

A survey on virtual environment applications to fear of public speaking

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Abstract. – **BACKGROUND:** Social Anxiety Disorder (SAD) is one of the most prevalent anxiety disorders in Europe and comprises the fear of public speaking as its typical sub-type. Cognitive-Behavioural Therapy (CBT) is the intervention of choice for SAD, and it includes exposure to anxiety-provoking stimuli to induce systematic desensitization and reduce anxiety. Similarly, exposure therapy per se has been used and found effective, although it is not as specific as CBT for the treatment of SAD. Interestingly, exposure to anxiety-provoking situations can be achieved in Virtual Environments (VEs) through the simulation of social situations allowing individuals with public speaking anxiety to live and develop real exposure-like reactions. The Virtual Reality Exposure Therapy (VRET) is the treatment of anxiety disorders based on such VEs.

AIM: This article aims to provide an overview of the scientific literature related to the applications of Virtual Reality to the treatment of fear of public speaking.

MATERIALS AND METHODS: We conducted the literature review on PubMed and Google Scholar for studies including the fear-of-public-speaking VEs.

RESULTS AND CONCLUSIONS: Reviewed studies addressed two main aspects: the design parameters of the VEs for adequate reactions to synthetic social stimuli, and the efficacy of VEs for fear of public speaking treatment. VEs resulted effective for triggering as-if-real reactions in relation to public speaking. VE-based exposures reduced public speaking anxiety measurements, decreased scores and maintained them at 3 month follow-up. Studies comparing VRET to pharmacological therapy are lacking, and there are few randomized controlled trials that compare VRET to CBT, especially on fear of public speaking treatment.

Key Words:

Virtual reality exposure therapy, Fear of public speaking, Social anxiety disorder, Virtual environments.

Introduction

Social Anxiety Disorder (SAD), also known as Social Phobia, is one of the most prevalent anxiety disorders, affecting from 3.5% to 16% of subjects at some time in their lives in European societies¹. It is characterized by marked and persistent fear of social or performance situations in which embarrassment may occur. Exposure to the social situation provokes an immediate anxiety response which may take the form of a situationally-bound panic attack. Patients usually recognize that their fear is excessive or unreasonable. This excessive anxiety usually leads to avoidance behaviour that can severely affect normal daily living. With an onset commonly occurring during childhood or adolescence, SAD may disrupt normal patterns of social and personal relationship development, often having a long-term impact on emotional stability in the social or working life². The clinical implications of SAD comorbid with mood disorders have been fully investigated^{3,4}.

More recently, a spectrum approach to the social anxiety symptomatology, i.e. dimensional, has been proposed and an assessment instrument for the evaluation of full-range social anxiety symptomatology has been developed (Social Anxiety-Spectrum Self-Report, SHY-SR)⁵. This model has been applied to the investigation of the general population⁶.

Randomized controlled trials have repeatedly demonstrated that SAD can be successfully treated with either pharmacotherapy or Cognitive-behavioral therapy (CBT)^{7,8}. Recently, in Ponniah and Hollon⁹ 30 psychological interventions for SAD were examined and the Authors concluded that CBT was the psychological intervention of

choice. One of the most widely studied variants of CBT – group CBT (CBGT) – has received empirical support in SAD. Therapists lead patients through individualized exposures to role-played simulations of each patient’s feared situations, preceded and followed by therapist-directed cognitive restructuring exercises. CBGT has produced outcomes superior to the waiting-list effect¹⁰ and psychological placebo treatment¹¹. Exposure Therapy (ET) has been also successfully applied to SAD. It involves exposure to a hierarchy of feared social and performance situations, starting with the least anxiety-provoking situation and remaining with it until fear has decreased before moving on to the next situation. Flooding is the intensive application of exposure. In several research settings ET has been found to be more efficacious than no treatment for SAD⁹. ET may be considered an efficacious, but not specific, treatment for social phobia at this stage; on the contrary, CBT has been shown to be both efficacious and specific⁹.

One of the techniques to expose the subject to a social performance task uses a virtual reality (VR) environment which is sufficiently realistic to provoke fear and anxiety in individuals who are highly vulnerable to socially threatening situations. Pan et al¹² gave a clear definition of what VR is: “the use of computer graphics systems in combination with various display and interface devices to provide the effect of immersion in the interactive 3D computer-generated environment. We call such an environment a virtual environment (VE).” The VE is generated and sustained by a sophisticated modular computer programme, which controls specific devices that are responsible for stimulating the participant’s sensory channels and for responding to the participant’s actions. The operations of such devices may be adapted in real-time to the participant’s behaviour. The involved sensory modalities may be a single one (e.g., only vision is elicited through the display of a 3D graphic environment) or multiple (e.g., by combining auditory and tactile stimulations with the graphic presentation). Individuals with SAD have been seen to show a robust increase in startle reactivity when the members of a virtual audience direct their eyes at the participant during speech anticipation¹³. The startle reactivity indirectly reflects activity of fear and anxiety circuits in the brain, and potentiated startle under social-evaluative threat indexes SAD-related fear of negative evaluation¹³. When applied to fear of public speaking, generally vi-

sual and auditory modalities are elicited, and a Head Mounted Display (HMD) is used to stimulate the participant with a 3D VE. The HMD is a helmet with two built-in monitors, one in front of each eye, thus conveying the proper view to the corresponding eye. Furthermore, the head of the participant may be tracked, making it possible to provide each eye with a perspective of the virtual scene that also adapts to head movement.

On the whole, the aim of Virtual Reality Exposure Therapy (VRET) is to use virtual stimuli for triggering, in an individual suffering from an anxiety disorder, responses similar to those that would be experienced in front of the real or imagery-based counterparts of the same stimuli. Indeed, graded exposure to a feared stimulus is known to induce systematic desensitization for that stimulus, reducing the generated anxiety^{14,15}. When dealing with fear of public speaking, the VRET approach has been devised to develop VEs that simulate the typical settings where public speaking is required (e.g., auditoria, classrooms or smaller meeting rooms). These VEs are populated with humanlike virtual characters that provide the social component of the environment, acting as a virtual audience for the participant in the VE. The task of the participant exposed to these VEs is usually to deliver a brief speech in front of the virtual audience. Clearly, the VE features that can be manipulated and the response variables measured vary, but the basic scheme of the VE is generally the same. Also in terms of stimulated sensory channels, the visual modality is always present in the VE output section, and auditory feedback is often used (e.g., by simulating the echo of a real auditorium). This article aims to provide an overview of the scientific literature related to the applications of VR to fear of public speaking. The review covers the last fifteen years, but it does not take a chronological perspective. Rather, the studies using VEs in relation to public speaking anxiety are isolated from those targeting generalized SAD, and the former are categorized according to the research questions they tackle, independently of their year of publication. The goals of this literature review are: (1) to get a compendious picture describing how VEs have been used in connection to fear of public speaking, and to explain which parameters must be taken into account to create a functional synthetic social interaction; (2) to assess the efficacy of VR based protocols for the treatment of subjects diagnosed with fear of public speaking.

Materials and Methods

Studies for review were identified in two main abstracts databases, Google Scholar and PubMed, following a keyword search for the terms: “social anxiety”, “social phobia”, “fear of public speaking”, “virtual reality exposure” and “virtual environments”.

The article search resulted in 40 articles published between 1997 and 2011, including studies addressing generalized SAD and others addressing its sub-type fear of public speaking, but also 7 reviews and 2 meta-analyses of VRET effects on anxiety disorders. Reviews and meta-analyses apart, most of the literature targets fear of public speaking; generalized SAD is instead less investigated. The remaining articles are introductory to VRET and its rationale and potential, or show different uses of social VEs in different contexts, as for schizophrenia and paranoid thinking.

Published studies about VR applications to fear of public speaking can be primarily clustered in two groups. A first group of studies attempts to evaluate what VE characteristics are functional to triggering and manipulating the anxious reactions typical of people with fear of public speaking; the second one comprises studies designed for definition and evaluation of a protocol to treat subjects diagnosed with social anxiety.

Results

Virtual Environments Applied to Fear of Public Speaking

In our review of the literature we found that Slater et al¹⁶ evaluated the emotional reactions of 10 university students in order to decide whether their emotional reactions were adequate to the confronted virtual audience. The students participating in this experiment showed a low rate of fear of public speaking (based on the Personal Report of Confidence as a Speaker – PRCS). Two factors were varied: the degree of immersion of the participant in the VE (HMD vs. Desktop VE output system) and the virtual audience behaviour (Hostile vs. Friendly) towards the participant who delivered a brief speech in the VE. Each student was engaged in three virtual experiences: speaking to either a very hostile or a very friendly virtual audience, then to the opposite type of audience, and finally – for ethical reasons – confronting with an initially rather negative audience that gradually turned to a positive ap-

proach as the speaker’s speech unfolded. The response variables used for this experiment were subjectively measured through self-rating instruments, a standard questionnaire for rating fear of public speaking, and a questionnaire concerning somatisation complaints induced by the virtual reality exposure. In the VE developed for this study the avatars (as the humanlike virtual characters constituting the virtual audience are often referred to) could be individually controlled. Their different behaviours collectively made a narrative that is expected to be interpreted as purely positive or negative by the subject speaking to them. No ambiguity was allowed by the design of this study. The 8 avatars sat in a semi-circle in front of the subject in a virtual seminar room. The virtual audience expression was based on 6 primary facial expressions, yawning and sleepy faces. Despite the rather poor appearance fidelity of the avatars, they result effective in triggering appropriate emotions in the speaker participating in their VE. One reason for this is probably that they do not appear unrealistically static in their postures, as they manifest automatically subtle elementary gestures, like twitches, blinks and nods. Besides, these avatars are able to follow the real speaker with gaze and head movements – in order to simulate eye contact, that is a very relevant variable in SAD – and they can stand up and leave the virtual room crossing the speaker’s line of sight, or they can clap their hands together in an applause. Finally, so as to avoid audience responses completely uncorrelated to the speaker’s performance, the narratives underlying the different audience *types* consisted of a sequence of scripts, each providing a combination of avatars behaviours. During the experiment, a concealed operator observing the speaker performance could adjust the duration of each sequence activating or de-activating it (even for a single avatar) at appropriate moments in time. At any event, the components and order of the whole sequence were the same across all subjects. Results accounted also for secondary explanatory variables, for example the sense of co-presence and the level of interest perceived in the virtual audience by the speaking subject. It emerged that a higher self-rating of performance corresponded to a greater interest perceived in the virtual audience, whereas the co-presence effect was to make the perceptions of the situation more intense as either positive or negative. However, the same study questioned the possibility to actually realize an audience that can be perceived

as purely positive or negative. It is argued that understanding which factors determine the speaker's perception of the virtual audience and its interest is crucial for the development of functional applications in this context.

Also in Pertaub et al's studies^{17,18} the participants in the experiments were university students. First, they were scored through the PRCS, and then they participated in a virtual scenario similar to that developed for the study of Slater et al¹⁶, but with only male avatars, formally dressed, and located in a virtual room that is the counterpart of the real room where the speaker was physically placed during the experiment. In addition to the hostile and friendly audiences, an additional scenario was included in the experimental design, where avatars were definitely static and displayed neutral expressions in terms of the emotional message conveyed. Again, half of the subjects were exposed by means of a HMD, while a non-immersive desktop-VE was delivered to the remaining half of participants, who still wore ear-phones through which the experimenter could transmit audio clips recorded in real seminar rooms. Also overtly evaluative comments may be individually spoken by the audience avatars. For the positive and negative scenarios 10 different audience behaviours were scripted. The concealed operator could decide the time instant when each script was activated according to the actual progress of the subject's speech, but the scripts order was fixed. Subjects' responses were evaluated using a self-rating instrument of the subject's performance, a modified PRCS and questionnaires targeting somatic symptoms induced by the exposure. Demographic questions, questions for assessing the familiarity of the subjects with video-games and the Fear of Negative Evaluation (FNE) questionnaires were administered before the exposure. Subjects felt at higher ease with the positive audience. Although the reactions of the negative audience to the speaker were markedly more explicit than those usually found in the real situations, the subjects considered this type of audience as the most realistic. Indeed, the negative audience majorly affected PRCS scores and somatic evaluation, and induced higher levels of co-presence, while the static neutral audience was considered the least realistic, inducing less somatisation. Finally, self-rating of performance decreased in animated scenarios when compared with the static condition. As for the effect of immersiveness/non-immersiveness of the VE, no clear trend emerged in connection with familiarity

with video-games or HMD compared to Desktop output condition; what came out was the obvious further deterioration in realism of the static audience when delivered through a Desktop-VE.

A common operating hypothesis shared among all the above mentioned studies, was the use of non-verbal communications, mainly facial expressions, body postures, gaze directions, and other avatar animations, to guide the speaker-subject towards the perception of an unambiguous evaluative message that the virtual audience manifests in front of the subject's performance. Another study, carried out by Slater et al¹⁹, verified whether the virtual scenarios were able to trigger anxiety and were also specific in their eliciting actions. For this purpose, subjects included two main groups: confident speakers (PRCS < 10) and people with an intense fear of public speaking (PRCS > 20). In each group, subjects were randomly assigned to two experimental conditions: in one case they had to speak in front of an empty virtual seminar room, while in the other they had to speak when the same room was populated with 3 male avatars and 2 female avatars seemingly interactive as in Pertaub et al's¹⁸ study, but with neutral expressions, regardless of the progress of the subject's speech. The article claimed neutrality obtained by means of subtle movements of the upper face that determined the avatar's interest, the direction of gaze, and non-intrinsically evaluative gestures. The VE was delivered through a HMD in all conditions.

Besides PRCS and a questionnaire for assessing self-focused attention (often prominent in social phobias during social interaction), heart rate was adopted as a response variable representing a physiologic parameter of somatisation. Consistently with Authors' prediction, in spite of virtual audience neutrality, somatisation was higher for high-PRCS subjects (no anxious reaction from confident speakers). In the same line, High-PRCS scoring subjects showed anxiety levels while speaking in the empty room if compared with the avatar-filled room. Again, a low-fidelity VE populated with avatars displaying a pre-programmed behaviour, independent of the actual subject's performance as a speaker, was able to engender a strong sense of presence and a response that is consistent with the subject's PRCS score.

Two complementary aspects were proposed as matter of further exploration: to which degree it is possible to decrease the visual fidelity of the VE and avatars while maintaining the functionality and specificity of the system to generate ap-

appropriate reactions in phobic subjects, and on the other hand, what contribution an increase of representational fidelity might bring to the functionality of the VE and the avatars.

Definition and Efficacy of VRET Protocols for the Treatment of Fear of Public Speaking

The first VR applications to specific phobias are reported in the publications by North et al^{15,20}. In North et al¹⁵ a VE showing a virtual auditorium resembling the real University auditorium was delivered via HMD to students showing fear of public speaking. The virtual auditorium had the capacity to contain up to 100 people, distributed across three sections. Students underwent one exposure per week for five weeks, and every exposure lasted 10-15 minutes. The objective of the study was to have a measurement of the treatment based on these VR-exposures. The Attitude Towards Public Speaking (ATPS) questionnaire and Subjective Units of Discomfort Scale (SUDS) rating engendered by the virtual exposure were used to reflect the VRET effect. The results of this experiment showed a decrease in the scores of both ATPS and SUDS following the virtual exposure treatment, and many subjects after VRET exposure agreed to speak in front of a real audience, displaying improvement in terms of avoidance as well.

Harris et al²¹ explored the efficacy of a brief VRET protocol – 4 weekly individual sessions – to trigger anxiety in students scoring 16 or more on the PRCS scale. The students were divided into two groups: one group participated in the brief VRET protocol, while the other group was assigned to a waiting-list. The VE consisted in a virtual auditorium, including a virtual podium on which the participant could read a text. The auditorium could be gradually filled with a virtual audience which had the faculty to encourage the speaker, and ask him/her to speak louder or clap. The protocol unfolded through three phases: treatment, pre-treatment and post-treatment. The subject's heart rate was used as an objective measure of somatisation. At pre-treatment, the subject was administered with PRCS, Liebowitz Social Anxiety Scale (LSAS), State-Trait Anxiety Inventory (STAI), Beck Depression Inventory (BDI) and ATPS. In addition, heart rate was measured in a rest condition and during a loud-voice reading of a short passage. During treatment, 4 weekly sessions were used, each including 12-15 minutes of VRET via HMD. In the first session

the subject became familiar with the empty auditorium, where he was asked to speak about him-/herself. Then, the subject was asked to prepare a 2-minute speech to deliver in session 3. In session 2 the subject had to read the pledge of allegiance while the experimenter gradually filled the virtual auditorium with a virtual audience. The reading was repeated twice, and the experimenter manipulated the audience so that it applauded and encouraged the subject. In session 3 the subject repeated the prepared speech twice, while the virtual auditorium was gradually filled. During this session, the virtual audience continuously asked the subject to speak louder, had the possibility to ask questions and laughter was audible. In the event of being questioned, the therapist asked the subject to stare at the audience while speaking. In the final session of the treatment, session 3 was repeated. Before, during and after exposures the subject was asked to use the SUDS to rate the situation on a 0-100 scale. The post-treatment phase repeated the same measurements taken at pre-treatment.

The analyses of pre-treatment and post-treatment data revealed a significant improvement in the Waiting-List group for the ATPS questionnaire, while the VRET group improved on every scale, also on PRCS, and the items related to fear of public speaking in the LSAS. Also significant differences in heart rate were found between pre-treatment and post-treatment, and between the second and fourth exposure sessions. SUDS scores did not display significant variations through the treatment phase. This might be due to the marked difference in required effort of tasks between sessions 2 and 4.

Anderson et al²² empirically assessed the efficacy of a VR exposure intervention for treating fear of public speaking in two ways: by analysing case-studies, and by conducting an open clinical trial²³. In the latter, the VE consisted of a virtual podium suitable for reading a text on it, placed in front of virtual curtains. The subject wore an HMD including headphones and a microphone for communicating with the therapist. When curtains opened, two possible scenarios might appear: either a seminar room with 5 people around a table, or an auditorium with 25 people. This virtual audience consisted of live video clips of real people embedded in the VE. The exposure procedure of the subject was based on a hierarchy of feared situations prepared by the subject, who commenced exposure from the least feared in the hierarchy. The subject was

asked to rate in terms of SUDS the ongoing situation, and did not pass to the higher-feared situation until the SUDS score decreased.

The response variables chosen for comparison before starting the treatment, immediately at its end and at a 3-month follow-up were PRCS, the Self-Statements during Public Speaking (SSPS) and the Personal report of Communication Apprehension (PRCA). The clinical trial comprised 8 sessions: 4 anxiety-management training sessions, and 4 VRET sessions. In contrast, in another study by Anderson et al²² two case-studies were considered, and each of them underwent a different VRET protocol differing in both the number and quality of sessions. The response variables used and the definition of a hierarchy of the patient's fear as a starting point were adopted similarly to the other study²³. The VE was the same, but the only situation used was that of the seminar room with five persons around the table. The speech text could be read on a virtual chalkboard. A peculiarity of these studies^{22,23} was the use of a behavioural avoidance test (BAT) to assess the VRET efficacy. The BAT consisted of the subjects speaking in front of a real audience.

The results of these studies demonstrated that the performance gained at post-treatment was retained at follow-up, and subjects' self-rating generally improved. Specifically, in Anderson et al's study²³ 80% of the sample's indexes related to exposure to public speaking improved at least by 30%. Furthermore, the scores achieved on PRCS and SPSS after the treatment were comparable to those gained after an 8-week CBT treatment. In contrast, VRET did not affect the proportion of the subjects who agreed to participate in the BAT. However, in Anderson et al²² both the subjects agreed to undergo the BAT, so after the VRET they were available to address a real audience.

The comparison between a VRET protocol and a standard CBT protocol mostly pertains to their applications to generalised SAD (see for example the studies of Klinger et al^{24,25} as non-controlled designs and the study of Robillard et al²⁶ as a design with a control group). Nonetheless, Wallach et al²⁷ compared three groups of subjects looking for a difference in the effects of a VRET, a CBGT treatment and a waiting-list for fear of public speaking. No statistically significant difference was found between CBT and VRET effects, while both VRET and CBT proved superior to the waiting-list group. Furthermore, these Authors found a drop-out rate from VRET much lower than the drop-out rate from CBT.

Discussion

Besides the most widely studied, evidence-based interventions of CBT and pharmacological therapy, VEs represent an emerging, promising tool to carry out exposure treatment, better than imaginary exposure and, potentially, as good as *in vivo* exposure, in triggering anxious reactions. For this reason, studies started to assess the capacity of purposely-designed VEs to engender emotional responses similar to those that would happen in front of the real feared situations.

In terms of public speaking anxiety, the elements that were found as critical for a successful application were all related to the virtual audience. The virtual audience most often consists of humanlike characters – the avatars. Interestingly, visual fidelity is not an important parameter, in fact also VEs populated with avatars with quite a low visual fidelity proved to be functional in eliciting anxiety in their participants. These VEs appear to be specific in those confident speakers who did not show any heart rate variation as, on the contrary, was shown by subjects who feared public speaking. This difference between the two groups was reduced when a neutral virtual audience was removed from the sight of the speakers. Another central element for the VE functionality was the virtual audience's behaviour: if perceived as hostile by the speaker, the provoked anxiety symptoms increased and the self-rated performance decreased. The negative, neutral or positive behaviour of the virtual audience was determined by the combination of avatars' behaviours, and each behaviour depends chiefly on the facial expressions, gaze direction, and actions of the avatars. In the reviewed literature, primarily the audience behaviour was determined through the facial expressions of the avatars (including, but not limited to, smiling, nodding, yawning, sleepy faces, laughter) and other gestures, like clapping hands to encourage the speaker, dozing, finger-tapping or manipulating objects to show lack of interest in the speaker's speech. Also controlling the avatar's gaze toward the speaker and delivering realistic sounds were regarded as important for triggering anxious reactions as if in reality. The interest of the audience perceived by the speaker was found as an important variable to determine appropriate emotional reactions.

On the whole, static avatars seemed to be inappropriate for triggering emotional reactions and sense of co-presence, so random autonomous behaviours based on subtle elementary gestures, like twitches, blinks and nods were used.

Along with or alternatively to this autonomous behaviour used to avoid lack of realism, the behaviours intended to communicate negative, positive or neutral evaluative contents were based usually on narratives. The narratives are composed of a pre-ordered sequence of scripted behaviours for the avatars. These scripts are activated/deactivated in the prefixed order, but at appropriate times chosen by the experimenter (often the therapist) who attends the participant's ongoing performance, and tries to activate the different scripts in a way that does not appear overtly independent of the actual course of performance. The output device used for delivering the VE is almost always a HMD with head tracking.

As far as the efficacy of VE based protocols is concerned, in the literature we found that the PRCS was the primary scale used as the response variable indexing fear of public speaking at pre- and post-treatment. Also the ATPS, LSAS and SSPS were adopted. Along with these measures, heart rate was used for having a physiological index of somatisation.

The protocols usually involve weekly exposure sessions for 4 or 5 weeks. Often, SUDS were used preliminary to the session for defining a feared-situation hierarchy to be used in the VE, and during and after exposure to decide the content of the following VE or as an index for capturing the treatment outcome.

The answer to the question whether VRET is effective on subjects diagnosed with fear of public speaking is affirmative, in the sense that, also compared to a waiting-list group, subjects who followed VR-based exposure protocols improved on all or several scores indexing fear of public speaking. In addition, some of them also agreed to participate in behavioural avoidance tests, and progress was retained at 3-month or longer follow-up.

As far as limitations of these studies are concerned, we observe that these results have been largely found by recruiting samples of University students, classified as fearing public speaking or not according to the PRCS questionnaire. None of the studies investigating the parameters and functionality of VEs to successfully simulate a synthetic social interaction enrolled patients with SAD.

As far as the comparison between the efficacy of CBT protocols and VEs exposure therapy is concerned, most studies focused on generalised SAD, and not on the fear of public speaking subtype. One recent study²⁷ compared VRET and CBT applications for public speaking anxiety: no significant difference emerged, and both proved

superior to the waiting-list group. Another interesting finding is that the drop-out rate from the VRET condition is much lower than the one from the CBT treatment group²⁷. A wider acceptance rate might be a key advantage of VR-based treatments of subjects who suffer from social anxiety. Authors' conclusions are in line with the view that VRET should not be seen as a replacement for CBT, but in contrast should be considered a valuable tool that may flank CBT for enhancing therapy outcomes, adjusting for some disadvantages of imaginary and *in vivo* exposure to anxiety-provoking stimuli.

No study compares pharmacotherapy directly with VRET. Only one study evaluated the effect of a single dose of quetiapine to alleviate anxiety symptoms arising through exposure to a VE simulating public speaking²⁸, but the efficacy of VRET was not an aim of this research.

Conclusions

Despite the promising, potential usefulness of VR in social phobia, especially as far as fear of public speaking is concerned, well-designed randomized controlled trials are needed to clearly draw conclusions about its efficacy in the treatment of such disorders.

Conflict of Interest

None to declare.

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