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# Exploring stigma, shame, and safety behaviours in social anxiety and paranoia amongst people diagnosed with schizophrenia

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## Abstract

**Background:** Social anxiety and paranoia are connected by a shared suspicion framework. Based on cognitive-behavioural approaches, there is evidence for treating social anxiety and psychosis. However, mechanisms underlying the relationship between social anxiety and paranoia remain unclear.

**Aims:** To investigate mediators between social anxiety and paranoia in schizophrenia such as negative social appraisals (i.e. stigma or shame; Hypothesis 1), and safety behaviours (i.e. anxious avoidance or *in situ* safety behaviours; Hypothesis 2).

**Method:** A cross-sectional study was conducted among Asian out-patients with schizophrenia (January–April 2020). Data on social anxiety, paranoia, depression, shame, stigma, anxious avoidance, and *in situ* behaviours were collected. Associations between social anxiety and paranoia were investigated using linear regressions. Mediation analysis via 10,000 bias-corrected bootstrap samples with 95% confidence intervals (CI) was used to test the indirect effects (*ab*) of mediators.

**Results:** Participants ( $n = 113$ , 59.3% male) with a mean age of 44.2 years were recruited. A linear relationship between social anxiety and paranoia was found. In multiple mediation analyses (co-varying for depression), stigma and shame (Hypothesis 1) did not show any significant indirect effects with  $ab = .004$  (95%CI =  $-.013, .031$ ) and  $-.003$  ( $-.023, .017$ ), respectively, whereas *in situ* behaviours (Hypothesis 2) showed a significant effect with  $ab = .110$  ( $.038, .201$ ) through the social anxiety–paranoia relationship.

**Conclusions:** Social anxiety and paranoia are positively correlated. *In situ* safety behaviours fully mediated the social anxiety and paranoia relationship. Targeted interventions focusing on safety behaviours could help reduce paranoia in psychosis. Symptom severity should be measured to help characterise the participants' characteristics.

**Keywords:** cognition; mediation analysis; paranoid disorders; safety behaviour; shame; social anxiety

## Introduction

The hierarchical paranoia continuum model provides a framework to portray the relationships and overlapping constructs between persecutory paranoia and social anxiety fears (Freeman *et al.*, 2005). Persecutory delusions, prevalent in psychosis, refer to the belief of imminent harm and malevolent intentions from others (Freeman and Garety, 2000). Individuals with paranoia or social anxiety often report fear regarding perceived threat and their reactions while under threat

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(Stopa *et al.*, 2013). However, those with paranoia tend to have more difficulties with perceptual experiences, distancing themselves from the threat, and narrative coherence (Stopa *et al.*, 2013). The complexity of paranoia and social anxiety requires further elucidation (Stopa *et al.*, 2013) to improve psychological interventions. It is recommended to identify manipulable mechanisms underlying the relationship between social anxiety and persecutory delusions (Michail *et al.*, 2017).

According to cognitive models, maladaptive self-beliefs and assumptions (e.g. I am incompetent) aggravate negative interpretations and feelings, leading to counter-productive safety behaviours aimed at preventing failure and embarrassment (Beck *et al.*, 2005). Individuals with social anxiety perceive themselves as social targets, which induces fear in social events and in public activities (Clark and Wells, 1995). Negative self-evaluations in society can spiral into worrying processes, escalating plausible ideas (e.g. others talk about me) to implausible ideas (e.g. people hate me and threaten me) (Freeman and Garety, 1999; Sun *et al.*, 2019). Our focus initially lies on appraisals regarding the loss of social role, feeling different from others, and enforced low social status that may worsen social fears (Aunjitsakul *et al.*, 2021; Iqbal *et al.*, 2000). Consequently, individuals may develop shame and stigma-related cognitions if they perceive themselves as falling short of social standards (Welten *et al.*, 2012). Several studies have found that both shame and stigma are higher in socially anxious people (Michail and Birchwood, 2013), and that these factors help predict social anxiety amongst those with psychosis (Aherne, 2014; Birchwood *et al.*, 2006; Lysaker *et al.*, 2010). Negative appraisals, particularly shame and stigma cognitions, could be a crucial factor in identifying the relationship between social anxiety and paranoid ideation (Aunjitsakul *et al.*, 2022a; Aunjitsakul *et al.*, 2022b).

Considering the behavioural aspect, safety behaviours (e.g. avoiding eye contact, or speaking softly) are often used by people with social anxiety to deal with feared social events (Haghighat, 2001; Smart and Wegner, 1999). Moreover, people with psychosis frequently use safety behaviours (e.g. avoidance, in-situation behaviours, or escape) to deal with persecutory threats (Freeman *et al.*, 2007). These safety behaviours often hinder the processing of conflicting evidence, thereby impeding individuals with social anxiety from reassessing their false assumptions, which may perpetuate negative self-beliefs in society. Using safety behaviours hinders the ability to assimilate new evidence (Clark and Wells, 1995), fostering interpersonal anxiety and potentially leading to paranoia (Sun *et al.*, 2019). Given their role in perpetuating social anxiety (Smart and Wegner, 1999) and delusional thinking (Freeman *et al.*, 2007), targeting safety behaviours holds significance in psychological interventions.

There is significant impact on mental health by cultural factors, for example expression and functional outcomes, health seeking behaviours, attitudes of patients, and the practitioners and mental health systems (Hernandez *et al.*, 2009). Asian individuals, for instance, are more likely to report somatic symptoms rather than emotions because they believe that mental weakness is not acceptable but physical illness is. Meanwhile, American individuals readily express their emotions to clinicians (Gopalkrishnan, 2018; Lin and Cheung, 1999). As values and norms from each culture may reflect individual interpretation, the sociocultural context may be an essential modulator of negative appraisals, such as stigma or shame reactions. Individuals with mental illness are judged and treated differently in several societies (Haghighat, 2001), where socio-cultural factors play an additional crucial role in the expression of psychopathology (Tseng, 2001). Various studies related to paranoid thinking have mainly been conducted in Western settings (Freeman *et al.*, 2005; Johns *et al.*, 2004; Kaymaz and van Os, 2010; Linscott and van Os, 2010), whereas there is insufficient information from Asian perspectives. Furthermore, culture is an important influence on mental health and social evaluation concerns, for example belief contents affecting persecutory delusions (Skodlar *et al.*, 2008), levels of social discrimination associated with mental illness (Moleiro, 2018), each contextual norm and value causing different shameful experiences (Ha, 1995), or each social interaction context leading to different safety behaviours (Piccirillo *et al.*, 2016). In such individuals, the expression of social anxiety or paranoia in

psychosis and its underlying mechanisms are likely to be affected by the cultural context. This study was conducted in Thailand, where individuals diagnosed with schizophrenia primarily receive medication-based treatment, with psychological interventions being less accessible due to limited personal healthcare resources (Wannasewok *et al.*, 2022). Considering cultural background, although stigma causes social difficulties for individuals with mental illness, Thai people now have a more positive attitude towards them and tend to support if those with mental illness are their friends/family (Aunjitsakul *et al.*, 2022b).

Social anxiety disorder (SAD) is a common psychological co-morbidity in schizophrenia (McEnery *et al.*, 2019b). Individuals with schizophrenia and co-morbid SAD experience low functioning, low self-esteem (Karatzias *et al.*, 2007), and experience difficulties in engaging with social activities and relationships (Agid *et al.*, 2012). Cognitive behavioural therapy is the treatment of choice for SAD (Acarturk *et al.*, 2009; Mayo-Wilson *et al.*, 2014) and can be used to reduce psychotic symptoms in psychosis patients (Taylor and Perera, 2015; Wykes *et al.*, 2008). Although there is evidence to treat social anxiety in psychosis (Hicks, 2019; McEnery *et al.*, 2019a), little is known about the mechanism of SAD in individuals with psychosis (Michail *et al.*, 2017).

As cognitions and behaviours could play different roles in the relationship between social anxiety and paranoia, we aim to investigate separately whether the relationship is mediated by negative appraisals (shame or stigma) and safety behaviours factors (anxious avoidance and *in situ* safety behaviour) in individuals with schizophrenia. We first hypothesised that cognitions, shame or stigma, may contribute to be a key mediator of the social anxiety and paranoia relationship after controlling for depression. Second, regarding this relationship, we also tested whether behavioural strategies, anxious avoidance or *in situ* safety behaviours, could be a significant mediator.

## Method

This cross-sectional study included individuals diagnosed with schizophrenia, who were followed up at the out-patient department (OPD) of University Hospital, Thailand.

### Participants

Individuals diagnosed with schizophrenia via the diagnostic code F20 according to ICD-10 (World Health Organization, 2016) were recruited. The inclusion criteria required that participants were aged at least 18 years and had no hospital admission or medication changes in the previous three months. Recruited participants were people with long-standing psychosis who regularly followed up at the OPD. We included individuals of any severity level (experiencing any level of social anxiety/paranoia), as evaluated by a psychiatrist or a qualified health professional who was independent of the research team, had the capacity to provide informed consent, and expressed their willingness to participate in the study. Individuals who were unable to cooperate well and communicate meaningfully in Thai language were excluded.

### Measurements

Five instruments were used in this study; one was the Thai version of the Depression Anxiety Stress Scale (DASS; Webster *et al.*, 2013). The other four English language instruments employed were forward and backward translated following the guidelines for the cross-cultural adaptation of self-report measures (Beaton *et al.*, 2000; Van Ommeren *et al.*, 1999). The translation process for the Thai versions of these instruments started with their translation by an author and a PhD student in another field, from English to Thai. Subsequently, two independent professional translators, who were unaware of the outcome measurements at play, performed their back translation from Thai to English. Finally, experts in the field (co-author team) reviewed and validated the translations.

### Measurement tools

#### *Paranoia*

The Revised Green *et al.* Paranoid Thought Scales (R-GPTS) is an 18-item questionnaire with an 'ideas of social reference' subscale (8 items) and a 'paranoia' subscale (10 items) (Freeman *et al.*, 2019). Items are scored on a 5-point Likert scale anchored by 0 (not at all) and 4 (total), giving a range of 0–32 for social reference scores and paranoia scores between 0 and 40. Higher scores indicate greater levels of paranoid thinking. R-GPTS has shown excellent psychometric properties, that is, a Cronbach's alpha of .90 (Freeman *et al.*, 2019); in this study, it was calculated at .94.

#### *Social anxiety*

The Social Interaction Anxiety Scale (SIAS) is a 20-item questionnaire using a 5-point Likert scale from 0 (not at all) to 4 (extremely) (Mattick and Clarke, 1998). It yields a total score of 80, with higher scores indicating higher levels of social anxiety. This scale has been shown to have excellent reliability (test–retest correlations 0.92), internal consistency (Cronbach's alpha .94), and validity (Mattick and Clarke, 1998). Our calculated Cronbach's alpha was at a value of .88. Consistent with previous studies, scores over 36 were used to determine the presence of significant social phobia in our research (Peters, 2000).

#### *Shame and stigma*

The Personal Beliefs about Illness Questionnaire-Revised (PBIQ-R) (Birchwood *et al.*, 2012) was used to assess shame and stigma based on the patients' appraisals of their post-psychotic experiences. It is a 20-item rating using a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The PBIQ-R contains five subscales: shame, loss, entrapment, control over illness, and social marginalisation/group fit (or stigma). The subscales of shame (PBIQ-R Shame) and stigma (PBIQ-R Stigma) factors were used as mediators between the link of social anxiety and paranoia. The test–retest reliability scores of shame (0.84) and stigma (0.64) have been reported to range from acceptable to good. Likewise, the Cronbach's alpha values of shame and stigma have also been reported to be adequate: .73 and .78, respectively (Birchwood *et al.*, 2012); in our study, these were .84 and .83, respectively.

#### *Safety behaviours (specific to paranoia)*

The Oxford Cognitions and Defences Questionnaire (O-CDQ) is a 46-item measure rated on a 4-point Likert scale with answers ranging from 0 (never) to 3 (always) (Rosebrock *et al.*, 2022). Its questions include three main factors related to (1) threat cognitions (O-CDQ Threat cognitions); (2) anxious avoidance (O-CDQ Avoidance); and (3) putting up defence in the presence of outside or *in situ* (within-situation) safety behaviours (O-CDQ *In situ* behaviours). The latter two factors – O-CDQ Avoidance and O-CDQ *In situ* behaviours – were the safety behaviour factors used as mediators between social anxiety and paranoia. O-CDQ has shown excellent psychometric properties. The reported Cronbach's alpha values are as follows: threat cognitions, .93; avoidance, .94; and *in situ* behaviours, .93; and those for the test–retest reliability are as follows: threat cognitions, 0.88; avoidance, 0.92; and *in situ* behaviours, 0.89 (Rosebrock *et al.*, 2022). From our analyses, the Cronbach's alpha coefficients of O-CDQ Threat cognitions, Avoidance and *In situ* behaviours were .91, .89, and .85, respectively.

#### *Depression*

The DASS-42 (Webster *et al.*, 2013) measures general negative affect and distress in the domains of depression, anxiety and stress. We employed only a 14-item depression sub-scale as a

co-variance factor; it consisted of 4-point scaled items with answers ranging from 0 (did not apply to me at all) to 3 (applied to me very much). The DASS scale has shown excellent psychometric properties for depression (Cronbach's alpha .91) (Lovibond and Lovibond, 1995; Webster *et al.*, 2013), and has been validated across Asian samples, including Thailand, with a Cronbach's alpha coefficient range of .70–.86 (Oei *et al.*, 2013); in this study, it was .94.

### Data collection

A convenience sample of patients was invited to participate by a nurse at the OPD; the nurse was not a part of the research team. After obtaining their consent, the questionnaires were given to participants by either the researcher or the research assistant. The participants were asked to complete the Thai version of the five instruments in full. Brief demographics including age, gender, ethnicity, religion, income and academic qualification were also collected. Participants were informed that they could request the researcher or research assistant to help with reading and/or filling in the questionnaires.

### Data analysis

IBM SPSS Statistics for Windows (version 27.0) was used for our data analyses. Pearson's correlation coefficients were employed to calculate inter-variable associations. Considering the hypotheses, we checked for assumptions to interpret the mediation analyses as well as for linearity and multi-collinearity. Regarding the linear associations of social anxiety with paranoia, we used a linear regression model to investigate the associations. A stepwise multiple regression analysis was also used to confirm the final model of the social anxiety–paranoia association. Regarding the stepwise regression, the factors were added to the model according to Hypothesis 1 (e.g. Shame, Stigma, Depression) and Hypothesis 2 (e.g. Anxious avoidance, *In situ* safety behaviours, Depression). Multi-collinearity was also checked in the regression model (factors with a variance inflation factor  $>5$  and tolerance  $<0.2$  were excluded) (Christopher and Odum Institute, 2019). There were no assumption violations related to linearity and multi-collinearity; this allowed us to continue using the mediation analyses.

The mediation analysis was addressed to test which variable(s) mediate(s) the association between social anxiety and paranoia. Simple and parallel multiple mediation analyses with co-varying depression were established, using shame and stigma (Hypothesis 1), and anxious avoidance and *in situ* safety behaviour (Hypothesis 2) as mediators. The PROCESS macro for SPSS (version 3.4) was used to conduct the mediation analyses (Hayes, 2018). The analyses of 10,000 bias-corrected bootstrap samples were conducted to estimate the 95% confidence intervals of the indirect effect.

As this study was conducted between January and April 2020, that is amid the SARS-COVID-19 outbreak, it is plausible that some of the anxious avoidance and *in situ* safety behaviour detected was attributable to the fear of COVID-19 infection. Hence, some increase in negative appraisals, threat cognitions related to social interaction, decreased socialisation, or avoidance of public places may have been a part of a normal reaction to a legitimate health threat. To explore this, we used 11 March 2020, the date when the World Health Organization announced COVID-19 as a pandemic, to categorise our study participants into two groups: (1) those who provided data pre-pandemic (1 January–11 March 2020); and (2) those who completed the questionnaires after the pandemic was declared (12 March–30 April 2020). We performed a *post-hoc* analysis to first compare the data profiles between pre- and post-pandemic declaration groups. Second, although the O-CDQ threat cognitions were not in our original hypotheses, we deemed it necessary to add this outcome using linear regression and mediation analyses because we reasoned that these worrying thoughts could have been theoretically affected by the pandemic and that the COVID-19 pandemic could create threat and mistrust amongst

community (Phillips *et al.*, 2022). Furthermore, we created the pre/post-COVID-19 pandemic variable to adjust the mediation analyses (along with depression); this was done to test whether the mediator outcomes (in Hypotheses 1 and 2) were affected by the duration of this pandemic or not. *Post-hoc* analyses outcomes are presented in the Supplementary material.

## Results

### **Sample characteristics**

We approached 130 individuals with schizophrenia; 113 respondents (86.9%) completed the questionnaires, nine (6.9%) declined to participate, and eight (6.2%) were excluded owing to language barrier or illness factors (e.g. severe disorganisation). Of the included responders, 59.3% were male, and the mean age of our samples was 44.2 years. All but one were educated at least at primary school level. The mean SIAS score was 21.6, and 9.7% of the participants met the threshold for social phobia. The details concerning the other factors are described in Table 1.

### **Inter-correlation of potential variables**

SIAS and R-GPTS Persecutory were significantly correlated with variables (e.g. R-GPTS Reference, PBIQ-R [Control over illness; Shame; Entrapment; Loss; Stigma], O-CDQ [Threat cognitions; Anxious avoidance; In situ safety behaviours], and DASS Depression). The highest correlation coefficients of SIAS and R-GPTS Persecutory were related to O-CDQ Threat cognitions ( $r=0.73, p < .01$  and  $0.74, p < .01$ ). The other bivariate correlation coefficients are shown in Table 2.

### **Social anxiety and potential mediators in association with persecutory delusions**

In Table 3, SIAS was significantly associated with R-GPTS Persecutory ( $B .33, p < .001$ ) (Model 1); however, after controlling for DASS Depression, this relationship was no longer significant (Model 4). When controlling for DASS Depression in the social anxiety and paranoia relationship, PBIQ-R Shame ( $B -.75, p < .05$ ) and PBIQ-R Stigma ( $B .88, p = .022$ ) were significantly associated with R-GPTS Persecutory (Model 5); meanwhile, only O-CDQ *In situ* behaviours was significantly associated with R-GTPS Persecutory ( $B .47, p < .01$ ) (Model 6).

To confirm these relationships, we used stepwise regression analyses. Concerning social appraisals, PBIQ-R Shame and PBIQ-R Stigma were not significantly associated with R-GTPS Persecutory; only DASS Depression ( $B .65, p < .001$ ) reached the level of significant in the final model, accounting for 37.1% of variance. In the safety behaviours model, accounting for 47.1% of variance, O-CDQ *In situ* behaviours ( $B .57, p < .001$ ) and Depression ( $B .47, p < .001$ ) were statistically significant.

### **Mediation analysis testing theoretical hypotheses with potential factors**

We investigated the relationship between social anxiety and paranoia with potential mediators. After the simple mediation analysis, SIAS was found to relate to R-GPTS Persecutory through its relationship with O-CDQ Avoidance and O-CDQ *In situ* behaviours; the indirect effect based on 10,000 bootstrapped samples was  $ab = .07$  (95% CI = .021, .149;  $a = .30, p < .001$ ;  $b = .24, p < .01$ ) and  $.12$  (95% CI = .053, .218;  $a = .21, p < .001$ ;  $b = .59, p < .001$ ), respectively. The details regarding the other effects are presented in Table 4.

To test the two priori hypotheses, with mediators being shame and stigma (Hypothesis 1), and anxious avoidance and *in situ* safety behaviours (Hypothesis 2), we used the multiple parallel mediation analysis controlling for depression. Considering Hypothesis 1, we analysed whether the social anxiety–paranoia relationship was mediated by stigma and shame (see Fig. 1A). We found

**Table 1.** Demographic and psychological factors of people with schizophrenia ( $N=113$ )

Variables	Mean $\pm$ SD	Min-max
Gender; $n$ (%)		
Male	67 (59.3)	
Female	46 (40.7)	
Age (years)	44.2 $\pm$ 13.1	18-70
Religion; $n$ (%)		
Buddhism	93 (82.3)	
Islam	19 (16.8)	
Other	1 (0.9)	
Highest education; $n$ (%)		
Primary school and none	14 (12.4)	
Junior high school	11 (9.7)	
Senior high school	37 (32.7)	
Vocational degree	16 (14.2)	
Bachelor's degree and postgraduate studies	35 (31.0)	
Income (GBP*); $n$ (%)		
No income	25 (22.1)	
<250	45 (39.8)	
250-615	25 (22.1)	
>615-1230	14 (12.4)	
Prefer not to say	4 (3.5)	
SIAS	21.6 $\pm$ 11.9	4-61
SIAS; $n$ (%)		
$\leq 36$	102 (90.3)	
>36 (social phobia group)	11 (9.7)	
R-GPTS		
Reference	7.2 $\pm$ 6.0	0-26
Persecutory	7.4 $\pm$ 8.1	0-33
PBIQ-R		
Control over illness	9.5 $\pm$ 2.8	4-16
Shame	9.2 $\pm$ 2.7	4-16
Entrapment	9.5 $\pm$ 3.0	4-16
Loss	9.4 $\pm$ 2.7	4-16
Social marginalization/group fit (Stigma)	8.7 $\pm$ 2.5	4-16
O-CDQ		
Threat cognitions	8.0 $\pm$ 6.9	0-31
Anxious avoidance	9.7 $\pm$ 8.5	0-41
<i>In situ</i> safety behaviours	6.8 $\pm$ 5.2	0-24
DASS depression	6.6 $\pm$ 7.7	0-37

O-CDQ, Oxford Cognitions and Defences Questionnaire; DASS, Depression Anxiety Stress Scales; PBIQ-R, Personal Beliefs about Illness Questionnaire-Revised; R-GPTS, Revised Green et al. Paranoid Thought Scales; SIAS, Social Interaction Anxiety Scale. Data are presented as means $\pm$ SD unless otherwise indicated. \*1GBP = 40.59Baht (source: Exchange Rates UK as of 29 October 2020; retrieved from: <https://www.exchangerates.org.uk/Pounds-to-Baht-currency-conversion-page.html>).

that PBIQ-R Shame and PBIQ-R Stigma did not show significant indirect effects. Only PBIQ-R Shame ( $b = -.69, p < .05$ ) and PBIQ-R Stigma ( $b = .80, p < .05$ ) were detected to have a significant direct effect on RGTPS Persecutory.

Regarding Hypothesis 2, we analysed whether the social anxiety-paranoia relationship was mediated by anxious avoidance or *in situ* safety behaviours (see Fig. 1B). We found that O-CDQ *In situ* behaviours showed a significant indirect effect through the relationship of SIAS with R-GPTS Persecutory when controlling for DASS Depression. The direct effect of SIAS on O-CDQ *In situ* behaviours was  $a = .21$  ( $p < .001$ ), and the direct effect of O-CDQ *In situ* behaviours on RGTPS Persecutory was  $b = .50$  ( $p < .01$ ); meanwhile, the indirect effect was  $ab = .11$  (95% CI = .038, .201) based on 10,000 bootstrapped samples.

**Table 2.** Intercorrelations of potential variables of people with schizophrenia (*N* = 113)

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. SIAS	1	—	—	—	—	—	—	—	—	—	—	—
2. R-GPTS Reference	.62*	1	—	—	—	—	—	—	—	—	—	—
3. R-GPTS Persecutory	.48*	.77*	1	—	—	—	—	—	—	—	—	—
4. PBIQ-R Control over illness	.28*	.35*	.36*	1	—	—	—	—	—	—	—	—
5. PBIQ-R Shame	.35*	.41*	.25*	.67*	1	—	—	—	—	—	—	—
6. PBIQ-R Entrapment	.43*	.45*	.38*	.83*	.77*	1	—	—	—	—	—	—
7. PBIQ-R Loss	.36*	.43*	.42*	.84*	.75*	.87*	1	—	—	—	—	—
8. PBIQ-R Social marginalization/ group fit (Stigma)	.33*	.39*	.36*	.78*	.75*	.78*	.79*	1	—	—	—	—
9. O-CDQ Threat cognitions	.73*	.73*	.74*	.38*	.38*	.52*	.46*	.35*	1	—	—	—
10. O-CDQ Anxious avoidance	.50*	.51*	.47*	.18	.18	.26*	.19	.15	.49*	1	—	—
11. O-CDQ <i>In situ</i> safety behaviours	.58*	.53*	.57*	.27*	.26*	.31*	.27*	.23	.66*	.60*	1	—
12. DASS Depression	.64*	.64*	.61*	.44*	.48*	.56*	.56*	.46*	.72*	.40*	.46*	1

O-CDQ, Oxford Cognitions and Defences Questionnaire; DASS, Depression Anxiety Stress Scales; PBIQ-R, Personal Beliefs about Illness Questionnaire-Revised; R-GPTS, Revised Green et al. Paranoid Thought Scales; SIAS, Social Interaction Anxiety Scale. \**p* < .01.

**Discussion**

To investigate the mechanisms of the relationship between social anxiety and paranoia in schizophrenia in an Asian sample, we tested whether negative social appraisals (shame or stigma) and safety behaviours (anxious avoidance or *in situ* safety behaviours) fully mediate the social anxiety–paranoia relationship. We discovered a linear relationship between social anxiety and paranoia. This finding is similar to Western populations (Freeman *et al.*, 2005; Linscott and van Os, 2010). However, after controlling for depression, the relationship between social anxiety and paranoia was no longer significant. This is because depression was highly correlated with all factors in the study. Multiple regression analyses controlling for age, gender and depression found that shame, stigma, and *in situ* safety behaviours were significantly associated with paranoia. In the stepwise regression analyses, only *in situ* safety behaviours was found to be a significant factor. We then conducted mediation analyses and found that stigma and shame were not significant mediators, whereas *in situ* safety behaviours was a full mediator of the social anxiety–paranoia relationship after co-varying for depression.

As our study was conducted during the COVID-19 pandemic, potentially impacting negative appraisals and safety behaviours, *post-hoc* analyses were also performed. No significant differences in terms of sociodemographic and potential variables were detected between the pre- and post-pandemic declaration groups. In the mediation analyses, controlling for the pre/post-COVID-19 pandemic variable, no differences in mediating effect were observed. While the pandemic might have influenced the negative appraisals or safety behaviours of people with psychosis in this study, definitive claims from *post-hoc* analyses are limited owing to study power constraints and misalignment with research objectives.

Contrary to our expectations, stigma and shame were not significant mediators of the social anxiety–paranoia relationship. One explanation for this is that depression could confound mediator outcomes of this relationship, because from the overall result depression is significant with social anxiety, paranoia, and other study factors. Depression also leads to negative appraisals in psychosis (Birchwood *et al.*, 1993; Karatzias *et al.*, 2007) and also links with social discrimination or unattractiveness concerns (Gumley *et al.*, 2004; Karatzias *et al.*, 2007), including interpersonal worry and threat (mis)interpretation (Freeman *et al.*, 2008).

Additionally, there were a small number of individuals with social anxiety (only 11) according to the SIAS cut-off score, indicating that their anxiety does not meet the threshold levels of distress in social evaluation. Given that negative social appraisals like stigma and shame could theoretically explain and have been suggested to be targeted in the treatment of social anxiety in psychosis



**Table 3.** Linear regression analysis of R-GPTS persecutory (a dependent variable) testing Hypotheses 1 and 2, in Model 5<sup>†</sup> and Model 6<sup>‡</sup>, respectively ( $N = 113$ )

Model	Independent variables	Adjusted $R^2$	Unstandardized coefficients		Standardized coefficients		t	Significance
			B	SE	beta			
<b>1</b>	—	.22	—	—	—	—	—	—
	(Constant)		.29	1.41			.20	.839
<b>2</b>	SIAS		.33	.06	.48		5.74	<.001
	(Constant)	.22	—	—	—	—	—	—
	(Constant)		.34	3.29			.10	.918
<b>3</b>	SIAS		.33	.06	.48		5.30	<.001
	Age		-.001	.06	-.002		-.02	.985
	(Constant)	.21	—	—	—	—	—	—
	(Constant)		1.45	3.86			.38	.708
<b>4</b>	SIAS		.32	.06	.47		5.19	<.001
	Age		.000	.06	.001		.01	.994
	Gender (male)		-.78	1.40	-.05		-.55	.581
	(Constant)	.37	—	—	—	—	—	—
	(Constant)		3.46	3.46			1.00	.319
<b>5<sup>†</sup></b>	SIAS		.09	.07	.13		1.27	.205
	Age		.002	.05	.003		.04	.972
	Gender (male)		-1.29	1.25	-.08		-1.03	.304
	DASS Depression		.56	.10	.53		5.42	<.001
	(Constant)	.40	—	—	—	—	—	—
	(Constant)		4.50	3.82			1.18	.242
	SIAS		.08	.07	.11		1.08	.281
Age		-.03	.05	-.04		-.50	.619	
Gender (male)		-1.51	1.23	-.09		-1.22	.224	
DASS Depression		.56	.11	.53		5.07	<.001	
PBIQ-R Shame		-.75	.34	-.25		-2.19	.031	
PBIQ-R Social marginalization/ group fit (Stigma)		.88	.38	.27		2.32	.022	
<b>6<sup>‡</sup></b>	(Constant)	.47	—	—	—	—	—	—
	(Constant)		2.86	3.22			.89	.377
	SIAS		-.06	.07	-.08		-.77	.445
	Age		-.01	.05	-.01		-.13	.900
	Gender (male)		-1.34	1.18	-.08		-1.14	.256
	DASS Depression		.49	.10	.46		5.10	<.001
	O-CDQ Anxious avoidance		.14	.09	.15		1.61	.110
	O-CDQ <i>In situ</i> safety behaviours		.47	.15	.30		3.19	.002

O-CDQ, Oxford Cognitions and Defences Questionnaire; DASS, Depression Anxiety Stress Scales; PBIQ-R, Personal Beliefs about Illness Questionnaire-Revised; R-GPTS, Revised Green et al. Paranoid Thought Scales; SIAS, Social Interaction Anxiety Scale. <sup>†</sup>Regarding the stepwise regression analysis, the final model of R-GPTS Persecutory included only Depression ( $B .65, p < .001$ ) with an adjusted  $R^2$  of 37.1%. <sup>‡</sup>Regarding the stepwise regression analysis, the final model of R-GPTS Persecutory included Depression ( $B .47, p < .001$ ) and O-CDQ *In situ* safety behaviours ( $B .57, p < .001$ ) with an adjusted  $R^2$  of 47.1%.

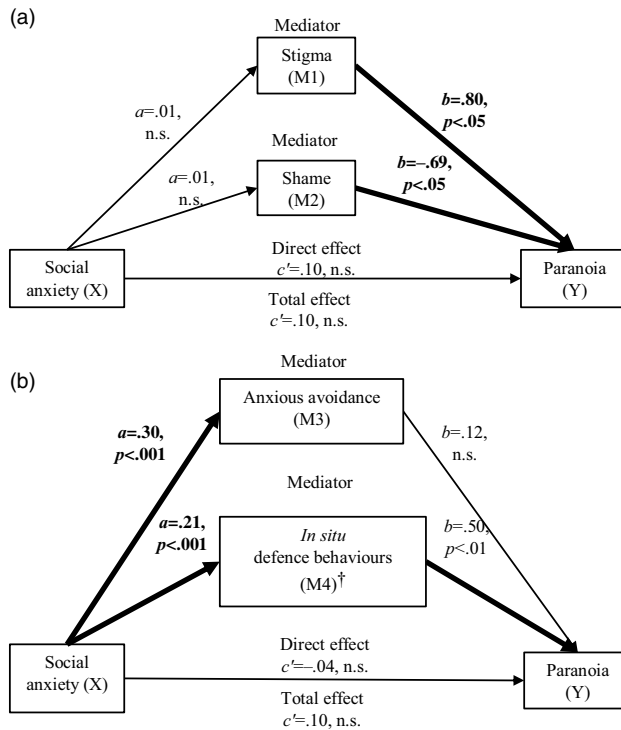
(Aunjitsakul *et al.*, 2021), further clinical work with a larger study sample is required to develop a comprehensive understanding of the role of stigma and shame in alleviating social fears or persecutory paranoia in psychosis. Furthermore, regarding the context or environment affecting negative interpretation in others, stigma or shame might be a moderator rather than a mediator of the social anxiety and paranoia association.

Safety behaviours were found to be a full mediator between social anxiety and paranoia in this study. It could be that when individuals with schizophrenia perceive threats as a misperception which is influenced by social anxiety or paranoia cognitions, they may feel different or fear being judged (Haghighat, 2001) or unattractive (Trower and Gilbert, 1989). Such individuals may design actions or safety behaviours to prevent their feared catastrophe from occurring (Salkovskis *et al.*, 1996). This, in turn, results in the persistence of social anxiety (Smart and Wegner, 1999),

**Table 4.** Results of simple and parallel multiple mediation analyses examining direct, indirect and total effects of independent (social anxiety) and dependent variables (R-GPTS persecutory) with co-variances (DASS Depression) through mediators ( $N=113$ )

	Independent variables	Mediators	Effect of SIAS on mediator (a)	Unique effect of mediator (b)	Indirect effect (ab)	Bootstrapping bias-corrected 95% CI	Direct effect (c')	Total effect (c)
Simple mediation analysis	R-GPTS Persecutory	PBIQ-R Shame	.01	-.19	-.003	-.023, .017	.10	.10
		PBIQ-R Social marginalisation (Stigma)	.01	.30	.004	-.013, .031	.10	.10
		O-CDQ Anxious avoidance	<b>.30***</b>	<b>.24**</b>	<b>.07</b>	<b>.021, .149</b>	.03	.10
		O-CDQ <i>In situ</i> safety behaviours	<b>.21***</b>	<b>.59***</b>	<b>.12</b>	<b>.053, .218</b>	-.02	.10
Multiple mediation analysis	R-GPTS Persecutory (Hypothesis 1)	PBIQ-R Shame	.01	<b>-.69*</b>	-.01	-.053, .033	.10	.10
		PBIQ-R Social marginalisation (Stigma)	.01	<b>.80*</b>	.01	-.027, .059		
	R-GPTS Persecutory (Hypothesis 2)	O-CDQ Anxious avoidance	<b>.30***</b>	.12	.04	-.005, .095	-.04	.10
		O-CDQ <i>In situ</i> safety behaviours	<b>.21***</b>	<b>.50**</b>	<b>.11</b>	<b>.038, .201</b>		

O-CDQ, Oxford Cognitions and Defences Questionnaire; DASS, Depression Anxiety Stress Scales; PBIQ-R, Personal Beliefs about Illness Questionnaire-Revised; R-GPTS, Revised Green et al. Paranoid Thought Scales; SIAS, Social Interaction Anxiety Scale. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .



**Figure 1.** Multiple mediation analyses of the relationship between social anxiety and paranoia with shame and stigma (Hypothesis 1, panel A), and anxious avoidance and *in situ* safety behaviours (Hypothesis 2, panel B) considered as mediators. †Value of indirect effect of the *in situ* safety behaviours (M3):  $ab = .105$ , 95% CI = .038, .201. n.s., not significant.

delusional thinking (Freeman *et al.*, 2007), and emotional distress (Tully *et al.*, 2017). Our data support the possibility that safety behaviours could be a crucial factor to be targeted in treating social anxiety or paranoia in individuals with psychosis.

Moreover, the results of this research highlight the crucial role behavioural strategies play in cognitive behavioural approaches (Wykes *et al.*, 2008). Regarding research implication, causal interventionist treatment trials (Kendler and Campbell, 2009) are required to test the effectiveness of modifying safety behaviours in treating paranoia, but also social anxiety, in individuals with psychosis. Further research is required to confirm this theoretical concept and develop a brief intervention targeting safety behaviours. Thus, clinical interventions targeting safety behaviours may help alleviate anxious distress for individuals with psychosis.

To our knowledge, this is the first study to investigate the mediators that affect the relationship between social anxiety and paranoia in an Asian clinical population. The strengths of this study were as follows. First, consistent with reports from Western settings (Aherne, 2014; Matos *et al.*, 2013; Newman Taylor and Stopa, 2013; Piccirillo and Heimberg, 2016), our findings offer a cross-cultural confirmation of a significant association between social anxiety and paranoia in Thailand. Second, we identified a potential mediator, namely safety behaviours, which is not only relevant to the theoretical understanding, but was also found to play a role in affecting the link between social anxiety and persecutory delusions. Therefore, these findings help shed some light on the intricacies involved as well as indicate the potential development of improved treatments for people with psychosis. However, this study has a few limitations. The COVID-19 pandemic during the data collection period could have affected the mental health and social functioning of our sample. Nevertheless, to avoid possible confounding, data were analysed by comparing the pre- and post-pandemic declaration groups and verified the outcomes by adjusting for the

pre/post-COVID-19 pandemic variable during the data analyses. This identified only anxious avoidance as being significantly affected; no significant differences were observed between the pre- and post-pandemic group data after controlling for the pre/post-COVID-19 pandemic variable. Therefore, we consider it to be unlikely that the number of participants, which were recruited after the pandemic, has confounded our mediation outcomes. Additionally, we did not measure severity or duration of illness, which limits our understanding of the sample, including the proportion of people with long-standing psychosis.

Moreover, the use of the convenience sampling method might mean that our study participants may not be fully representative of this patient population owing to possible selection bias. Hence, further longitudinal work is warranted to support our findings, given this study's limited ability to offer a causal explanation. Furthermore, the usefulness of safety behaviours relevant to the social anxiety–paranoia relationship remains to be elucidated in experimental studies. Larger clinical investigations examining stigma and shame related to cognitions within this relationship along with developing novel intervention designs should be undertaken.

### Conclusion

Safety behaviours play a crucial role in the relationship between social anxiety and persecutory thoughts in individuals experiencing psychosis. The *in situ* safety behaviours was found to be a full mediator of this relationship. We also found that negative social appraisals (shame and stigma) as well as safety behaviours (*in situ* safety behaviours) were associated with paranoia. Emphasising causal and mechanistic approaches could produce robust findings related to safety behaviours facilitating the development of tailored interventions for addressing social anxiety and paranoia among individuals with psychosis.

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**Data availability statement.** Data will be available on reasonable request from the authors.

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**Competing interests.** The authors declare none.

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