlig | Meget alvorlig |
|---|---|---|---|---|---|---|
| a) Socialt nyttige aktiviteter, herunder arbejde eller studier | ○ | ○ | ○ | ○ | ○ | ○ |
| b) Personlige- og sociale forhold | ○ | ○ | ○ | ○ | ○ | ○ |
| c) Egenomsorg | ○ | ○ | ○ | ○ | ○ | ○ |
| d) Forstyrret og aggressiv adfærd | ○ | ○ | ○ | ○ | ○ | ○ |

Sværhedsgrad: områderne a-c

(i) Fraværende

(ii) Mild: Kun synligt for nogen, der er meget tæt på personen.

(iii) Tydelig: Vanskeligheder der er tydelige for alle, selv om de ikke i en væsentlig grad forstyrrer personens evne til at agere på dette område taget i betragtning hans / hendes socio-kulturelle kontekst, alder, køn og uddannelsesniveau.

(iv) Markant: Vanskeligheder der betydeligt hindrer ham / hende i at agere på dette område. Personen er stadig i stand til at udføre nogle opgaver, dog utilstrækkeligt, og lejlighedsvis uden professionel eller social hjælp. Hvis personen bliver hjulpet af nogen, kan han / hun kvalificere sig til det foregående niveau af funktion.

(v) Alvorlig: Vanskeligheder der gør det umuligt for personen at agere på dette område, hvis han/hun ikke hjælpes af en professionel, eller hvis personen udøver destruktiv adfærd dog uden, at denne truer personens overlevelse.

(vi) Meget alvorlig: Forringelse og ekstreme vanskeligheder, der kan sætte personens overlevelse i fare.

Sværhedsgrad: Område d

(i) Fraværende

(ii) Mild: uhøflig, uselskabelig og/eller mindre klager omkring adfærd

(iii) Tydelig: Taler for højt, taler til andre på en for familiær måde eller spiser på en socialt uacceptabel måde

(iv) Markant: Fornærmer andre i offentligheden, ødelægger eller kaster objekter, opfører sig ofte på en socialt uacceptabel, men ufarlig måde (f.eks. afklæder sig eller urinerer i offentligheden).

(v) Alvorlig: Hyppige verbale trusler eller fysiske angreb uden intention eller risiko for alvorlig personskade

(vi) Meget alvorlig: hyppige aggressive handlinger med hensigt på at forårsage alvorlig personskade

**(2)**

Vælg et 10-pointsinterval. Dette 10-pointsinterval er baseret på niveauet af dysfunktion for de 4 hovedområder: (a) selvpleje; b) personlige og sociale forhold c) socialt nyttige aktiviteter, herunder arbejde eller studier og (d) forstyrret og aggressiv adfærd.

100-91 Fremragende funktion i alle 4 områder. Personen nyder anseelse for hans/hendes gode kvaliteter, håndterer adækvat livets problemer og er involveret i en lang række af interesser og aktiviteter.

90-81 God funktionsevne på alle fire områder. Har kun almindelige problemer eller vanskeligheder

80-71 Milde vanskeligheder for et eller flere a-c områder

70-61 Tydelige men ikke markante vanskeligheder i et eller flere a-c områder eller milde vanskeligheder i d

60-51 Markante vanskeligheder i et eller flere a-c områder eller åbenbare vanskeligheder i d

50-41 Markante vanskeligheder i to eller flere områder eller alvorlige vanskeligheder i et eller flere a-c områder, med eller uden markante vanskeligheder i d

40-31 Alvorlige vanskeligheder i et område og markante vanskeligheder i mindst et af a-c områderne eller markante vanskeligheder i d

30-21 Alvorlige vanskeligheder i to a-c områder eller alvorlige vanskeligheder i d med, eller uden forringelse af a-c områderne

20-11 Alvorlige vanskeligheder i alle a-d områder eller meget alvorlige vanskeligheder i d med eller uden forringelse af generelle a-c områder. Hvis personen reagerer på provokerende stimuli, så er den foreslåede rating 20-16; hvis ikke, 15-11.

10-1 Mangel på grundlæggende funktionsevne, med ekstrem adfærd, men uden, at denne truer personens overlevelse (6-10) eller med livsfare, f.eks. dødsrisiko på grund af underernæring, dehydrering, infektioner, manglende evne til at genkende tydeligt farlige situationer (1-5)

**(3)**

Justering indenfor 10-pointssintervallet

Niveauet af dysfunktion i andre områder bør tages i betragtning ved at tilføje points indenfor 10- pointsintervallet (fx fra 31 til 40).

Tag følgende i betragtning:
Vedligeholdelse af fysisk og psykisk sundhed
Indkvartering, bopæl, evne til at holde eget hjem/værelse
Bidrager til husholdningsaktiviteter, deltagelse i familieliv eller dagcenter / bosted
Personlige og seksuelle forhold
Passer børn
Socialt netværk, venner og kolleger
Tilpasning til sociale normer
Generelle interesser
Brug af transport og telefon
Strategier til at håndtere krisesituationer
Risiko og selvmordsadfærd tages ikke i betragtning i denne skala

**(4)**

Indfør den endelige score (0-100)

*(Place a mark on the scale above)*

# Fear of Negative Evaluation Scale

| **Læs hver af de følgende sætninger grundigt og angiv, hvor karakteristiske de er for dig.** | Slet ikke karakterstisk for mig | En smule karakteristisk for mig | Moderat karakteristisk for mig | Meget karakteristisk for mig | Ekstremt karakteristisk for mig |
|---|---|---|---|---|---|
| 108) Jeg er bekymret for, hvad andre mennesker vil tænke om mig, selv når jeg ved, at det ikke betyder noget. | ○ | ○ | ○ | ○ | ○ |
| 109) Jeg er ubekymret, selvom jeg ved, at folk danner et negativt indtryk af mig. | ○ | ○ | ○ | ○ | ○ |
| 110) Jeg er ofte bange for, at andre mennesker bemærker mine mangler. | ○ | ○ | ○ | ○ | ○ |
| 111) Jeg bekymrer mig sjældent om, hvad slags indtryk jeg giver andre. | ○ | ○ | ○ | ○ | ○ |
| 112) Jeg er bange for, at andre ikke vil anerkende mig. | ○ | ○ | ○ | ○ | ○ |
| 113) Jeg er bange for, at folk vil finde fejl ved mig. | ○ | ○ | ○ | ○ | ○ |
| 114) Andres mening om mig generer mig ikke. | ○ | ○ | ○ | ○ | ○ |
| 115) Når jeg snakker med nogen, bekymrer jeg mig om, hvad de måske tænker om mig. | ○ | ○ | ○ | ○ | ○ |
| 116) Jeg bekymrer mig normalt om, hvad slags indtryk jeg giver andre. | ○ | ○ | ○ | ○ | ○ |
| 117) Hvis jeg ved, at nogen dømmer mig, har det ikke stor virkning på mig. | ○ | ○ | ○ | ○ | ○ |
| 118) Nogle gange tænker jeg, at jeg er for optaget af, hvad andre mennesker tænker om mig. | ○ | ○ | ○ | ○ | ○ |
| 119) Jeg er ofte bekymret for, at jeg kommer til at sige eller gøre noget forkert. | ○ | ○ | ○ | ○ | ○ |

# Multimodal Presence Scale for virtual reality environments (MPS)

| **Physical Presence**<br>**Social Presence** | | | | | |
|---|---|---|---|---|---|
| | Helt uenig | Uenig | Hverken uenig eller enig | Enig | Helt enig |
| Det virtuelle rum fremstod virkeligt for mig | ○ | ○ | ○ | ○ | ○ |
| Jeg havde en fornemmelse af at agere i det virtuelle rum fremfor at styre noget udefra | ○ | ○ | ○ | ○ | ○ |
| Min oplevelse i det virtuelle rum var i overensstemmelse med mine oplevelser i den virkelige verden | ○ | ○ | ○ | ○ | ○ |
| Mens jeg var i det virtuelle rum, havde jeg en fornemmelse af at "være der" | ○ | ○ | ○ | ○ | ○ |
| Jeg var fuldstændigt betaget af den virtuelle verden | ○ | ○ | ○ | ○ | ○ |
| Jeg havde en fornemmelse af at være i tilstedeværelsen af en anden person i det virtuelle rum | ○ | ○ | ○ | ○ | ○ |
| Jeg følte, at personerne i det virtuelle rum var opmærksom på min tilstedeværelse | ○ | ○ | ○ | ○ | ○ |
| Personerne i det virtuelle rum fremstod som bevidste og levende for mig | ○ | ○ | ○ | ○ | ○ |
| Under simulationen var der tidspunkter hvor computer grænsefladen syntes at forsvinde, og det virkede som om, jeg samarbejde direkte med en anden person | ○ | ○ | ○ | ○ | ○ |
| Jeg havde en fornemmelse af at interagere med andre personer i det virtuelle rum fremfor en computersimulering | ○ | ○ | ○ | ○ | ○ |

# SUDS subjective unit of distress scale

| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SUDS pre experimental tasks | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| SUDS post experimental tasks | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

# Reason For Missing Data

| | |
|---|---|
| Is there missing data for this data collection timepoint? | ◯ Yes<br>◯ No<br>(Med data menes kun den information som indgår i den statistiske analyse) |
| Please state the reaons (You can choose more than one) | ☐ Poor eye tracking data<br>☐ Participant does not want to attend the study, withdraws consent<br>☐ Other technical errors |
| If other, please describe | _____ |