Author/s:
McEnery, C;Lim, MH;Knowles, A;Rice, S;Gleeson, J;Howell, S;Russon, P;Miles, C;D'Alfonso, S;Alvarez-Jimenez, M

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McEnery Carla (Orcid ID: 0000-0001-9145-9068)
Rice Simon (Orcid ID: 0000-0003-4045-8553)

Social Anxiety in Young People With First-Episode Psychosis: Pilot Study of the EMBRACE Moderated Online Social Intervention

Carla McEnery,[*a,d,e] Michelle H. Lim,[a,b] Ann Knowles,[c] Simon Rice [d,e], John Gleeson[f], Simmone Howell[e], Penni Russon[e], Chris Miles[e], Simon D'Alfonso[e,g], and Mario Alvarez-Jimenez[d,e]

[a] Centre for Mental Health, Swinburne University of Technology, Melbourne, Australia
[b] Iverson Health Innovation Research Institute, Swinburne University of Technology, Melbourne, Australia
[c] Department of Psychology, Swinburne University of Technology, Melbourne, Australia
[d] Centre for Youth Mental Health, The University of Melbourne, Melbourne, Australia
[e] Orygen, The National Centre of Excellence in Youth Mental Health, Parkville, Australia
[f] School of Behavioural and Health Sciences, Australian Catholic University, Melbourne, Australia
[g] School of Computing and Information Systems, University of Melbourne, Parkville, Victoria, Australia

*To whom correspondence should be addressed:

Carla McEnery
Centre for Mental Health,
Swinburne University of Technology, Melbourne, Australia
Mail H24
PO Box 218
Hawthorn VIC 3122
Australia
e-mail: cmcenery@swin.edu.au

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ABSTRACT

Aim

We conducted a single-group pilot study to evaluate the feasibility, acceptability and safety of a novel online intervention (entitled EMBRACE) that includes expert and peer moderation, therapeutic comics and social networking features. The cognitive–behavioural-based intervention was specifically designed to treat social anxiety as a primary treatment target in youth with first-episode psychosis (FEP).

Method

The 10 participants (17–26 years; *M*age = 23 years) had a diagnosis of FEP and experienced significant levels of social anxiety as defined by exceeding a sub-threshold clinical score (>30) on the Social Interaction Anxiety Scale (SIAS). They had access to the EMBRACE intervention for two months.

Results

In total, seven out of ten participants completed eight modules or more (total of 12 modules). All participants rated the intervention as positive and safe, and endorsed recommending it to others who experience social anxiety. Improvement in pre–post social anxiety symptoms, as measured via the SIAS (d = -1.70, p = .0005) and the Liebowitz Social Anxiety Scale (d = -1.35, p = .002) were found. No statistically significant pre-post improvements were found for depressive or loneliness symptoms.

Conclusion

EMBRACE was shown to be a feasible, acceptable, and safe online intervention to specifically target social anxiety as a primary treatment concern in young people with FEP.

Keywords: social anxiety, psychosis, Internet, online, cognitive–behavioural therapy

Social Anxiety in Young People With First-Episode Psychosis: Pilot Study of the EMBRACE Moderated Online Social Intervention

Social anxiety disorder (SAD) is characterised by an excessive fear of social situations that involve the potential for scrutiny by others (American Psychiatric Association, 2013). Prevalence rates of SAD ranging from 22% to 25% have been reported for individuals with psychosis (Achim et al., 2009; McEnery et al., 2019; Michail & Birchwood, 2009), compared to lifetime prevalence estimates of 12% to 16% in the general population (Magee, Eaton, Wittchen, McGonagle, & Kessler, 1996; Ruscio, Brown, Chiu, Sareen, Stein & Kessler, 2008). SAD is one of the most commonly reported anxiety co-morbidities in a psychosis population (Achim et al., 2009). Research findings show that individuals with psychosis and co-morbid SAD compared with those without co-morbid SAD also report poorer overall functioning outcomes (Aikawai et al., 2018; Sutcliff, Roy, & Achim, 2015), higher levels of self-reported internalised shame (Birchwood et al., 2007; Michail & Birchwood, 2009), and a higher lifetime rate (and greater lethality) of suicide attempts (Pallanti, 2004). Evidence also indicates that young people with FEP and co-morbid SAD, compared with their age-matched peers with an FEP diagnosis only, are more likely to experience poorer functional adjustment subsequent to their FEP, in addition to a greater frequency of relapses (Amos, 2012; Birchwood et al., 2007).

Yet, despite the reported prevalence and associated adverse clinical outcomes, co-morbid SAD amongst individuals with psychosis remains under-recognised and under-treated (Michail, Birchwood, & Tait, 2017; Roy, 2018). The National Institute for Health and Care Excellence (NICE; 2013) recommends CBT as the gold-standard psychological treatment for SAD. To date, only two randomised controlled trials (RCTs) using a cognitive–behavioural-

therapy (CBT) framework to treat SAD within a psychosis population have been conducted (Halperin, Nathan, Drummond, & Castle, 2000; Kingsep, Nathan, & Castle, 2003). The findings from the two RCTs (Halperin et al., 2000; Kingsep et al., 2003) suggested that CBT for SAD is effective in an adult co-morbid SAD and schizophrenia population. However, there has not been a randomised controlled trial (RCT) examining the efficacy of a CBT-based intervention for SAD in FEP.

In relation to treatment modalities, a recent meta-analysis comparing guided, online CBT treating social anxiety with face-to-face treatment reported that online CBT and face-to face treatment produced equivalent overall post-treatment effects (Hedges g = .05; 95% CI, -.09 to .20) (Carlbring, Andersson, Cuijpers, Riper, & Hedman-Lagerlöf, 2018). This is promising, given that online interventions provide flexibility regarding time and location, low effort, accessibility, anonymity, and are cost-effective and scalable (Eysenbach et al., 2016; Lim & Penn, 2018). Online interventions may hold particular appeal to young people, given that they are the highest users of the internet and consider online social networking to be the norm for everyday communication (Ridout & Campbell, 2018). Similarly, the higher levels of anonymity and privacy offered by online interventions have been found to circumvent reported barriers in accessing face-to-face treatment in individuals with a highly stigmatised mental ill health condition such as psychosis (Álvarez-Jiménez et al., 2012).

Accordingly, we designed an online CBT-based intervention, called EMBRACE, that uniquely integrates purpose-built social networking, expert and peer moderation, and therapeutic comics within a single online application. Therapeutic comics were used in this intervention because they can employ a complex interplay of text and images, giving them the potential to effectively convey difficult concepts (e.g., psychosis symptoms, social anxiety

safety behaviours), and they may motivate therapeutic engagement due to their perceived 'fun factor' (McNicol, 2017). This article includes a description of the feasibility, acceptance, safety, and potential clinical benefits of this multi-facted moderated online social intervention as assessed via a pilot study.

2 METHODS

2.1 Participants

Participation in the 8-week pre–post pilot study was open to all completers of the Horyzons RCT (Alvarez-Jimenez et al., 2019) at the 18-month intervention point. The aim of the single-blind Horyzons RCT (findings currently being evaluated) is to determine whether two years of specialised face-to-face FEP support (TAU) and 18-month online social media-based intervention (Horyzons) is superior to 18 months of TAU in improving social functioning outcomes (Alvarez-Jimenez et al., 2019). A sample of 170 young people with FEP, aged 16-27 years, in clinical remission and nearing discharge from Early Psychosis Prevention and Intervention Centre, Melbourne were recruited for the Horyzons RCT.

Completers of the Horyzons RCT who scored above subthreshold levels (exceeding the cut off score of 30) on the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) at the baseline assessment point were invited to participate in our study. This inclusion criterion allowed us to recruit a sample of young people with FEP who continued to report problematic levels of social anxiety despite having received two years of face-to-face specialised care (McGorry, 1993), and a further 18 months of online support subsequent to participating in the Horyzons RCT.

The additional inclusion criteria for participants were: (A) a first episode of a Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) psychotic disorder or mood disorder with

psychotic features; (B) aged 16–27 years inclusive; (C) remission of positive symptoms of psychosis, defined, using the Positive and Negative Syndrome Scale (PANSS), as 4 weeks or more of scores of 3 (mild) or below on items P2 (conceptual disorganisation) and G9 (unusual thought content) and scores of 4 (moderate) or below with no functional impairment on items P3 (hallucinatory behaviour) and P1 (delusions). The exclusion criteria were: 1) intellectual disability and 2) an inability to converse in or read English. To ensure safety within the online system included 3) a DSM-V diagnosis of either antisocial personality disorder (ASPD); or 4) a DSM-V diagnosis of borderline personality disorder (BPD).

45 participants from the Horyzons RCT (Alvarez-Jimenez et al., 2019) were identified as meeting the inclusion criteria for this pilot. Of the 45 potential participants, 22 consented with a research assistant on the Horyzons study to be contacted by a member of the EMBRACE research team to learn more about the study. All 22 individuals consented to take part and were assessed for eligibility. Following on from this, nine participants were excluded (seven did not meet the inclusion criteria and two met the exclusion criteria. Thirteen individuals started the EMBRACE intervention of which two were non-starters and one was lost to follow up, resulting in 10 study participants.

Participants' mean age was 23 years (*SD* = 3.2). Five participants were female, four were male, and one was non-gender binary. Five participants were students, three were in paid employment, one was unemployed and another a stay-at-home parent. Seven participants lived with their family, whereas three lived independently. Five participants were single and the other five were in a relationship (married or de facto).

The CONSORT 2010 checklist was used to develop and review this article. The study protocol was reviewed and approved by the Melbourne Health Human Research Ethics

Committee (HREC approval: 2017.308). The Horyzons trial (Alvarez-Jimenez et al., 2019) was supported by the Mental Illness Research Fund from the State Government of Victoria.

2.2 Study Design

We used a single-arm, non-randomized study design to assess the feasibility, acceptability, safety and preliminary clinical outcomes of the EMBRACE intervention. Clinical outcomes were assessed pre-post the 8-week intervention.

2.3 Procedures

Consenting completers of the Horyzons RCT (Alvarez-Jimenez et al., 2019) were invited by a researcher to take part in the EMBRACE pilot. They were then assessed to determine whether they met inclusion/exclusion criteria. After participants provided written informed consent, they completed a baseline assessment and, following an induction with a clinical moderator, commenced the 8-week study. Participants were assessed again at the end of the 8-week period.

2.4 Intervention

The EMBRACE platform is based on the moderated online social therapy (MOST) model pioneered by eOrygen, the digital branch of Orygen, the National Centre of Excellence in Youth Mental Health. It was developed in collaboration with investigators from the Australian Catholic University and the Department of Computing and Information Systems at the University of Melbourne (Alvarez-Jimenez et al., 2013; Gleeson, Alvarez-Jimenez, & Lederman, 2012). The MOST model is a framework for online interventions in youth mental health that uniquely incorporates (i) peer-to-peer online social networking, (ii) individually tailored interactive psychosocial interventions and (iii) the involvement of expert mental health

clinicians and lived-experience peer moderators (Alvarez-Jimenez et al., 2012; Rice et al., 2018).

2.4.1 Therapy content

The clinical content of the EMBRACE intervention is based on a cognitive–behavioural-treatment framework. We integrated CBT elements from the NICE-recommended Clark and Wells (1995) and Rapee and Heimberg (1997) SAD models to provide a treatment focus on the cognitions and behaviours that perpetuate social anxiety symptoms. This included modification of maladaptive cognitions, safety behaviours and addressing maladaptive self-focused attention. In addition to this, we also addressed maladaptive external focus on environmental threats and overt avoidance behaviours. A detailed account of the development of the EMBRACE intervention is provided elsewhere (McEnery et al.,2019).

The intervention comprised 12 independent online modules, which we termed *steps*. Each step included clinical content which targeted a particular CBT therapeutic aim related to the management of SAD, and was presented online via four formats: (1) a brief psycho-educational description of each therapeutic concept; (2) unique therapeutic comics; (3) discrete behavioural experiments, which we referred to as *actions*, that were designed to address safety and avoidance behaviours associated with SAD; and (4) an interactive discussion feature, which we termed *talking points*, that allowed users to answer each other's questions about related content in an online social forum. Table 1 provides a detailed description of the 12 steps.

2.4.2 Moderation

Within EMBRACE, there were two types of moderation: expert clinical moderation and lived-experience peer-to-peer moderation. The clinical moderator's primary role was to guide the participants through the steps of the intervention and monitor their clinical status. Emphasis

was placed on adherence to a moderator manual, which outlined specific therapeutic targets and techniques characterising the CBT-based EMBRACE intervention. Every week, the clinical moderators would send each user tailored content suggestions online (e.g., a particular step or an appropriate action), and the young person would be notified via newsfeed or text. Clinical moderators also contacted each young person by phone every week. Fidelity to the moderator manual was checked via a weekly supervision session with a senior clinical researcher (MAJ) and provisional psychologist (CMcE). Peer moderators were young people with a lived experience of a mental ill health condition, who had undertaken peer-support training. Their role included providing support and fostering engagement (e.g., commenting and liking posts).

2.5 Outcome measures

Detailed feasibility, acceptability and safety criteria for EMBRACE are given in Table 2.

2.5.1 Feasibility

Feasibility was assessed via usage statistics and met if the majority (> 70%) of participants completed (>70% or 8 out of 12 modules) of the pathway's content.

2.5.2 Acceptability

Acceptability was assessed via a post-intervention interview and met if the majority (>70%) of participants perceived the intervention as an overall helpful and positive experience.

2.5.3 Safety

Safety was assessed through a priori indicators: 1) number of adverse events occurring during the study (including worsening of symptoms) and 2) 100% of participants perceiving the intervention as safe. We utilized the PANSS (Kay et al., 1997) to measure severity of psychotic symptomatology pre-post intervention.

2.6 Psychological Outcome Measures

To evaluate likely effectiveness, the primary outcome measures were changes in social anxiety levels reported pre-post intervention. Secondary outcome measures included changes in depression and loneliness levels reported pre-post intervention. Depression and loneliness were measured as they are well-known clinical correlates of comorbid SAD in psychosis (Lim, Penn, Thomas, & Gleeson, 2019; Lim et al., 2019) and general populations (Güçlü, Erkıran, Aksu, & Aksu, 2012; Lim, Rodebaugh, Zyphur, & Gleeson, 2016). Table 3 provides an overview of the measures used and their psychometric properties.

2.7 Statistical Analysis

Online use patterns were tracked in real time. Paired samples *t*-tests were conducted, and within-group effect sizes (Cohen's *d*) were reported, for changes between the baseline and post-test in study measures. Given the small sample size, we also measured clinical to non-clinical symptom reductions (across all measures) pre-post for all participants.

3 RESULTS

3.1 Feasibility

As reported in Table 2, feasibility expectations were met. In terms of overall usage, a total of 191 logins (M = 19.1 per user) occurred during the 2-month study, with six participants logging on at least seven times and five logging on 12 or more times (see Table 4). Six of the participants used the online social networking features, such as interactive messages or liking others' content, with a total of 44 postings (M = 4).

3.2 Acceptability

Acceptability expectations were also met (see Table 2). Table 5 provides the results of the semi-structured interview assessing acceptability criteria post-intervention.

3.3 Safety

Safety expectations were met (see Table 2).

3.4 Psychological outcomes

Statistical assumptions required to conduct paired *t*-tests across all four measures were met. The difference scores for all pre-post assessments were normally distributed as assessed by Shapiro-Wilks test (SIAS, p=.813; LSAS, p=.809; DASS, p=.562; UCLA, p=.658). There was a statistically significant decrease in social anxiety symptoms as measured using the SIAS from pre–post intervention (d = -1.70, p = .0005). Furthermore, a statistically significant decrease in social anxiety was also found using the LSAS *(*d = -1.35, p = .002), providing concurrent validity for the findings (see Table 6). Finally, non-statistically significant decreases were found for depression (d = -0.22, p = .50), and loneliness (d = -0.23, p = .48) scores.

In terms of social anxiety symptoms, all participants exceeded the clinical cut off score as measured by the SIAS (Mattick & Clarke, 1998) pre-intervention and reducing to three participants post intervention. Utilising the LSAS (Liebowitz, 1987), eight participants' scores exceeded those required to indicate marked social anxiety (> 65) pre-intervention and this reduced to two participants post intervention.

Four participants exceeded clinical cut off scores for depression pre-intervention and only one participant post-intervention. In relation to loneliness, six participants exceeded the clinical cut off score (see Table 3) pre-intervention, decreasing to four participants post intervention.

4 DISCUSSION

To date, there has only been two RCTs conducted that have specifically targeted SAD using a CBT framework within a psychosis population (Halperin et al., 2000; Kingsep et al., 2003). Findings from the 6-week (Halperin et al., 2000; N= 20) and 8-week (Kingsep et al.,

2003; *N*=33) studies demonstrated that face-to-face group CBT (CBGT) is effective in reducing social anxiety symptoms in individuals with a schizophrenia diagnosis. In terms of early intervention, findings from a 2016 pilot study (Montrueil et al.) also demonstrated that CBGT (14 weeks) is feasible and can improve social anxiety symptomatology in individuals at risk for psychosis (ARMS) and FEP (*N*=29).

Our online intervention was designed to address reported barriers to accessing face-to-face therapy associated with a FEP cohort such as perceived stigma (Gulliver, Griffiths, & Christensen, 2010). It is the first study to develop and evaluate an online intervention designed to treat social anxiety as a primary treatment concern in youth with FEP. It is novel because it extends upon traditional online CBT based treatment modalities by offering both social networking features and therapeutic comics.

4.1 Feasibility, acceptability, and safety

Seven out of ten participants completed over 70% of the intervention content, and this is comparable to other similar interventions, albeit with less therapeutic content (Tulbure et al., 2015). The intervention was found to have a high level of appeal, with all participants reporting that EMBRACE made them feel more in control of their social anxiety symptoms and that they would recommend the intervention to others. There was also a majority positive endorsement for the comic and behavioural experiment content. Research into science education has demonstrated that comics can increase the desire to engage more with science, even amongst youth who do not perceive themselves as interested in science (Spiegel et al., 2013). The use of comics in the EMBRACE intervention may have generated more interest in the online content; however, leveraging the potential of comics requires further understanding of the specific

features that are effective, for whom they are most useful, and the amount of exposure required to effect results.

4.2 Psychological outcomes

Due to the small sample size in this pilot, the statistical analysis should be interpreted with caution. Our findings indicated statistically significant decreases in social anxiety symptoms using two validated SAD measures pre–post intervention, lending preliminary support for the benefits of a MOST (Alvarez-Jimenez et al., 2018) framework to treat social anxiety as a primary treatment concern in FEP.

4.3 Limitations

Limitations of the study include its small sample size, which can inflate effect sizes, and the uncontrolled study design, which limits speculation on any casual inferences, related to social anxiety outcomes. Likewise, we did not assess for comorbidity beyond that stipulated in the inclusion/exclusion criteria, which means confounding clinical presentations were not accounted for. Medication use (type, level and adherence) was also not measured; meaning treatment effects cannot be solely attributed to the intervention. The small sample size also precludes statistically partially out the potential effects of depression and, or loneliness on social anxiety scores. Additionally, the short duration of the study precluded examining long-term outcomes. Furthermore, the assessor was non-blind to the study, and therefore there was potential for an overestimation of positive effects. There was also a possibility of acquiescence biases from responders to the self-report measures.

4.1 Conclusions

The full clinical benefits and scope of EMBRACE remain unknown until a RCT can be

conducted. However, findings provide some preliminary support for a reduction of social anxiety symptoms in a small sample of young people with FEP, who despite receiving two years of face-to-face specialised care and a further 18 months of online support to improve social functioning, continued to experience significant social anxiety symptoms. Social anxiety is a treatable condition but in the context of psychosis it currently is largely ignored (Roy, 2018). This is concerning, as co-morbid SAD greatly hinders functional outcomes (Roy, 2018) and therefore treating SAD as a primary concern in individuals with psychosis may promote recovery – an avenue for future research. The results of this pilot study showed EMBRACE to be a promising intervention for social anxiety as a primary treatment target in FEP, due to its perceived usefulness and appeal and demonstrated safety. Further research utilizing a randomized controlled study design and a larger recruitment sample is warranted.

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Conflicts of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Achim, A. M., Maziade, M., Raymond, É., Olivier, D., Mérette, C., & Roy, M.A. (2011). How prevalent are anxiety disorders in schizophrenia? A meta-analysis and critical review on a significant association. *Schizophrenia Bulletin, 37*(4), 811-821. doi: 10.1093/schbul/sbp148

Adams, G. C., Balbuena, L., Meng, X., & Asmundson, G.J. (2016). When social anxiety and depression go together: A population study of comorbidity and associated consequences. *Journal of Affective Disorders, 206*, 48-54. doi: 10.1016/j.jad.2016.07.031.

Aikawai, S., Hiroyuki, K., Takahiro, N., Matsuo, S., Wada, Y., Mamiya, M. 2018. Social anxiety and risk factors in patients with schizophrenia: Relationship with duration of untreated psychosis. *Psychiatry Research, 263.* 94-100. doi: 10.1016/j.psychres.2018.02.038

Alvarez-Jimenez, M., Bendall, Koval, Rice, Cagliarini, Valentine, . . . Gleeson. (2019). HORYZONS trial: Protocol for a randomised controlled trial of a moderated online social therapy to maintain treatment effects from first-episode psychosis services. *BMJ Open, 9*(2).

Alvarez-Jimenez, M., Bendall, S., Lederman, R., Wadley, G., Chinnery, G., Vargas, S., . . . Gleeson, J. F. (2013). On the HORYZON: Moderated online social therapy for long-term recovery in first episode psychosis. *Schizophrenia Research, 143*(1), 143-149. doi: 10.1016/j.schres.2012.10.009

Álvarez-Jiménez, M., Gleeson, J., Bendall, S., Lederman, R., Wadley, B., Killackey, E., & Mcgorry. P. (2012). Internet-based interventions for psychosis:A sneak-peek into the future. *Psychiatric Clinics of North America, 35*(3), 735-747.

Álvarez-Jiménez, M., Gleeson, J. F., Cotton, S., Wade, D., Gee, D., Pearce, T., … McGorry, P. D. (2009). Predictors of adherence to cognitive-behavioural therapy in first-episode psychosis. *The Canadian Journal of Psychiatry*, *54*(10), 710–718. https://doi.org/10.1177/070674370905401008

Alvarez-Jimenez, M., Gleeson, J., Bendall, S., Penn, D., Yung, A.R., Ryan, R.M . . . Nelson, B. (2018). Enhancing social functioning in young people at Ultra High Risk (UHR) for psychosis:

A pilot study of a novel strengths and mindfulness-based online social therapy. *Schizophrenia Research, 202*, 369-377.

Alvarez-Jimenez, M., Gleeson, J., Rice, S., Gonzalez-Blanch, C., & Bendall, S. (2016). Online peer-to-peer support in youth mental health: Seizing the opportunity. *Epidemiology and Psychiatric Sciences, 25*(2), 123-126. doi: 10.1017/S2045796015001092

Álvarez-Jiménez, M., Parker, A. G., Hetrick, S. E., McGorry, P. D., & Gleeson, J. F. (2011). Preventing the second episode: A systematic review and meta-analysis of psychosocial and pharmacological trials in first-episode psychosis. *Schizophrenia Bulletin, 37*(3), 619-630. doi: 10.1093/schbul/sbp129

American Psychiatric Association, (2000). *Diagnostic and statistical manual of mental disorders : DSM-IV*. Washington, DC: American Psychiatric Association.

American Psychiatric Association, (2013). *Diagnostic and statistical manual of mental disorders : DSM-V*. Washington, DC: American Psychiatric Association.

Amos, A. (2012). Assessing the cost of early intervention in psychosis: A systematic review. *Australian and New Zealand Journal of Psychiatry*, 47, 719-734.

Andersson, G., & Cuijpers, P. (2009). Internet-based and other computerized psychological treatments for adult depression: A meta-analysis. *Cognitive Behaviour Therapy, 38*, 196–205.

Barak, A., Hen, L., Boniel-Nissim, M., & Shapira, N. (2008). A comprehensive review and a metaanalysis of the effectiveness of internet-based psychotherapeutic interventions. *Journal of Technology in Human Services, 26*, 109–160.

Bargas-Avila, J., & Hornbæk, K. (2012). Foci and blind spots in user experience research. *Interactions, 19*(6), 24-27.

Bermanzohn, P. (2000). Hierarchical diagnosis in chronic schizophrenia: A clinical study of co-occurring syndromes. *Schizophrenia Research, 41*(1), 43.

Birchwood, M., Trower, P., Brunet, K., Gilbert, P., Iqbal, Z., & Jackson, C. 2007. Social anxiety and the shame of psychosis: a study in first episode psychosis. *Behaviour Research and Therapy, 45.* 1025-1037. doi: 10.1016/j.brat.2006.07.011.

Brown, Chorpita, Korotitsch, & Barlow. (1997). Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. *Behaviour Research and Therapy, 35*(1), 79-89.

Bowden, S.C. (2017). *Neuropsychlogical assessment in the age of evidence-based practice: diagnostic and treatment evaluations.* UK: Oxford University Press.

Carlbring, P., Andersson, G., Cuijpers, P., Riper, H., & Hedman-Lagerlöf, E. (2018). Internet-

based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: An updated systematic review and meta-analysis. *Cognitive Behaviour Therapy, 47*(1), 1-18.

Cassano, G., Pini, S., Saettoni, M., & Dell'Osso, L. (1999). Multiple anxiety disorder comorbidity in patients with mood spectrum disorders with psychotic features. *The American Journal of Psychiatry, 156*(3), 474-476.

Clark, D. M., & Wells, A. (1995). A cognitive model of social phobia. In R. G. Heimberg, M. Liebowitz, D. Hope, & F. Schneier (Eds.), *Social phobia: Diagnosis, assessment, and treatment* (pp. 69–93). New York: Guilford Press.

Cuming, S., & Rapee, R. (2010). Social anxiety and self-protective communication style in close relationships. *Behaviour Research and Therapy, 48*(2), 87-96.

Dixon, L., Holoshitz, Y., & Nossel, I. (2016). Treatment engagement of individuals experiencing mental illness: Review and update. *World Psychiatry : Official Journal of the World Psychiatric Association (WPA), 15*(1), 13-20.

Doyle, R., Turner, N., Fanning, F., Brennan, D., Renwick, L., Lawlor, E., & Clarke, M. (2014). First-episode psychosis and disengagement from treatment: A systematic review. *Psychiatric Services, 65*(5), 603-611. doi: 10.1176/appi.ps.201200570

Eysenbach, G., Giacobbi, Jr., P., Parks, A., Gliddon, E., Wallin, E., Mattsson, S., & Olsson, E. (2016). The Preference for internet-based psychological interventions by individuals without past or current use of mental health treatment delivered online: A survey study with mixed-methods analysis. *JMIR Mental Health, 3*(2). doi: 10.2196/mental.5324

Freeman, D., Garety, P. A., Bebbington, P. E., Smith, B., Rollinson, R., Fowler, D., . . . Dunn, G. (2005). Psychological investigation of the structure of paranoia in a non-clinical population. *The British Journal of Psychiatry, 186*(5), 427.

Gilbert, P. (2000). The relationship of shame, social anxiety and depression: The role of the evaluation of social rank. *Clinical Psychology & Psychotherapy, 7*(3), 174-189.

Gleeson, J., Alvarez-Jimenez, M., & Lederman, R. (2012). Moderated online social therapy for recovery from early psychosis. *Psychiatric Services. 63*(7), 719-719.

Graham, R. (2018). Introducing graphic medicine: Care and comics. *International Journal of Whole Person Care, 5*(1).

Green, M., & Myers, K. (2010). Graphic medicine: Use of comics in medical education and patient care. *BMJ, 340*(7746), 574-577.

Güçlü, O., Erkiran, M., & Aksu, H. (2012). Clinical Correlates of Social Anxiety Disorder Comorbidity in Schizophrenia. *Turk Psikiyatri Dergisi, 23*(1), 1-8.

Gulliver, A., Griffiths, K., & Christensen, H. (2010). Perceived barriers and facilitators to mental health help-seeking in young people: A systematic review. *BMC Psychiatry, 10*(1), 113.

Gumley, A., O'grady, M., Power, K., & Schwannauer, M. (2004). Negative beliefs about self and illness: A comparison of individuals with psychosis with or without comorbid social anxiety disorder. *Australian and New Zealand Journal of Psychiatry, 38*(12), 960-964.

Halperin, N., Drummond, P., Castle, D., & Halperin, S. (2000). A cognitive-behavioural, group-based intervention for social anxiety in schizophrenia. *Australian and New Zealand Journal of Psychiatry, 34*(5), 809-813. doi:10.1080/j.1440-1614.2000.00820.x.

Hedman, E., Andersson, E., Ljótsson, B., Andersson, G., Rück, C., & Lindefors, N. (2011). Cost-effectiveness of Internet-based cognitive behavior therapy vs. cognitive behavioral group therapy for social anxiety disorder: Results from a randomized controlled trial. *Behaviour Research and Therapy, 49*(11), 729-736.

Heimberg, R., Horner, K., Juster, H., Safren, S., Brown, E., Schneier, F., & Liebowitz, M. (1999). Psychometric properties of the Liebowitz Social Anxiety Scale. *Psychological Medicine, 29*(1), 199-212.

Hofmann, S. (2007). Cognitive factors that maintain social anxiety disorder: A comprehensive model and its treatment implications. *Cognitive Behaviour Therapy, 36*(4), 193-209.

Hofmann, S., Scepkowski, L.A. (2006). Social self-reappraisal therapy for social phobia: Preliminary findings. *Journal of Cognitive Psychotherapy, 20*(1), 45-57.

Hughes, M. E., Waite, L. J., Hawkley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging, 26*(6), 655–672. doi:10.1177/0164027504268574

Jacobson, N., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59*,12-19.

Kampmann, I.L., Emmelkamp, P.M., & Morina, N. (2016). Meta-analysis of technology-assisted interventions for social anxiety disorder. *Journal of Anxiety Disorders, 42*, 71-84. doi: 10.1016/j.janxdis.2016.06.007

Karatzias, T., Gumley, A., Power, K., O'Grady, M. (2007). Illness appraisals and self-esteem as correlates of anxiety and affective comorbid disorders in schizophrenia. *Comprehensive*

Psychiatry, 48(4), 371-375.

Kay, S. R., Fiszbein, A., & Opfer, L. A. (1987). The positive and negative syndrome scale (PANSS) for schizophrenia. *Schizophrenia Bulletin, 13*(2), 261-276.

King, R., Bambling, M., Lloyd, C., Gomurra, R., Smith, S., Reid, W., Wegner, K. (2006), Online counselling: The motives and experiences of young people who choose the Internet instead of face to face or telephone counselling. *Counselling and Psychotherapy Research*, 6 doi: 10.1080/14733140600848179.

Killackey, E., Purcell, R., Álvarez-Jiménez, M., & Mcgorry, P. (2012). Review: More research needed on early intervention for psychosis. *Evidence Based Mental Health, 15*(1), 23.

Kingsep, P., Nathan, P., & Castle, D. (2003). Cognitive behavioural group treatment for social anxiety in schizophrenia. *Schizophrenia Research, 63*(1), 121-129. doi:10.1016/S0920-9964(02)00376-6.

Lal, S., & Malla, A. (2015). Service engagement in first-episode psychosis: Current issues and future directions. *Canadian journal of psychiatry. Revue canadienne de psychiatrie*, *60*(8), 341–345. doi:10.1177/070674371506000802

Lederman, R., Wadley, G., Gleeson, J., Bendall, S., & Álvarez-Jiménez, M. (2014). Moderated online social therapy: Designing and evaluating technology for mental health. *ACM Transactions on Computer-Human Interaction (TOCHI), 21*(1), 1-26.

Liebowitz, M.R. (1987). Social phobia. *Modern Problems of Pharmacopsychiatry*, *22*, 141-173.

Lim, M., Gleeson, H., Alvarez-Jimenez, J., & Penn, F. (2018). Loneliness in psychosis: A systematic review. *Social Psychiatry and Psychiatric Epidemiology, 53*(3), 221-238.

Lim, M.H., Gleeson, J.F., Thomas, N., & Penn, D.L. (2019). Is loneliness a feasible treatment target in psychosis. *Social Psychiatry and Psychiatric Epidemiology*. doi.org/10.1007/s00127-019-01731

Lim, M.H., Gleeson, J.F., Rodebaugh, T.L., Eres, R., Long, K., Casey, K.M., Abbott, J., Thomas, N., & Penn, D.L. (2019). A pilot digital intervention targeting loneliness in young people with psychosis. *Social Psychiatry and Psychiatric Epidemiology*. doi.org/10.1007/s00127-019-01681-2

Lim, M., & Penn, D. (2018). Using digital technology in the treatment of schizophrenia. *Schizophrenia Bulletin, 44*(5), 937-938.

Lim, M., Rodebaugh, T., Zyphur, M., & Gleeson, J. (2016). Loneliness over time: The crucial role of social anxiety. *Journal of Abnormal Psychology, 125*(5), 620.

Lovibond, S., & Lovibond, Peter F. (1996). *Manual for the depression anxiety stress scales*

[kit] (2nd ed.). Sydney: Psychology Foundation of Australia.

Lysaker, P., Yanos, P., Outcalt, J., Roe, D. (2011). Association of stigma, self-esteem, and symptoms with concurrent and prospective assessment of social anxiety in schizophrenia. *Clinical Schizophrenia & Related Psychoses, 4*(1), 41-49. doi:10.3371/CSRP.4.1.3.

Magee, W., Eaton, W., Wittchen, H., Mcgonagle, K., & Kessler, R. (1996). Agoraphobia, simple phobia, and social phobia in the National Comorbidity Survey. *Archives of General Psychiatry, 53*(2), 159-68.

Mattick, R.P., & Clarke, J.C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy, 36*(4), 455-70.

McEnery, C., Lim, M.H., Tremain, H., & Alvarez-Jimenez, M. (2019). Prevalence rate of social anxiety disorder in individuals with a psychotic disorder: a systematic review and meta-analysis. *Schizophrenia Reasearch.* doi: 10.1016/j.schres.2019.01.045

McEnery, C., Lim, M.H., Knowles, A., Rice, S., Gleeson, J., Howell, S., Russon, P., Miles, C., D'Alfonso, S., & Alvarez-Jimenez, M. (2019). Development of a moderated online intervention to treat social anxiety in first-episode psychosis. *Frontiers in Psychiatry (under review).*

McGorry, P. D. (2015). Early intervention in psychosis: Obvious, effective, overdue. *The Journal of Nervous and Mental Disease, 203*(5), 310-318.

Mcgorry, P. (1993). Early Psychosis Prevention and Intervention Centre. *Australasian Psychiatry, 1*(1), 32-34.

McNicol, S. (2017). The potential of educational comics as a health information medium. *Health Information & Libraries Journal, 34*(1), 20-31.

Michail, M., & Birchwood, M. (2009). Social anxiety disorder in first-episode psychosis: Incidence, phenomenology and relationship with paranoia. *The British Journal of Psychiatry, 195*(3), 234-241. doi: 10.1192/bjp.bp.108.053124

Michail, M., & Birchwood, M. (2013). Social anxiety disorder and shame cognitions in psychosis. *Psychological Medicine, 43*(1), 133-142. doi: 10.1017/S0033291712001146

Mohr, D., Cuijpers, P., & Lehman, K. (2011). Supportive Accountability: A Model for Providing Human Support to Enhance Adherence to eHealth Interventions. *Journal of Medical Internet Research, 13*(1), 30. doi: 10.2196/jmir.1602

Montreuil, T., Malla, A., Joober, R., Bélanger, C., Myhr, G., & Lepage, M. (2016). Manualized Group Cognitive-Behavioral Intervention for Social Anxiety in First-Episode Psychosis. *International Journal of Group Psychotherapy*, 66(2), 225-245. doi: 10.1080/00207284.2015.1106190

National Institute of Clinical Excellence. (2014). *Psychosis and schizophrenia in adults: prevention and management* (NICE Quality Standard No. CG17). Retrieved from https://www.nice.org.uk/guidance/cg178

National Insitute for Health and Care Excellence. (2013). *Social Anxiety Disorder: Recognition, Assessment and Treatment* (NICE Quality Standard No. 159). Retrieved from https://www.nice.org.uk/guidance/cg159

Nieuwenhuijsen, K., De Boer, A., Verbeek, J., Blonk, R., & Van Dijk, F. (2003). The Depression Anxiety Stress Scales (DASS): Detecting anxiety disorder and depression in employees absent from work because of mental health problems. *Occupational and Environmental Medicine, 60*, I77-82.

Nordh, M., Vigerland, S., Öst, L., Ljótsson, B., Mataix-Cols, D., Serlachius, E., & Högström, J. (2017). Therapist-guided internet-delivered cognitive–behavioural therapy supplemented with group exposure sessions for adolescents with social anxiety disorder: A feasibility trial. *BMJ Open, 7*(12).

Pallanti, S., Quercioli, L., & Hollander, E. (2004). Social anxiety in outpatients with schizophrenia: A relevant cause of disability. *The American Journal of Psychiatry, 161*(1), 53-58.

Peters, L. (2000). Discriminant validity of the Social Phobia and Anxiety Inventory (SPAI), the Social Phobia Scale (SPS) and the Social Interaction Anxiety Scale (SIAS). *Behaviour Research and Therapy, 38*(9), 943-950.

Rapee, & Heimberg. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behaviour Research and Therapy, 35*(8), 741-756.

Rice, S.M., Gleeson, J., Davey, C., Hetrick, S.E., Parker, A.G., Lederman, R . . . Alvarez-Jimenez, M. (2018). Moderated online social therapy for depression relapse prevention in young people: Pilot study of a 'next generation' online intervention. *Early Intervention in Psychiatry, 12*(4), 613-625.

Rice, S. M., Goodall, J., Hetrick, S. E., Parker, A. G., Gilbertson, T., Amminger, G. P., … Alvarez-Jimenez, M. (2014). Online and social networking interventions for the treatment of depression in young people: A systematic review. *Journal of Medical Internet Research, 16*(9), 206.

Ridout, B., & Campbell, A. (2018). The use of social networking sites in mental health interventions for young people: systematic review. *Journal of Medical Internet Research, 20*(12).

Romm, K. L., Melle, I., Thoresen, C., Andreassen, O. A., & Rossberg, J. I. (2012). Severe social anxiety in early psychosis is associated with poor premorbid functioning, depression, and

reduced quality of life. *Comprehensive Psychiatry, 53*(5), 434-440. doi: 10.1016/j.comppsych.2011.06.002

Romm, K.L., Rossberg, J.I., Berg, A.O., Hansen, C.F., Andreassen, O.A., & Melle, I. (2011). Assessment of social anxiety in first episode psychosis using the Liebowitz Social Anxiety scale as a self-report measure. *European Psychiatry, 26*(2), 115-121.

Roy, M.A., Achim, A.M., Vallières, C., Labbé, A., Mérette, C., Maziade, M., . . . Bouchard, R.H. (2015). Comorbidity between anxiety disorders and recent-onset psychotic disorders. *Schizophrenia Research, 166*(1-3), 353-354.

Roy, M., Demers, M., & Achim, A. (2018). Social anxiety disorder in schizophrenia: A neglected, yet potentially important comorbidity. *Journal of Psychiatry and Neuroscience, 43*(4), 287-288.

Rüegg, N., Moritz, S., Berger, T., Lüdtke, T., & Westermann, S. (2018). An internet-based intervention for people with psychosis (EviBaS): Study protocol for a randomized controlled trial. *BMC Psychiatry, 18*(1).

Spek, V., Cuijpers, P., Nyklicek, I., Riper, H., Keyzer, J., & Pop, V. (2007). Internet-based cognitive-behaviour therapy for symptoms of depression and anxiety: A meta-analysis. *Psychological Medicine, 37*, 319–328.

Spiegel, A., Mcquillan, J., Halpin, P., Matuk, C., & Diamond, J. (2013). Engaging teenagers with science through comics. *Research in Science Education, 43*(6), 1-18.

Steptoe, A., Shankar, A., Demakakos, P., & Wardle, J. 2013. Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences*. 110(*15*), 5797–5801

Sutcliff, S., Roy, M.A., & Achim, M. 2015. Social anxiety disorder in recent onset schizophrenia spectrum disorders: The relation with symptomatology, anxiety, and social rank. *Psychiatry Research, 227*(1) 39-45. doi: 10.1015/j.psychres.2015.02.017

Trew, J., & Alden, L. (2015). Kindness reduces avoidance goals in socially anxious individuals. *Motivation and Emotion, 39*(6), 892-907.

Tulbure, B.T., Szentagotai , A., Oana, D., Simona, S., Kristoffer N. T., David, D.,… Andersson, G. (2015). Internet-delivered cognitive-behavioral therapy for social anxiety disorder in romania: a randomized controlled trial. *PLOS ONE, 10*(5). doi.org/10.1371/journal.pone.0123997

Wildeboer, G., Kelders, S.M., & Van Gemert-Pijnen, J. (2016). The relationship between persuasive technology principles, adherence and effect of web-Based interventions for mental health: A meta-analysis. *International Journal of Medical Informatics, 96*, 71-85.

Williams, I. (2012). Graphic medicine: Comics as medical narrative. *Medical Humanities, 38*(1), 21-27.

Wong, C., Davidson, L., Anglin, D., Link, B., Gerson, R., Malaspina, D., . . . Corcoran, C. (2009). Stigma in families of individuals in early stages of psychotic illness: Family stigma and early psychosis. *Early Intervention in Psychiatry, 3*(2), 108-15.

Wood, L., & Irons, C. (2016). Exploring the associations between social rank and external shame with experiences of psychosis. *Behavioural and Cognitive Psychotherapy*, *44*(5), 527-538.

Table 1

Description of EMBRACE therapy modules and frequency of usage

Therapy module	**Therapeutic target**	**Theoretical, empirical and clinical**	***n***
1: *Zooming in* Introduction to social anxiety	Defining SAD on a spectrum. Providing psycho-education on the core characteristics of SAD (e.g. cognitions, emotions, and behaviours).	Integrated CBT model of SAD	10 (100%)
2: *Fortune telling* Maladaptive SAD cognitions	Assisting individuals with identifying and challenging automatic thoughts associated with SAD.	Integrated CBT model of SAD	8 (80%)
3. *Unpopular mechanics* Unhelpful self-focused attention	Assisting individuals with identifying differences between helpful and unhelpful self-directed attention and how to flexibly shift attention to manage SAD.	Integrated CBT model of SAD	8 (80%)
4. *Navigating physical symptoms* Physical symptoms of anxiety	Building awareness of physical symptoms associated with SAD and fostering acceptance of physical sensations (e.g. expansion techniques).	Integrated CBT model of SAD	8 (80%)
5. *Ice-breaking and conversation making* Avoidance behaviours	Building awareness of what constitutes overt avoidance behaviours and how they maintain SAD symptomatology. Using kindness as a stepping stone to social interactions.	Integrated CBT model of SAD	8 (80%)
6. *Chameleon dreams* Safety behaviours	Building awareness of what constitutes covert safety behaviours and how they maintain SAD symptomatology. Strategies to reduce and drop safety behaviours.	Integrated CBT model of SAD	7 (70%)
7. *Perfectly rolled* Perfectionism and SAD	Demonstrating how perfectionism can exacerbate and perpetuate SAD symptoms. Self-compassion to counteract rigid perfectionistic schemas which can perpetuate SAD symptomatology.	Integrated CBT model of SAD Hofmans (2006,2013) Social self-reappraisal therapy for social phobia	7 (70%)
8. *Dark skies and bright nights* Personalising bias and maintenance of SAD	Shifting attention from perceived negative interactions and finding meaning in things we value (e.g. friendships) to increase positive emotions.	Integrated CBT model of SAD Hofmans (2006, 2013) Social self-reappraisal therapy for social phobia	7 (70%)

Therapy module	**Therapeutic target**	**Theoretical, empirical and clinical**	***n***
9. *Monsters, kittens and popcorn* Intimate relationships and SAD	Social anxiety and interpersonal styles within relationships (e.g. self-silencing/appeasement).	Integrated CBT model of SAD Cuming and Rapee (2010) findings on social anxiety and self-protective communication style in close relationships	6 (60%)
10. *Beautiful broken things* Shame (cognitions), SAD & associated safety behaviours	Building awareness of shame and how it can perpetuate SAD symptoms. Strategies to reduce and drop associated safety behaviours.	Integrated CBT model of SAD Michail and Birchwood (2007) findings on increased shame experiences in individuals with psychosis and co-morbid SAD	6 (60%)

Table 2.
Feasibility, Acceptability and Safety Criteria

Research questions	Criteria	Assessment	Met?	Outcome
Is it feasible for participants to complete the 8-week intervention?	We anticipated that EMBRACE would be feasible if the majority of 70% or more of participants completed at least 8 out of the 12 treatment modules (70%).	Usage statistics (completed modules)	Yes	Feasibility expectations were met as 70% of the participants completed 8 modules or more (70%) of all intervention content. Four individuals completed 100%
Will participants find the EMBRACE intervention acceptable?	We anticipated that the majority of participants would find the intervention acceptable based on perceived helpfulness and enjoyment.	A semi-structured interview, based on the user experience approach assessed the acceptability of the intervention (Bargas-Avila & Hornbaek, 2011) according to the following themes: 1) helpfulness, 2) enjoyment, 3) overall impression, 4) further suggestions, and 5) safety.	Yes	100% of participants reported that using the online intervention helped them feel more in control of their social anxiety and that they would recommend the intervention to others. Full acceptability results are reported in Table 3.
Will the EMBRACE intervention pose harm to the participants?	We anticipated no adverse events related to system use and that participants would report feeling safe.	A priori safety criteria were established. These included 1) adverse events occurring during the study as reported by the moderators; 2) worsening of symptoms post intervention and 3) participants reporting that they did not feel safe. To measure worsening of symptoms, in addition to the psychological outcome measures, the clinician-administered PANSS (Kay et al., 1987), a semi-structured interview consisting of 30 items measuring positive, negative symptomatology and general psychopathology was administered pre-post intervention.	Yes	Weekly clinical check in with moderators (no adverse events reported related to system use). No worsening of any symptoms found. When queried post intervention, 100% of participants found the intervention safe. No worsening of psychotic symptomatology as measured by the PANSS (Kay et al., 1997) pre-post intervention was found
Will participants' experiences of social anxiety symptoms improve?	EMBRACE participants will demonstrate improvement in social anxiety outcomes	Pre-post assessment via two validated social anxiety measures: 1) the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1999) and the 2) Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987)	Yes	There was a statistically significant improvement in social anxiety symptoms as measured using the SIAS from pre–post intervention (d = -1.70, p = .0005). Furthermore, a

				statistically significant decrease in social anxiety was found using the LSAS measure *(d* = -1.35, *p* = .002), providing concurrent validity for the findings
Will participants' experiences of depression and loneliness improve?	EMBRACE participants will demonstrate improvement in depression and loneliness outcomes	Pre-post assessment via validated questionnaires including The Depression, Anxiety, Stress Scales (DASS; Lovibond & Lovidbond, 1995), UCLA Loneliness scale (Steptoe, Shankar, Demakakos, & Wardle, 2013).	Yes/No	Non-statistically significant decreases were found for depression (*d* = -0.22, *p* = .50), and loneliness (*d* = -0.23, *p* = .48) scores.

Table 3.
Psychological Measures and their Psychometric Properties

Psychological outcome	Measure	Description	Cut off score	Psychometric properties
Social Anxiety	Social Interaction Anxiety Scale (SIAS; Mattick & Clark, 1998)	The self-report SIAS (Mattick & Clark, 1998) is a 20-item measure of social anxiety that measures anxiety-related reactions to different social interactions (e.g., *I get nervous if I have to speak with someone in authority* [teacher, boss]). Items are rated on 5-point Likert scale ranging from 0 (not at all characteristic or true of me) to 5 (extremely characteristic or true of me).	A clinical cut off score of 34 is recommended to detect SAD (Heimberg, 1997; Mattick & Clark, 1998).	The SIAS has shown excellent psychometric properties and received extensive validation(Mattick & Clark, 1998; Peters, 2000).
Social Anxiety	Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987).	The 24-item clinician-administered Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987) designed to assess both fear and avoidance of social and performance situations was used to assess social anxiety severity. Each of the items are rated on a Likert scale from 0 to 4, with high scores representing more fear and/or avoidance. In this study, the LSAS was administered via a	Overall scores of 65 and above are said to indicate marked social anxiety (Liebowitz, 1987).	In social anxiety disorder (SAD) patients, the LSAS showed good internal consistency, test-retest reliability, convergent and discriminant validity, and sensitivity to treatment (Heimberg et al., 1999). Romm et al. (2012) have demonstrated that the LSAS is a psychometrically sound and clinically valuable instrument to assess social anxiety in an FEP

		trained clinician and participants provided a verbal self-report rating of their responses to each of item posed.		population.
Depression	Depression, Anxiety, Stress Scales (DASS; Lovibond & Lovidbond, 1995)	The seven-item depression subscale of the self-report Depression, Anxiety, Stress Scales (DASS; Lovibond & Lovidbond, 1995) was used to measure frequency and severity of symptoms. Each item is rated on a 4-point Likert scale ranging from 0 (did not apply to me) to 3 (applied to me very much), with higher scores denoting greater severity of symptoms.	A cut off score of 12 is recommended to detect depression (Nieuwenhuijsen, De Boer, Verbeek, Blonk, & Van Dijk, 2003).	Studies have shown that the Depression subscale correlates strongly with depression severity across other validated measures (Brown et al., 1997) and that internal consistency of the subscale is high (0.94; Nieuwenhuijsen et al., 2003).
Loneliness	UCLA Loneliness scale (Steptoe, Shankar, Demakakos, & Wardle, 2013)	A brief version of the original 21-item self-report UCLA Loneliness scale (Steptoe, Shankar, Demakakos, & Wardle, 2013) was used to assess loneliness. The UCLA 3-item measure is rated on a 3-point Likert scale of 1 (hardly ever), 2 (some of the time), and 3 (often). Responses are summed, with higher scores indicating greater loneliness.	A cut off score of 6 or above indicates the presence of loneliness (Hughes et al., 2004).	Hughes et al. (2004) reported the three-item UCLA displayed satisfactory reliability, concurrent and discriminant validity.

Note. A subthreshold cut off score of 30 on the SIAS (Mattick & Clark, 1998) was chosen a priori in the inclusion criteria of this pilot to capture individuals who continued to experience problematic social anxiety symptoms in spite of receiving a minimum of 18-months specialist face-to-face FEP treatment, in addition to a further 18-months online social therapy to target social functioning. All 10 participants included in the EMBRACE study exceeded the recommended SIAS clinical cut off score of 34 (Heimberg, 1997)

Table 4.
Logins and Individual Usage of the Main Components of EMBRACE

EMBRACE component	Total	*M*	*SD*	Mdn
Completed steps	82	8.2	4.2	10
Logins	191	19.1	19.4	11
Social networking – Interactive usage (likes, posts)	44	7.3	5.8	7

Table 5.
Participant Impressions of the Intervention (*n* = 10)

EMBRACE experience	*M*	*SD*	Mdn	Range	*n* (%)
Overall experience of the intervention was very positive	4.3	.66	4	3-5	10 (100%)
Overall the intervention was very helpful	4.4	1.2	5	1-5	10 (100%)
The comic content was very helpful	3.7	1.00	4	1-5	10 (100%)
The actions (behavioural experiments) were very helpful	4	1.18	4	1-5	10 (100%)
Information on maintaining general wellbeing was very helpful	3.9	1.2	4	1-5	10 (100%)
Information on managing social anxiety was very helpful	4.4	1.2	5	1-5	10 (100%)
Using the intervention helped me feel in more control of my social anxiety	5	0	5	5	10 (100%)
I would recommend this intervention to others	5	0	5	5	10 (100%)
Using the intervention helped me feel in more control of my mood	3.9	.94	4	1-5	10 (100%)
I would recommend this intervention	5	0	5	5	10 (100%)

to others to help manage social anxiety

Note. All items rated from 1 = strongly disagree; 5 = strongly agree.

Table 6.

Change between Baseline and 2-Month Follow-Up for Clinical Outcome Variables

Measure	Baseline		2-month follow up				
	M	*SD*	*M*	*SD*	*t(9)*	*p*	Cohens *d*
SIAS	48.50	13.28	27.90	9.62	- 5.39	.0005*	-1.70
LSAS	70.40	26.02	43.40	21.03	- 4.26	.002*	-1.35
DASS	8.50	4.16	6.70	7.50	- .67	.504	- 0.22.
UCLA	5.90	2.72	5.10	2.28	- .74	.48	-0.23.

Note. * Statistically significant at p<.05. Cohen (1990) classified effect sizes as small (d = 0.2), medium (d = 0.5), and large ($d \geq 0.8$).
M = Mean; *SD* = Standard Deviation;.