Author/s:
González-Blanch, C;Gleeson, JF;McEnery, C;O'Sullivan, S;Ayesa-Arriola, R;D'Alfonso, S;Valentine, L;Tremain, H;Bell, I;Bendall, S;Alvarez-Jimenez, M

Title:
The impact of persistent social anxiety on social functioning and health-related quality of life in young people with remitted first-episode psychosis

Date:
2022-08-01

Citation:
González-Blanch, C., Gleeson, J. F., McEnery, C., O'Sullivan, S., Ayesa-Arriola, R., D'Alfonso, S., Valentine, L., Tremain, H., Bell, I., Bendall, S. & Alvarez-Jimenez, M. (2022). The impact of persistent social anxiety on social functioning and health-related quality of life in young people with remitted first-episode psychosis. Early Intervention in Psychiatry, 16 (8), pp.868-874. https://doi.org/10.1111/eip.13228.

Gleeson John (Orcid ID: 0000-0001-7969-492X)
D'Alfonso Simon (Orcid ID: 0000-0001-7407-8730)
González-Blanch César (Orcid ID: 0000-0002-3181-4731)

Running title: Persistent social anxiety in FEP

The impact of persistent social anxiety on social functioning and health-related quality of life in young people with remitted first-episode psychosis

César González-Blanch[1], John F. Gleeson[2], Carla McEnery[3,4], Shaunagh O'Sullivan[3,4], Rosa Ayesa-Arriola[5], Simon D'Alfonso[3,6], Lee Valentine[3,4], Hailey Tremain[3,4], Imogen Bell[3,4], Sarah Bendall[3,4], Mario Alvarez-Jimenez[3,4]

(1) Mental Health Centre, University Hospital Marqués de Valdecilla- IDIVAL. Santander, Spain.
(2) Healthy Brain and Mind Research Centre and School of Behavioural and Health Sciences, Australian Catholic University, Melbourne, Victoria, Australia
(3) Orygen, Melbourne, Australia
(4) Centre for Youth Mental Health, The University of Melbourne, Australia
(5) Valdecilla Biomedical Research Institute (IDIVAL), Santander, Spain
(6) School of Computing and Information Systems, University of Melbourne, Parkville, Victoria, Australia

Corresponding author:
César González-Blanch
Hospital Universitario "Marqués de Valdecilla".
Unidad de Salud Mental "Puertochico"
c./ Tetuán, 59 - 39004-Santander (Spain)
Tel: +34-942-202537 Fax: +34-942-203447
E-mail: cesar.gonzalezblanch@scsalud.es

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/eip.13228

Abstract

Objective

Comorbid social anxiety is common in psychotic disorders and is associated with multiple negative consequences. However, the long-term effects of persistent social anxiety versus fluctuating or no anxiety on social functioning and health-related quality of life (HR-QoL) have received scant attention. Therefore, we aimed to examine the prevalence of persistent social anxiety to determine its effect on social functioning and HR-QoL in first-episode psychosis (FEP).

Methods

One hundred and eight individuals with remitted FEP were classified into three groups (persistent, fluctuating or no social anxiety) according to the Social Interaction Anxiety Scale over an 18-month follow-up period. The three groups were then compared at 18 months follow-up to assess the influence of social anxiety on social functioning and HR-QoL before and after controlling for confounders.

Results

Of the 108 individuals with FEP, 25 (23.1%) had persistent social anxiety. This group presented lower social functioning and HR-QoL levels compared to the groups with fluctuating or no anxiety symptoms. The effect on HR-QoL remained significant after controlling for positive psychotic and depressive symptoms.

Conclusions

In this study, nearly one-quarter of young people with remitted FEP experienced persistent social anxiety symptoms, which had a negative impact on HR-QoL. Thus, individuals with persistent social anxiety constitute a highly vulnerable group and may require targeted interventions to improve their social functioning and HR-QoL.

Key words: social anxiety, social functioning, quality of life, psychosis

The impact of persistent social anxiety on social functioning and health-related quality of life in young people with remitted first-episode psychosis

Anxiety symptoms and disorders are common in individuals with psychosis. Most published studies report that prevalence rates in schizophrenia and related disorders are higher than typically found in the general population (Achim et al., 2011; Pokos & Castle, 2006). While most of these research studies are based on samples involving relapsed or chronic schizophrenia, the prevalence of comorbid anxiety disorders in first-episode psychosis (FEP) might be similar or higher than in individuals with chronic psychotic disorders (Achim et al., 2011; Michail & Birchwood, 2009). A recent meta-analysis found that the mean comorbidity rate for anxiety disorders in FEP was 29% (range, 20% to 40%), although these figures should be viewed cautiously given that they are based on only a limited number of highly heterogeneous studies (Wilson, Yung, & Morrison, 2020). Social anxiety, a type of anxiety characterized by the persistent fear of negative evaluation in social situations, is the most prevalent type of anxiety disorder among psychotic disorders (Achim et al., 2011). A meta-analysis found a pooled prevalence rate of 21% (16%–26%) for social anxiety disorder (SaD) comorbidity in individuals with a psychotic disorder (McEnery, Lim, Tremain, Knowles, & Alvarez-Jimenez, 2019). Prominent social anxiety is of particular importance as it has been shown to impact on a broad range of social life and everyday activities (National Collaborating Centre for Mental Health, 2013), which may result in social impairment and reduced QoL in individuals with psychotic disorders (McEnery, Lim, Tremain, et al., 2019; Pallanti, Quercioli, & Hollander, 2004).

Previous studies evaluating the consequences of anxiety in the context of FEP have focused on the relationships between anxiety symptoms/syndromes and outcomes cross-sectionally (Braga, Mendlowicz, Marrocos, & Figueira, 2005; Pallanti et al., 2004; Romm, Melle, Thoresen, Andreassen, & Rossberg, 2012; Voges & Addington, 2005) or at follow-ups (Huppert & Smith, 2001; Karpov, Kieseppa, Lindgren, Wegelius, & Suvisaari, 2020; Lysaker, Yanos, Outcalt, & Roe, 2010). However, anxiety levels in FEP change over time (Karpov et al., 2020; Montreuil, Malla, Joober, Belanger, & Lepage, 2013). Some individuals might show elevated levels of social anxiety as a transient psychological reaction to illness onset and the associated stigma or to isolated stressors. However, persistently high social anxiety levels may be associated with a higher likelihood of poorer outcomes than fluctuating symptoms. Since previous studies have not distinguished between persistent and fluctuating symptoms, our understanding of the consequences of co-occurring social anxiety in FEP is limited. Consequently, it is essential that we advance our knowledge in this area to identify those individuals who may be at greater risk of developing long-lasting emotional disturbances after experiencing a psychotic disorder, and may therefore require targeted interventions for secondary prevention. Social anxiety symptoms have considerable clinical relevance because, once identified, they can be treated effectively with psychological and/or pharmacological interventions (Mayo-Wilson et al., 2014).

In this context, the aims of this study were twofold: (i) to determine the prevalence of persistent social anxiety symptoms in a sample of FEP in clinical remission; and (ii) to examine the differences between the social anxiety groups in social functioning and health-related quality of life (HR-QoL) after 18-months of follow-up while controlling for potential confounders. The main hypothesis was that individuals with persistent

social anxiety would present worse social functioning and HR-QoL than individuals with fluctuating or no symptoms.

Methods

Participants

Data were derived from a randomized controlled trial (RCT), considered as a single cohort, conducted to evaluate the effectiveness of an online intervention for extending the clinical benefits of specialised early intervention services (Alvarez-Jimenez et al., 2021). The study inclusion criteria for HORYZONS study were (i) diagnosis of a FEP or mood disorder with psychotic features according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria; (ii) age 16–27 years (inclusive); (iii) ≤ 6 months of treatment with an antipsychotic medication prior to registration with the Early Psychosis Prevention and Intervention Centre; (iv) remission of positive symptoms of psychosis, defined as ≥ 4 weeks with scores ≤ 3 (mild) on items P2 (conceptual disorganisation) and G9 (unusual thought content) on the Positive and Negative Syndrome Scale (PANSS) (Kay, Fiszbein, & Opler, 1987) and scores ≤ 4 (moderate) with no functional impairment on items P3 (hallucinatory behaviour) and P1 (delusions) on the PANSS. Exclusion criteria were 1) severe intellectual disability; 2) inability to speak or read English; additional exclusion criteria to ensure safety within the Horyzons trial wereDSM-IV diagnosis of antisocial or borderline personality disorder. All participants provided written informed consent. Ethics approval for the trial was provided by the Melbourne Health Research and Ethics Committee (No. 2013.146).

Measures

Participants underwent a thorough clinical assessment at baseline and at months 6, 12 and 18 of follow-up.

Social anxiety measures

Social anxiety was assessed using the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998). The SIAS is a 20-item self-report measuring anxiety in interpersonal interactions on a 5-point Likert scale from 0 (*not at all characteristic of me*) to 4 (*extremely characteristic of me*), with a total score ranging from 0 to 80. A cutoff score of ≥34 was used in the present study, which has been shown to discriminate between individuals with SaD and community controls without an Axis I disorder (Brown et al., 1997; Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992). The SIAS has excellent psychometric properties (Rodebaugh, Woods, Heimberg, Liebowitz, & Schneier, 2006).

In the present study, persistent social anxiety was defined as the presence of clinically-significant levels of social anxiety symptoms (based on preestablished cutoff score of the SIAS) at all time point assessments (with ≥ three out of four assessments available). Fluctuating social anxiety was defined as having at least one score over the cut-off value on one of the four assessments and one score below the cutoff score on at least one assessment. Absence of social anxiety (no clinically significant symptoms) was defined as having scored under the cutoff score at all assessments, with at least three scores available over the 18-month follow-up period.

Assessment of social functioning and HR-QoL

Outcome measures were assessed at 18-month follow-up. Overall social functioning was assessed by the Personal and Social Performance scale (PSP; Nasrallah, Morosini, & Gagnon, 2008), an observed-rated instrument. The PSP provides a global score ranging from 1 to 100, with higher scores representing better functioning. The PSP has

sound psychometric properties, including construct, concurrent and predictive validity, internal consistency and inter-rater reliability (Burgess, Harris, Coombs, & Pirkis, 2017).

HR-QoL was assessed using the Assessment of Quality of Life-8D (AQoL-8D; J. Richardson et al., 2011), a 35-item instrument with eight separately scored dimensions which load onto two super-dimensions: physical (independent living, pain and senses) and psychosocial (happiness, self-worth, coping, relationships, mental health). Due to the high correlation between the physical and psychosocial super-dimensions (r = .69), we opted to use only the psychosocial super-dimension for this study. Higher scores represent better HR-QoL. The AQoL-8D has good validity and excellent internal consistency (J. Richardson, Iezzi, Khan, & Maxwell, 2014).

Confounding variables

PANSS subscales were used to assess negative (e.g., apathetic social withdrawal and blunted affect) and positive (e.g., hallucinatory behaviour and delusions) symptoms (Kay et al., 1987). The Calgary Depression Scale for Schizophrenia (CDSS; Addington, Addington, & Maticka-Tyndale, 1993) was used to assess depressive symptoms. The total risk for substance use problems was screened using the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST; WHO Assist Working Group, 2002)]. Other potential confounding variables considered were as follows: age, sex, years of education, duration of untreated psychosis (DUP), and intervention group (experimental vs. control). To control for these potential confounding variables, we used baseline data.

Data analysis

Prior to exploring the differences between the social anxiety groups in terms of baseline characteristics, we first investigated violations of normality assumptions for residuals

and homogeneity of variance. Two outliers were identified on the PSP scale and therefore removed from further analyses. To identify potential confounders, we compared the relevant sociodemographic and clinical variables in the anxiety groups using parametric and non-parametric tests, as appropriated. Two separate analyses of covariance (ANCOVA) were performed to control for baseline covariates when examining differences among the social anxiety groups in social functioning and HR-QoL outcomes at the 18-month follow-up. Post-hoc *t*-tests with Bonferroni correction were conducted to determine the source of differences among statistically significant dependent variables. Effect sizes are provided as partial eta squared (η^2_p). A post-hoc power analysis for ANCOVA was conducted using G*Power 3.1 Software (Faul, Erdfelder, Buchner, & Lang, 2009) to ensure that the sample size of the study had the power ($1 - \beta = 0.80$) to detect medium effect sizes ($f \geq 0.3$) at the significant level of 0.05 for a model including two covariates as well as the fixed factor (i.e., three groups). A significance level of p=0.05 was used for all statistical tests, and two-tailed tests were applied. All analyses were performed with IBM SPSS Statistics (version 25.0).

Results

Of 170 participants in the HORYZONS study, 108 (63.5%) completed at least three of the four assessments with the SIAS, and therefore were included in the analysis. Table 1 describes the baseline characteristics of this sample. There were no significant differences ($p > 0.10$) on any baseline sociodemographic characteristic or clinical measures between the participants included in the present analysis (n=108) and those who were not included in the present study because they did not have at least three assessments during the 18-month follow-up (n=62) (see Table S1).

Of the 108 participants, 25 (23.1%) had persistent social anxiety, 41 (38.0%) fluctuating social anxiety, and 42 (38.9%) no anxiety. Forty-seven (44.3%) participants scored over the cut-off point for social anxiety in the SIAS at baseline.

We conducted univariate analyses to identify the sociodemographic and clinical confounders associated with the anxiety measure and dependent variables (PSP and AQoL-8D) in this sample. There were significant differences between the social anxiety groups for the PANSS positive ($H = 6.56$, $p = .038$) and negative symptom dimensions ($H = 10.48$, $p = 0 .005$), and the CDSS ($H = 26.24$, $p < .001$). No significant differences were found between social anxiety groups for any other variables, including age, sex, education, diagnosis (affective vs. non-affective psychosis), DUP, and ASSIST total score (see Table 1). As the sample was part of a RCT, we also tested for differences between social anxiety groups in the study arms (control vs. experimental), finding no significant differences in the social anxiety groups ($\chi^2 = 4.38$, $p = .112$).

To test our main hypothesis, social anxiety groups were compared for social functioning and HR-QoL at the 18-month follow-up assessment. To retain the power of the ANCOVAs, we opted to include only two covariates related to psychotic and mood phenomena (PANSS positive and CDSS) of those identified as putative confounders in the previous univariate analyses. Table 2 reports results for comparisons between the anxiety and social anxiety groups before and after adjusting for these covariates. Before adjustment for covariates, social anxiety groups explained 9% of the variance in the PSP and 34% of the HR-QoL. After adjusting for covariates, the only significant difference was on the AQoL-8D, which explained 21% of the variance. Post hoc pairwise comparisons revealed that the persistent social anxiety group had lower scores on the AQoL-8D than the fluctuating and no anxiety comparison groups, which did not

differ significantly between them. Figures 1 depicts the estimated marginal means of AQoL-8D for social anxiety groups.

Next, we explored whether these results remained unchanged, controlling only for negative and positive symptoms and excluding depression as a covariate in the ANCOVAs. The results were similar to the other ANCOVAs, although the variance explained in the AQoL-8D increased to 30% (see Table 2).

To test the robustness of these results, we performed an (underpowered) ANCOVA with three covariates (PANSS positive, PANSS positive and CDSS) and AQoL-8D as the dependent variable, which yielded similar results ($F[2, 91] = 11.10$, $p < .001$, $\eta_p^2 = .196$).

Discussion

In the present study involving individuals with remitted FEP, approximately one-quarter of the sample reported clinically-significant persistent social anxiety symptoms over an 18-month follow-up period. As expected, the persistent social anxiety groups presented significantly worse social functioning and HR-QoL levels at the 18-month follow-up when compared to the fluctuating and no anxiety groups; however, after controlling for positive psychotic and depressive symptoms, the differences remained significant only for HR-QoL. Namely, the subgroup of individuals with persistent social anxiety symptoms had lower levels of HR-QoL compared to fluctuating and no symptoms subgroups, which were similar to one another. Furthermore, when we ran the analysis controlling only for negative and positive symptoms, we found similar results but with higher effect sizes.

To our knowledge, this is the first study to focus on the persistence of social anxiety symptoms in FEP. While it can reasonably be expected that a young person in the early stages of a psychotic disorder would experience social anxiety as a transient reaction to the recent diagnosis and treatment for a severe mental illness, the long-term persistence of elevated anxiety is concerning. In our study, a significant proportion (≈25%) of individuals with remitted FEP experienced persistent, clinically-significant social anxiety symptoms. These rates are comparable to the reported prevalence rates for anxiety and social anxiety disorders in FEP studies that used a semi-structured clinical interview by trained clinicians (Michail & Birchwood, 2013; Voges & Addington, 2005).

We found that, before controlling for confounders, the presence of persistent social anxiety was associated with lower social functioning and HR-QoL compared to fluctuating and no anxiety. This finding is consistent with previous reviews of social anxiety in psychotic disorders (McEnery, Lim, Tremain, et al., 2019). Interestingly, in one FEP study, the presence of generalized SaD (a more pervasive subtype of social anxiety) versus the absence of SaD was associated with lower social functioning as well as a decreased QoL compared to individuals without SaD and those with a non-generalized subtype of SaD (Romm et al., 2012). However, few FEP studies have examined the relationship between social anxiety and social functioning or QoL after adjusting for depression and psychotic symptoms. In the study by Romm et al. (2012), social anxiety predicted subjective QoL, even after controlling for depression and psychotic symptoms; however, in another FEP study (Voges & Addington, 2005), the effect of social anxiety on social functioning disappeared once negative symptoms were accounted for, likely due to its small sample size (n = 60).

The contribution of persistent social anxiety to HR-QoL proved to be robust and independent of psychotic and depressive symptoms —the effect remained even after controlling for positive, negative and depressive symptoms at the same time. However, larger effect sizes were found when negative symptoms instead of depression was included in the models as a covariate. Thus, depression had a suppressive effect on the influence of persistent social anxiety on social functioning and HR-QoL. A plausible explanation for this finding is that anxiety is largely inseparable from depression and both of these are likely part of the same emotional reaction to psychosis. As Michail and Birchwood (2013) suggested, controlling for depression entails the risk of controlling for anxiety itself. The attenuating effect of depressive symptoms was observed for social anxiety, where the percentage of variance explained notably increased when, instead of controlling for depression, we included negative symptoms as an additional covariate to positive symptoms in the model. This would indicate that—beyond psychotic phenomena—persistent emotional disturbances make a unique contribution to long-term HR-QoL and, probably, to social functioning as well.

This study has several limitations. First, this study is based on a sample from a previous RCT. Consequently, this limits the generalizability of our results. Second, we included a broad range of DSM-IV affective and non-affective psychotic disorders. While no significant differences were observed between these broad categories, due to the small number of cases in the diagnostic categories, we cannot rule out the possibility of significant differences between the specific diagnoses. Particularly relevant could be the schizotypal personality disorder, which is characterized by excessive social anxiety, however, no scale was administered to measure schizotypy, thus we could not control for this potential confounding factor. Third, the distribution of individuals to the social anxiety groups was based on the cutoff score of a self-report measure rather than

clinician-based clinical diagnostic interview. Self-report measures may overestimate the prevalence of a disorder by not taking into account functional impairment or other conditions that can cause similar symptoms (Thombs, Kwakkenbos, Levis, & Benedetti, 2018). However, for the aims of this study, the specific diagnosis was less important than detecting the presence of elevated levels of social anxiety symptoms sustained over time; moreover, a number of factors were assessed and the relevant differences were statistically controlled. Finally, although our sample size was large enough to detect medium effect sizes, it is possible that small effect sizes were undetected. Additionally, sample size, based on our power calculations, was not large enough to perform an ANCOVA with three covariates (including positive, negative and depressive symptoms), this would have been more appropriate than separate ANCOVAs with only two covariates. However, the underpowered ANCOVA (with all three covariates) yielded similar results to the separate ANCOVAs, providing further support to the reported results. Furthermore, separate ANCOVAs allow us to appreciate the particular suppressive effect of depressive symptoms, compared to negative symptoms, on the influence of persistent social anxiety on social functioning and HR-QoL.

While anxiety is a treatable condition in non-psychotic populations, the available literature on the treatment of anxiety disorders in schizophrenia consists primarily of case reports and open trials (Braga, Reynolds, & Siris, 2013). However, two small RCTs reported promising results in terms of reduced social anxiety symptoms in individuals with schizophrenia (Halperin, Nathan, Drummond, & Castle, 2000; Kingsep, Nathan, & Castle, 2003). Interestingly, supporting individuals to cope with psychological stressors and to manage their response towards those stressors may help to reduce anxiety levels and, secondarily, improve QoL (Buonocore et al., 2017). Some authors have suggested that a transdiagnostic approach could be used to simultaneously

treat both anxiety and depression in patients with FEP, rather than focusing on psychotic symptoms alone (Wilson et al., 2020). In this regard, it is worth highlighting recent initiatives carried out by our group with the aim of developing novel psychosocial treatments tailored to the needs of individuals with FEP and comorbid social anxiety (McEnery, Lim, Knowles, et al., 2019).

In conclusion, the findings of the present study show that, in a group of individuals with remitted psychosis who have already received 18 months to 2 years of specialised care, a significant proportion experienced persistent, clinically-significant symptoms of social anxiety, which negatively impacted HR-QoL and, probably, social functioning (as part of more general emotional disturbance, which includes low mood). Our findings challenge the assumption that anxiety is a by-product of psychotic symptoms that would be expected to improve in parallel with those symptoms. More clinical and research efforts are needed to address this highly prevalent but still under-recognized and hence under-treated debilitating comorbidity.

Acknowledgements

The authors wish to thank the Orygen Youth Advisory Council and Orygen Youth Research Council for their input into the development of Horyzons. The authors also wish to thank the inspiring and generous young people who took part in the study. The HORYZONS trial was supported by the Mental Illness Research Fund from the State Government of Victoria. C.G-B was supported by a Research Intensification Grant (INT/A19/02) from the IDIVAL. S.B. was supported by the McCusker Charitable Foundation (grant number N/A). S.O.S. was supported by the National Health and Medical Research Council (APP1144563). M.A-J. was supported by a Career Development Fellowship (APP1082934) and by an Investigator Grant (APP1177235) from the National Health and Medical Research Council.

Conflict of interest statement

The authors declare that there is no conflict of interest.

Data availability statement

The data that support the findings of this study are available from the corresponding author, CGB, upon reasonable request.

References

Achim, A. M., Maziade, M., Raymond, E., Olivier, D., Merette, 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

Addington, D., Addington, J., & Maticka-Tyndale, E. (1993). Assessing depression in schizophrenia: the Calgary Depression Scale. *British Journal of Psychiatry. Supplement*(22), 39-44.

Alvarez-Jimenez, M., Koval, P., Schmaal, L., Bendall, S., O'Sullivan, S., Cagliarini, D., . . . Gleeson, J. F. M. (2021). The Horyzons project: a randomized controlled trial of a novel online social therapy to maintain treatment effects from specialist first-episode psychosis services. *World Psychiatry, 20*(2), 233-243. doi:10.1002/wps.20858

Braga, R. J., Mendlowicz, M. V., Marrocos, R. P., & Figueira, I. L. (2005). Anxiety disorders in outpatients with schizophrenia: prevalence and impact on the subjective quality of life. *Journal of Psychiatric Research, 39*(4), 409-414. doi:10.1016/j.jpsychires.2004.09.003

Braga, R. J., Reynolds, G. P., & Siris, S. G. (2013). Anxiety comorbidity in schizophrenia. *Psychiatry Research, 210*(1), 1-7. doi:10.1016/j.psychres.2013.07.030

Brown, E. J., Turovsky, J., Heimberg, R. G., Juster, H. R., Brown, T. A., & Barlow, D. H. (1997). Validation of the Social Interaction Anxiety Scale and the Social Phobia Scale across the anxiety disorders. *Psychological Assessment, 9*(1), 21-27. doi:10.1037/1040-3590.9.1.21

Buonocore, M., Bosia, M., Bechi, M., Spangaro, M., Cavedoni, S., Cocchi, F., . . . Cavallaro, R. (2017). Targeting anxiety to improve quality of life in patients

with schizophrenia. *European Psychiatry, 45*, 129-135. doi:10.1016/j.eurpsy.2017.06.014

Burgess, P. M., Harris, M. G., Coombs, T., & Pirkis, J. E. (2017). A systematic review of clinician-rated instruments to assess adults' levels of functioning in specialised public sector mental health services. *Australian and New Zealand Journal of Psychiatry, 51*(4), 338-354. doi:10.1177/0004867416688098

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149-1160. doi:10.3758/BRM.41.4.1149

Halperin, S., Nathan, P., Drummond, P., & Castle, D. (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

Heimberg, R. G., Mueller, G. P., Holt, C. S., Hope, D. A., & Liebowitz, M. R. (1992). Assessment of anxiety in social interaction and being observed by others: The Social Interaction Anxiety Scale and the Social Phobia Scale. *Behavior Therapy, 23*(1), 53-73. doi:10.1016/S0005-7894(05)80308-9

Huppert, J. D., & Smith, T. E. (2001). Longitudinal analysis of subjective quality of life in schizophrenia: anxiety as the best symptom predictor. *Journal of Nervous and Mental Disease, 189*(10), 669-675. doi:10.1097/00005053-200110000-00003

Karpov, B., Kieseppa, T., Lindgren, M., Wegelius, A., & Suvisaari, J. (2020). Anxiety symptoms in first-episode psychosis. *Early Interv Psychiatry*. doi:10.1111/eip.12986

Kay, S. R., Fiszbein, A., & Opler, L. A. (1987). The positive and negative syndrome scale (PANSS) for schizophrenia. *Schizophrenia Bulletin, 13*(2), 261-276. doi:10.1093/schbul/13.2.261

Kingsep, P., Nathan, P., & Castle, D. (2003). Cognitive behavioural group treatment for social anxiety in schizophrenia. *Schizophrenia Research, 63*(1-2), 121-129. doi:10.1016/s0920-9964(02)00376-6

Lysaker, P. H., Yanos, P. T., Outcalt, J., & Roe, D. (2010). Association of stigma, self-esteem, and symptoms with concurrent and prospective assessment of social anxiety in schizophrenia. *Clinical Schizophrenia & Related Psychoses, 4*(1), 41-48. doi:10.3371/CSRP.4.1.3

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), 455-470. doi:10.1016/s0005-7967(97)10031-6

Mayo-Wilson, E., Dias, S., Mavranezouli, I., Kew, K., Clark, D. M., Ades, A. E., & Pilling, S. (2014). Psychological and pharmacological interventions for social anxiety disorder in adults: a systematic review and network meta-analysis. *Lancet Psychiatry, 1*(5), 368-376. doi:10.1016/S2215-0366(14)70329-3

McEnery, C., Lim, M. H., Knowles, A., Rice, S., Gleeson, J., Howell, S., . . . Alvarez-Jimenez, M. (2019). Social anxiety in young people with first-episode psychosis: Pilot study of the EMBRACE moderated online social intervention. *Early Interv Psychiatry*. doi:10.1111/eip.12912

McEnery, C., Lim, M. H., Tremain, H., Knowles, A., & Alvarez-Jimenez, M. (2019). Prevalence rate of social anxiety disorder in individuals with a psychotic disorder: A systematic review and meta-analysis. *Schizophrenia Research, 208*, 25-33. doi:10.1016/j.schres.2019.01.045

Michail, M., & Birchwood, M. (2009). Social anxiety disorder in first-episode psychosis: incidence, phenomenology and relationship with paranoia. *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

Montreuil, T. C., Malla, A. K., Joober, R., Belanger, C., & Lepage, M. (2013). Anxiety symptoms severity and short-term clinical outcome in first-episode psychosis. *Early Interv Psychiatry, 7*(1), 5-11. doi:10.1111/eip.12018

Nasrallah, H., Morosini, P., & Gagnon, D. D. (2008). Reliability, validity and ability to detect change of the Personal and Social Performance scale in patients with stable schizophrenia. *Psychiatry Research, 161*(2), 213-224. doi:10.1016/j.psychres.2007.11.012

National Collaborating Centre for Mental Health. (2013). Social Anxiety Disorder. In B. P. Society (Ed.), *Social Anxiety Disorder: Recognition, Assessment and Treatment*. Leicester (UK).

Pallanti, S., Quercioli, L., & Hollander, E. (2004). Social anxiety in outpatients with schizophrenia: a relevant cause of disability. *American Journal of Psychiatry, 161*(1), 53-58. doi:10.1176/appi.ajp.161.1.53

Pokos, V., & Castle, D. J. (2006). Prevalence of Comorbid Anxiety Disorders in Schizophrenia Spectrum Disorders: A Literature Review. *Current Psychiatry Reviews, 2*(3), 285-307. doi:10.2174/157340006778018193

Richardson, J., Elsworth, G., Iezzi, A., Khan, M., Mihalopoulos, C., Schweitzer, I., & Herrman, H. (2011). *Increasing the sensitivity of the AQoL inventory for*

the evaluation of interventions affecting mental health. Melbourne: Centre for Health Economics, Monash University.

Richardson, J., Iezzi, A., Khan, M. A., & Maxwell, A. (2014). Validity and reliability of the Assessment of Quality of Life (AQoL)-8D multi-attribute utility instrument. *Patient, 7*(1), 85-96. doi:10.1007/s40271-013-0036-x

Rodebaugh, T. L., Woods, C. M., Heimberg, R. G., Liebowitz, M. R., & Schneier, F. R. (2006). The factor structure and screening utility of the Social Interaction Anxiety Scale. *Psychological Assessment, 18*(2), 231-237. doi:10.1037/1040-3590.18.2.231

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

Thombs, B. D., Kwakkenbos, L., Levis, A. W., & Benedetti, A. (2018). Addressing overestimation of the prevalence of depression based on self-report screening questionnaires. *CMAJ: Canadian Medical Association Journal, 190*(2), E44-E49. doi:10.1503/cmaj.170691

Voges, M., & Addington, J. (2005). The association between social anxiety and social functioning in first episode psychosis. *Schizophrenia Research, 76*(2-3), 287-292. doi:10.1016/j.schres.2005.01.001

WHO Assist Working Group. (2002). The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST): development, reliability and feasibility. *Addiction, 97*(9), 1183-1194. doi:10.1046/j.1360-0443.2002.00185.x

Wilson, R. S., Yung, A. R., & Morrison, A. P. (2020). Comorbidity rates of depression and anxiety in first episode psychosis: A systematic review and meta-

analysis. *Schizophrenia Research, 216*, 322-329.

doi:10.1016/j.schres.2019.11.035

Table 1. Comparison between social anxiety groups at baseline

	Total	No anxiety	Fluctuating anxiety	Persistent anxiety	Statistics
	(N=108)	(n = 42)	(n = 41)	(n = 25)	
Age, mean (SD)	20.9 (2.8)	21.3 (2.7)	20.4 (2.8)	21.2 (2.7)	F=1.36, p=.262
Sex, female, n (%)	49 (45.4)	20 (47.6)	17 (41.5)	12 (48)	χ^2=0.41, p=.815
Education, years, median (IQR)	12 (10-12)	11 (10-12)	11 (10-12)	12 (10-12)	H=2.33, p=.312
DUP, days, median (IQR)	30 (3-122)	30 (5-76)	25.5 (3.5-114.3)	30 (0-228.5)	H=.17, p=.918
Diagnosis, non-affective psychosis, n (%)[a]	56 (51.9)	20 (47.7)	22 (53.7)	14 (56)	χ^2=0.53, p=.768
PANSS- Positive. median (IQR)	9 (7-12)	8 (7-11)	9 (7-11.5)	11 (8-13.5)	H=6.56, p=.038
PANSS Negative, median (IQR)	10 (8-13)	9 (8-13)	10 (8-12.5)	13 (10-14.5)	H=10.48, p=.005
CDSS, median (IQR)	2 (1-5.8)	1 (0-2.7)	2 (1-4.5)	6 (3.7-10.5)	H=26.24, p<.001
ASSIST, median (IQR)	92.6 (44.4-160.0)	71 (44.4-153.0)	97.4 (0-161.9)	126.8 (55.5-166.1)	H=1.73, p=.420

SD, standard deviation; IQR, interquartile range; DUP, Duration of Untreated Psychosis; PANSS, Positive and Negative Syndrome Scale; CDSS, Calgary Depression Scale for Schizophrenia; ASSIST, Alcohol, Smoking and Substance Involvement Screening Test.

[a] Patients diagnosed with bipolar disorder, major depression with psychotic features and schizoaffective disorder were included in the affective psychosis group, the rest were included in the non-affective group.

Table 2. Comparisons between the social anxiety groups in social functioning and health-related quality of life at 18-month follow-up.

	No anxiety	Fluctuating anxiety	Persistent anxiety	ANOVA			ANCOVA[1]			ANCOVA[2]		
	Mean (SD)	Mean (SD)	Mean (SD)	F (df)	p	ES	F (df)	p	ES	F (df)	p	ES
PSP	70.6 (11.8)	68.1 (12.0)	61.2 (13.0)	4.67	.011	.085	0.92	.401	.018	2.63	.077	.051

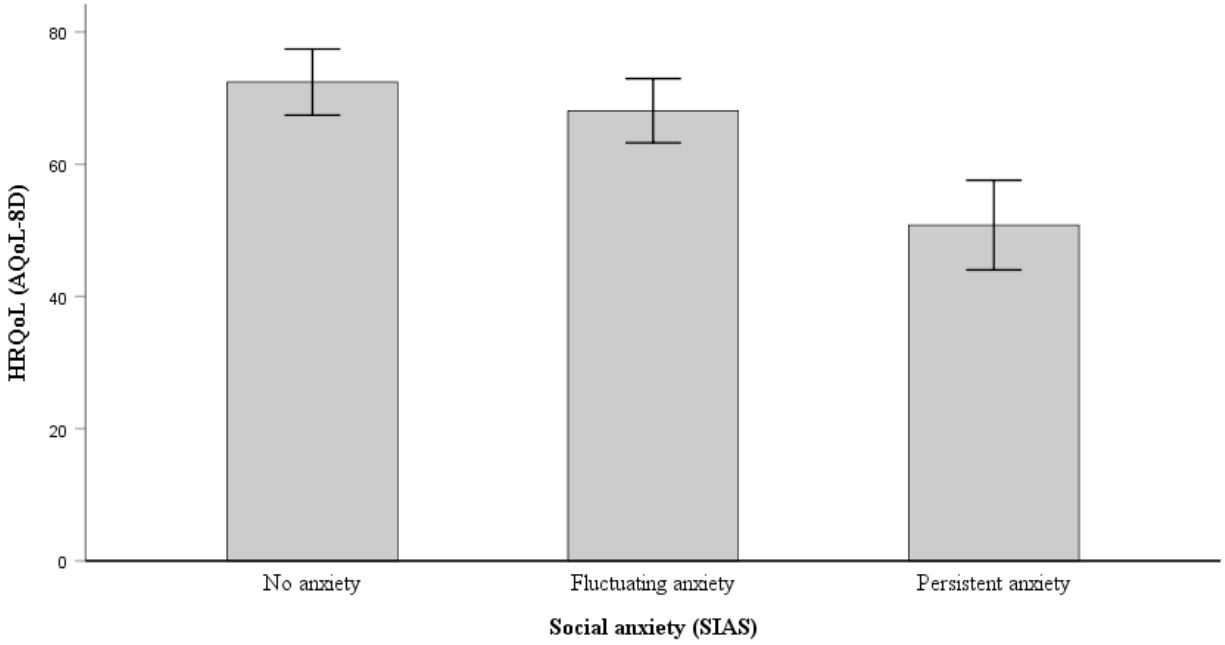
				(2,100)			(2,98)			(2,98)		
AQoL-8D	74.4 (12.4)	68.2 (15.3)	47.3 (18.7)	23.64 (2,94)	<.001	.335	12.01 (2,92)	<.001	.207	19.65 (2,92)	<.001	.299

DASS-A, Depression, Anxiety and Stress Scale (anxiety subscale); SIAS, Social Interaction Anxiety Scale; PSP, Personal and Social Performance scale; AQoL-8D, Assessment of Quality of Life-8D (psychosocial super-dimension); SD, Standard deviation; df, degrees of freedom; ES, effect size (partial eta squared).

[1] Positive and Negative Syndrome Scale (PANSS)-positive and Calgary Depression Scale for Schizophrenia (CDSS) at baseline entered as covariates.

[2] Positive and Negative Syndrome Scale (PANSS)-positive and PANSS-negative at baseline entered as covariates.

Figure 1. Estimated marginal means of AQoL-8D at 18-months assessment for social anxiety groups[1].



Note. SIAS, Social Interaction Anxiety Scale; AQoL-8D, Assessment of Quality of Life-8D (psychosocial super-dimension). Error bars show 95% confidence intervals.
[1] Positive and Negative Syndrome Scale (PANSS)-positive and Calgary Depression Scale for Schizophrenia (CDSS) at baseline entered as covariates.