A Psychosocial Pathway to Paranoia: The Interplay Between Social Connectedness and Self-esteem

By: Manel Monsonet, Amad Amedy, Thomas R. Kwapil, Neus Barrantes-Vidal

Abstract:

The quantity and quality of social contacts have been related to self-esteem, and both social relationships and self-esteem have been implicated in the pathways to paranoia. However, how social relationships interplay with self-esteem to trigger paranoia is not well understood. This study aims to investigate whether different measures of social connectedness (social support, loneliness, and desired friendship), as well as the frequency of social contact, impact paranoia and other positive and negative psychotic-like experiences (PLE) through the indirect effect of self-esteem. Data from a sample of 169 nonclinically ascertained participants oversampled for schizotypy scores were analyzed using two different approaches: retrospective trait-like and ecological momentary measures of social connectedness. Results showed that self-esteem mediates the pathways from poor social support and social longing, but not from loneliness, to paranoia and other cognitive PLE. In contrast, pathways from social connectedness to perceptual PLE and negative PLE were not mediated by self-esteem. Results were consistent across trait-like and momentary measures. Finally, self-esteem was not implicated in the pathways from the frequency of social contact and paranoia or other forms of PLE. These results provide a comprehensive picture of how social connectedness drives specific symptoms of psychosis through self-esteem. Findings underscore the need to explore separately the quality and quantity of social relationships and suggest that the subjective experience of meaningful social bonds is key social determinants of mental health. Therefore, addressing inadequacies of social connectedness could substantially improve symptomatic and functional outcomes of psychosis.

Keywords: social connectedness | schizotypy | paranoia | self-esteem | loneliness | experience sampling

Article:

1. Introduction

Paranoia is among the most prevalent symptom of psychosis across the schizotypy continuum (e.g., Coid et al., 2013; Horton et al., 2014; Moutoussis et al., 2007; Zhang et al., 2014). Schizotypy refers to the expression of the underlying vulnerability for schizophrenia-spectrum

disorders that can be observed across a wide range of clinical, subclinical, and personality phenomenology (Kwapil and Barrantes-Vidal, 2015). Cognitive models of paranoia theorize that negative attributions about the self may play a crucial role in driving paranoid delusions (e.g., Bentall et al., 2001; Freeman et al., 2002). Previous reviews have shown that paranoia is associated with negative self-esteem in both clinical and non-clinical populations (Kesting and Lincoln, 2013; Murphy et al., 2018; Tiernan et al., 2014). Additionally, previous studies that tracked symptom dynamics in participants with varying levels of expression of paranoia found that low levels of self-esteem predicted subsequent paranoia throughout daily life (Monsonet et al., 2022; Thewissen et al., 2011). Despite the well-established link between self- esteem and paranoia, various other socio-environmental factors seem to be implicated in both the development of paranoia (Bentall et al., 2012; Freeman et al., 2011; Selten et al., 2013) and self-esteem (Haslam et al., 2009; Jetten et al., 2015; Tajfel and Turner, 1979).

As human beings are fundamentally social animals, a primary need is to seek a sense of belonging through meaningful social relationships (Baumeister and Leary, 1995; Maslow, 1943); this universal process drives social connectedness. Social connectedness is a broad and multifaceted construct defined by the strength of interpersonal relationships rather than by the mere number of relationships one has. Thus, social connectedness refers to the subjective and experiential aspects of social relationships, that is, the feeling of having a psychological bond with other individuals or groups and the sense of belonging (Haslam et al., 2015). Therefore, the general term of social connectedness involves other related constructs such as social identification, social support, loneliness or perceived social isolation, belongingness, etc. (Cruwys et al., 2014). In contrast, social contact simply quantifies the number of social interactions without considering the subjective psychological aspects of those interactions. It is relevant to examine both the quantity and quality aspects of social relationships because subjective perceptions of social relationships, such as loneliness, are only weakly related to number of social interactions (Cornwell and Waite, 2009; Hawkley et al., 2003; Reinhardt et al., 2006). Thus, people can feel socially disconnected irrespective of the amount of time they spend alone.

Social connectedness through membership of multiple meaningful groups can promote well-being and self-esteem (e.g., Berkman and Glass, 2000; Greenaway et al., 2016; Jetten et al., 2015). Furthermore, it has been linked to general mental health (Saeri et al., 2018), psychosis (Lim et al., 2018; Michalska da Rocha et al., 2018), and specifically to paranoia (Chau et al., 2019; Lamster et al., 2017; Lim et al., 2016; McIntyre et al., 2016). Growing evidence suggests that social connectedness has an impact on self-esteem (e.g., Ludwig et al., 2020; Rosenberg, 1979; Thomas et al., 2017), and self-esteem on paranoia (e.g., Monsonet et al., 2020; Thewissen et al., 2008). However, to our knowledge, few previous studies have investigated how the interaction between social connectedness and self-esteem may impact paranoia. Kesting et al. (2013) found that a decrease in self-esteem mediated the impact of social exclusion on subsequent paranoia in an experimental study with nonclinical participants. McIntyre et al. (2021) did not find that self-esteem was implicated in the association between British identification and paranoia among people from African and African- Caribbean backgrounds. However, McIntyre et al. (2017) found that self-esteem mediated the association between social identification and paranoia in the general population and concluded that having solid group ties buffers paranoia by bolstering personal self-esteem. They also found unexpected evidence of an indirect pathway between social connectedness and auditory-verbal hallucinations (AVH) through self- esteem, albeit in only one of their two samples. Thus, it remains to be investigated whether this mechanism is exclusive to paranoia or applies to AVH. Likewise, it would be critical to examine these putative pathways in

their natural context of occurrence, exploring the moment-to- moment interaction of individuals with their environment. Experience sampling methodology (ESM) provides an ideal method for such investigations as it involves the assessment of mental experiences in real-time and in the normal context of daily life, thus increasing ecological validity and avoiding retrospective bias (Myin-Germeys et al., 2009, 2018).To our knowledge, no previous studies have investigated how the interplay between social connectedness and self-esteem may impact paranoia and other psychosis spectrum traits and experiences in individuals with different levels of expression across the schizotypy continuum.

Therefore, the primary goal of this study was to investigate whether self-esteem mediates the association of social connectedness with paranoia in a nonclinical sample oversampled for elevated schizotypy. A schematic representation to illustrate the interplay between social connectedness, self-esteem, and paranoia is presented in Fig. 1. It was hypothesized that self-esteem would mediate the pathway from poor social connectedness to paranoia. We also examined whether self- esteem mediates the pathway between the number of social interactions and paranoia to differentiate between the quantity and quality aspects of social relationships. Furthermore, this study also investigated whether this mechanistic pathway is applicable to other positive psychotic-like experiences (PLE) such as ideas of reference, magical ideation, perceptual aberration, and AVH. We also extended research in this area by including negative PLE as an outcome variable. Thus, one of the secondary aims of the present study was to examine for the first time whether self-esteem mediated the pathway between social connectedness and negative PLE. Since other mechanistic pathways have been established for AVH (Pilton et al., 2015) and negative symptoms (Rector et al., 2005), we did not expect that self-esteem would mediate the pathways from social connectedness to AVH and negative PLE. In contrast, given the associations found between social support and self-esteem with positive PLE other than paranoia (Monsonet et al., 2022), some evidence of mediation on these pathways would be expected. Finally, a significant novel addition of this study is that the mediational model was tested using two different approaches: 1) retrospective psychometric trait-like measures, and 2) prospective and contextualized repeated momentary measurements of social connectedness, self-esteem and PLE using ESM.

2. Methods

2.1 Participants and procedure

The sample used in this study belongs to the Barcelona Longitudinal Investigation of Schizotypy Study (BLISS; Barrantes-Vidal et al., 2013a). The initial sample of participants at T1 consisted of 589 unselected college students from Universitat Auton`oma de Barcelona. In order to have continuous distributions of scores on the schizotypy dimensions with an adequate representation of high scorers, we invited at T2 all 189 participants who had standard scores based upon sample norms of at least 1.0 on the positive or negative schizotypy factors from the Wisconsin Schizotypy Scales (WSS; Kwapil et al., 2008), the suspiciousness subscale of the Schizotypal Personality Questionnaire (SPQ; Raine, 1991), or the positive symptom subscale of the Community Assessment of Psychic Experiences (CAPE; Stefanis et al., 2002), and 150 randomly selected participants who had standard scores <1.0 on each of these measures. Two hundred fourteen participants completed in-depth assessments at T2 (a detailed description of this sample can be found in Barrantes-Vidal et al., 2013a,b). At T3 and T4, due to funding constraints, we invited a reduced subsample to participate that retained the original distribution of scores. Finally, at T5 (3.2

years later) we sought to contact all participants assessed at T2 (n = 214) and successfully reassessed 169 (79 % of target sample; mean age = 28.01, SD = 2.41, 80 % female) with self-report and ESM measurements. The present study used data from participants assessed at T5, when measures of social connectedness were collected. Please note that participants' assessment was conducted before the beginning of the COVID-pandemic; therefore, potential social isolation experienced during the pandemic did not affect the results of the study. Participants provided informed consent at each assessment, and ethical approval was granted by the Ethics Committee of the Universitat Aut`onoma de Barcelona (Comissi´o d'`Etica en l'Experimentaci´o Animal i Humana (CEEAH); number 701H-JS; htt p://www.recerca.uab.es/ceeah/).
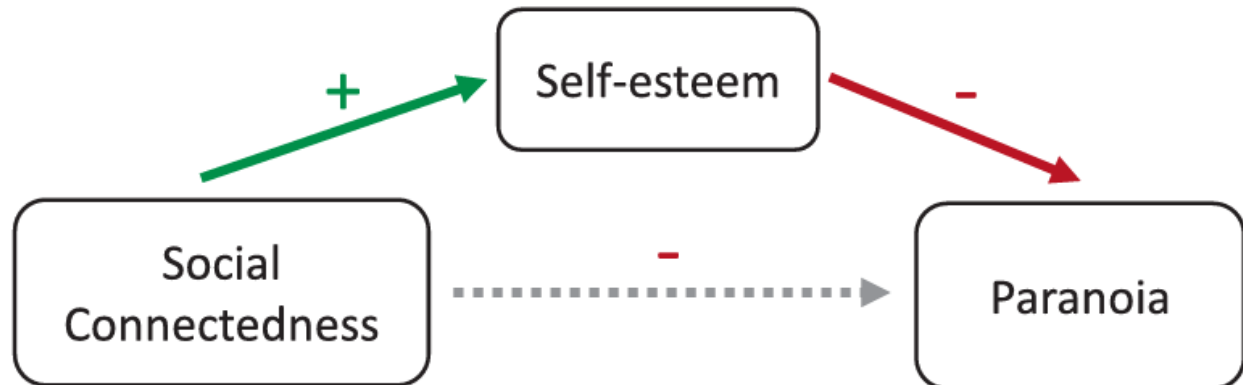
Fig. 1. Diagram of the hypothesized interplay between social connectedness, self-esteem, and paranoia.

2.2. Measures

2.2.1. Psychometric measures

Several components of social connectedness were measured with self-reported measures. Perceived social support was measured with the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988). It contains12 items scored on a 7-point Likert scale ranging from "Very strongly disagree" to "Very strongly agree", with higher scores indicating greater social support (Cronbach's α =0.92). Perceived loneliness was measured with the Three-Item Loneliness Scale (TILS; Hughes et al., 2004), a short questionnaire developed from the Revised UCLA Loneliness Scale (Russell et al., 1980) enquiring about how often participants feel they lack companionship, feel left out, and isolated from others. Items are scored on a 3-point Likert scale: "Almost never," "Part of the time," and "Often," with higher scores reflecting greater perceived loneliness (Cronbach's α =0.72). Two out of the three items of the subscale "Social & Leisure" of the Social Adjustment Scale-self report short version (SAS-SR: Short; Weissman, 2007) were also used in this study. Item 10 "How many friends have you seen or been in contact with (e.g., on the telephone, via e-mail, etc.) in the last 2 weeks?" was employed as a direct measure of social contact. Item 11 "How often have you felt lonely and wished for more friends during the last 2 weeks?" provided a proxy measure of perceived loneliness with a desire for having more social connectedness, that is, social longing. Responses to each item were based on a five-point Likert scale, where higher scores indicate higher levels of social contact and desired friendship. Since item 12 "How often have you felt bored in your spare time during the last two weeks?" does not directly tap social connectedness, it was not employed in this study.

Trait self-esteem was measured using the 10-item Rosenberg Self- Esteem Scale (RSES; Rosenberg, 1965). Each item consisted of responses based on a 4-point Likert scale ranging from "Strongly disagree" to "Strongly agree." The scale included both positive (i.e., "I am able to do things as well as most people") and negative items (i.e., "I feel that I am a failure"), and higher scores indicated greater self-esteem (Cronbach's α =0.88).

Multiple measures were used to tap psychosis spectrum traits and experiences. Paranoid ideation and ideas of reference were measured using the SPQ 8-item Suspiciousness (SPQ-S; Cronbach's α the 9-item Ideas of Reference (SPQ-I; Cronbach's α = 0.70) and =0.69) subscales. For both subscales, each item was answered true (1) or false (0), and higher scores reflected greater presence of these experiences. Positive and negative schizotypy traits and PLE were measured with the WSS: the Perceptual Aberration Scale assesses psychotic-like bodily distortions and perceptual experiences; the Magical Ideation Scale taps belief in invalid causation; the Revised Social Anhedonia Scale measures schizoid asociality; and the Physical Anhedonia Scale assesses deficits in sensory and aesthetic pleasure. Finally, nonclinical AVH were measured using a single item from the Dissociative Experience Scale (DES; Bernstein and Putnam, 1986): "Some people sometimes find that they hear voices inside their head that tell them to do things or comment on things that they are doing." This item was rated on a 10-point scale ranging from "never" to "always."

2.2.2. ESM measures

ESM is a structured diary technique that assesses mental experiences and contextual factors in daily life, offering several advantages to traditional assessment procedures (Hektner et al., 2007; Shiffman et al., 2008). Several studies have employed ESM across the schizotypy continuum demonstrating its validity and reliability (Barrantes-Vidal et al., 2013a; Kwapil et al., 2020; Reininghaus et al., 2016; Thewissen et al., 2011). Participants used a smartphone that randomly signalled them 8 times daily (between 10 am and 10 pm) for seven days to complete brief questionnaires. Items were rated on a 7-point Likert scale ranging from "not at all" to "very much". Of the initial sample, 10 participants were excluded from the ESM analyses due to invalid data, leaving a final sample of 159 participants in the ESM study.

Indices of momentary social connectedness, self-esteem, paranoia and other positive PLE were created. Within- and between-person reliability for ESM indices were computed following Geldhof et al. (2014). The social connectedness index consists of four items: "Right now I feel lonely" reversed, "Right now I feel that others care about me," "Right now I feel accepted by others," and "Right now I feel that I have someone to rely on" (within alpha = 0.55, between alpha = 0.89). The self-esteem index comprises: "Right now I feel good about myself", "Right now I feel guilty or ashamed" reversed, and "Right now I can cope" (within alpha = 0.52, between alpha = 0.83). The paranoia index comprised: "Right now I feel I have to be on my guard," "Right now I feel like I can't trust others," and "Right now I suspect I am being thought or talked badly about" (within alpha = 0.42, between alpha = 0.86). Two separate indices, perceptual PLE and cognitive PLE, were used to assess other positive PLE. Perceptual PLE included "Right now my sight or hearing seem strange or unusual," and "Right now familiar things seem strange or unusual" (within alpha = 0.29, between alpha = 0.95), whereas the cognitive PLE index comprised "Right now my thoughts are strange or unusual" and "Right now I have difficulty controlling my thoughts" (within alpha = 0.38, between alpha = 0.59). Finally, to capture negative PLE, we used the item, "Right now I have no thoughts or emotions".

2.3. Statistical Analysis

Unilevel mediation analyses were performed using PROCESS v3.3 (Hayes, 2018). Simple mediation analyses examined the indirect effect of social connectedness on paranoia, as well as other PLE, via self- esteem. Mediation is demonstrated by significant indirect coefficients. Bootstrapping with 10,000 resamples was used to generate 95 % bias- corrected confidence intervals. Mediation analyses were considered significant when zero was not included within the 95 % bias-corrected confidence intervals.

ESM data have a multilevel structure in which ESM ratings (level 1 data) are nested within participants (level 2 data). It has been shown that Multilevel Structural Equation Models (MSEMs) have several advantages over traditional multilevel modeling for mediation in nested data (Preacher et al., 2011). Thus, MSEMs were employed using Mplus Version 8 (Muth´en and Muth´en, 2010). Following the recommendation of the developers of Mplus, we fit the models of interest using Bayesian estimation and posterior credible intervals (comparable to frequentist-based confidence intervals) for the parameter estimates were used to determine statistical significance (Asparouhov and Muth´en, 2019). All variables analyzed in this study were level 1 data (repeated daily-life ratings). Separate multilevel mediation models were conducted to examine the within-person direct and indirect effects of social connectedness (predictor variables) on paranoia and other PLE (criterion variables), through self-esteem (mediator variable).

This study used a unilevel and multilevel cross-sectional designs.

3. Results

Table 1 provides descriptive data for the variables used in the study. Pearson's correlations among the measures of the study are shown in Supplementary Table S1.

3.1 Results

Fig. 2 and Table 2 displays the results of the unilevel mediation models. There were significant indirect effects of perceived social support on paranoia via self-esteem; that is, self-esteem mediated the association between perceived social support and paranoia. Self-esteem also mediated the pathway from loneliness with social longing to paranoia, but not from loneliness per se or social contact to paranoia. The same pattern of indirect effects emerged for ideas of reference and magical ideation. Thus, self-esteem mediates the pathways from social support and social longing, but not the pathways from loneliness and low social contact to ideas of reference and magical ideation. Finally, no significant indirect effects between any of the social connectedness measures and AVH or perceptual aberration through self-esteem were found. Similarly, self-esteem did not mediate the pathways from any of the social connectedness measures to physical anhedonia or social anhedonia. The only exception was the association of social longing and social anhedonia, which was mediated by self-esteem.

Table 1. Means (standard deviations) and score ranges for the measures of the study.

	Mean (S. D.)	Observed score range	Possible score range
Psychometric-trait measures			
RSES (self-esteem)	22.4 (5.10)	2–30	0–30
MSPSS (social support)	73.3 (11.24)	13–84	12–84
TILS (loneliness)	3.9 (1.22)	3–8	3–9
SAS it 10 (social contact)	3.8 (0.90)	1–5	1–5
SAS it 11 (social longing)	4.6 (0.64)	2–5	1–5
SPQ-S Suspiciousness	1.4 (1.57)	0–8	0–8
SPQ-I Ideas of reference	1.4 (1.65)	0–7	0–9
WSS- Magical Ideation	0.8 (1.22)	0–7	0–15
WSS-Social Anhedonia	1.5 (2.42)	0–14	0–15
WSS-Physical Anhedonia	2.0 (1.89)	0–10	0–15
WSS-Perceptual aberration	0.2 (0.99)	0–9	0–15
DES it 27 (AVH)	0.2 (1.88)	0–2	0–10
ESM measures			
Usable	38.4 (7.57)	25–56	0–56
Self-esteem index	5.74 (0.69)	2.8–7	1–7
Social connectedness index	5.83 (0.82)	3.3–7	1–7
Paranoia index	1.27 (0.42)	1–4.1	1–7
Cognitive PLE index	1.10 (0.21)	1–2.3	1–7
Perceptive PLE index	1.03 (0.10)	1–1.9	1–7
Positive PLE index	1.08 (0.26)	1–3.9	1–7
Negative PLE	1.15 (0.42)	1–3.7	1–7

Note. RSES: Rosenberg Self-Esteem Scale; MSPSS: Multidimensional Scale of Perceived Social Support; TILS: Three-Item Loneliness Scale; SAS: Social Adjustment Scale; SPQ: Schizotypal Personality Questionnaire; WSS: Wisconsin Schizotypy Scales; DES: Dissociative Experience Scale; AVH: Auditory-verbal hallucinations; ESM: Experience Sampling Methodology; PLE: Psychotic-like experiences.

Regarding direct effects, low social support is associated with greater levels of paranoia, ideas of reference, and physical and social anhedonia. Loneliness and isolation with social longing were positively associated with paranoia, ideas of reference, perceptual aberration, and social anhedonia, but only loneliness was associated with physical anhedonia. Finally, social contact was only inversely associated with physical and social anhedonia. No more significant association was found.

3.2. Multilevel mediation analysis

Results of simple multilevel mediation models are presented in Fig. 3 and Table 3. There was an indirect effect of momentary social connectedness on momentary paranoia via self-esteem, indicating that higher levels of momentary social connectedness were related to higher levels of momentary self-esteem, and this was associated with decreased paranoia in daily-life. Similarly, self-esteem mediated the association of social connectedness and cognitive PLE in daily-life. In contrast, self- esteem did not mediate the pathway from social connectedness to perceptual PLE. Finally, there was no evidence of an indirect effect of momentary social connectedness on negative PLE through self-esteem. Thus, the pathways from social connectedness to negative and perceptive PLE in daily-life are not explained by the effect of momentary self- esteem.

Regarding direct effects, social connectedness was negatively associated with paranoia, and negative PLE in daily-life, but it was not significantly related to cognitive and perceptive PLE.
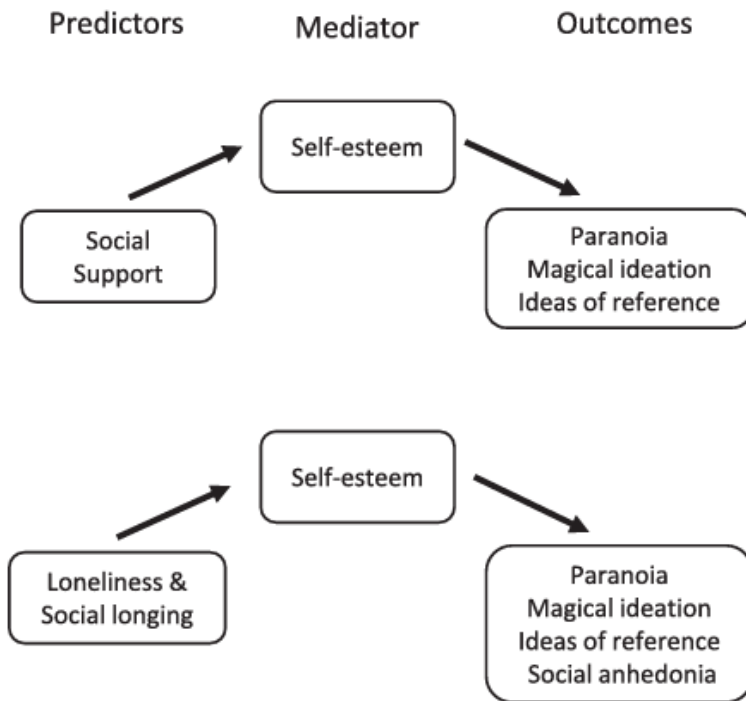
4. Discussion

The present study examined the interplay between social connectedness, self-esteem, and paranoia employing two different approaches: traditional psychometric measures and momentary measures assessed in real-life and real-time. Overall, the results indicate that the strength and subjective quality, but not the frequency, of social relationships are associated to greater levels of positive self-esteem, and that this is associated with lower levels of paranoid ideation. In other words, it suggests that social connectedness protects against paranoia by furnishing people with positive attributions of the self. Additionally, we extended research in this area by examining whether self-esteem also mediated the pathways between social connectedness and other positive and negative PLE. As predicted, findings indicate that self-esteem also mediated the pathways from social connectedness to other cognitive PLE (ideas of reference, magical ideation, and momentary cognitive PLE), but not to perceptual PLE (perceptual aberration, AVH, and momentary perceptual PLE). Finally, we did not find any evidence that self-esteem mediated the link between social connectedness and negative PLE (physical anhedonia, social anhedonia, and momentary negative PLE). The consistency of results across both levels of analyses, retrospective and contextualized in daily-life, provides convergent evidence into how meaningful social relationships, or lack thereof, can influence paranoia and other cognitive PLE through self-esteem.

Self-esteem mediated the pathways from social support and loneliness mixed with unmet social longing to paranoia, but not between mere loneliness and paranoia. Although we found a strong association between loneliness and paranoia, consistent with previous reports (e.g., Badcock et al., 2015; Lim et al., 2018), it seems that this association is better explained by other factors, such as negative-other schemas (Lamster et al., 2017), anxiety (Sündermann et al., 2014), and depression (Jaya et al., 2016). Self-esteem also mediates the link between experiences of discrimination and loneliness (´Switaj et al., 2015). Overall, these findings indicate that self-esteem is not implicated in the pathways from loneliness to positive symptoms, but is implicated in the pathways that drive loneliness. Similarly, self-esteem mediated associations of social support and loneliness with unmet social longing, but not mere loneliness, to ideas of reference and magical ideation. Two conclusions can be drawn from these findings. First, it seems that this mechanistic pathway is not exclusive to paranoia, but can be applied to other cognitive PLE. Second, the different profile of results found for some of the social connectedness measures employed provides further supports the relevance of examining the nuances between distinct aspects of this construct. Thus, we found similar results for social support and desire for social longing, as well as social identification (McIntyre et al., 2017), another construct under the scope of social connectedness. However, in our study pathways from loneliness were not mediated by self-esteem, which suggests differences among loneliness and the other subconstructs related to social connectedness. Indeed, it has been theorized that loneliness and social support reflect opposite poles of human connectedness (Newcomb, 1990). Recently, a five-dimension conceptual framework of social connectedness in mental disorders has been proposed (e. g., Hare-Duke et al., 2019; Haslam et al., 2015). The operationalization of such complex construct should facilitate the examination of how different dimensions/subconstructs of social connectedness impact on expression and development of symptoms.
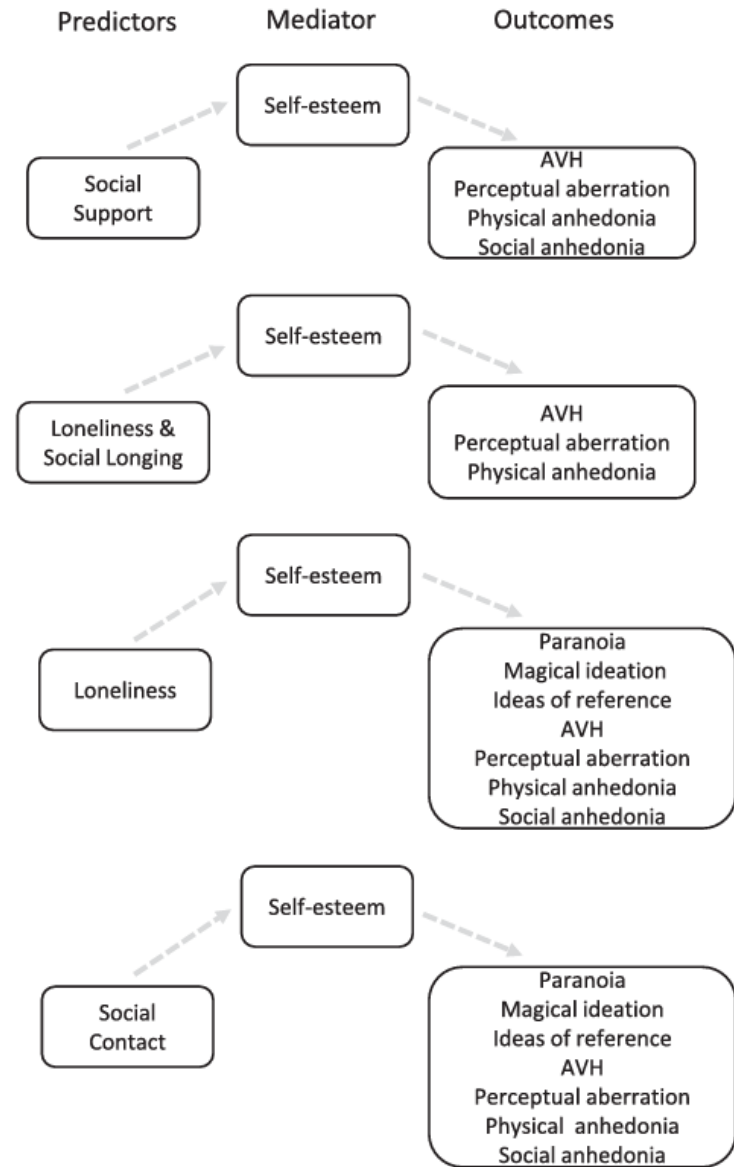
Fig. 2. Diagrams of hypothesized pathways examined in the study (unilevel analyses with retrospective measures). *Note.* AVH: Auditory-verbal hallucinations.

Results with ESM data provided further support that self-esteem mediates the association of social connectedness with paranoia (and other cognitive PLE) in the realm of daily-life. It is argued that social connectedness is related to paranoia because a lack of social identification may disrupt the ability to establish trusting social relationships, which limits a person's perceived ability to interact effectively and increases the likelihood of developing paranoid ideation (Greenaway et al., 2019). Therefore, distrustful thoughts can be seen to result from person-environmental interactions in which individuals become disconnected from meaningful social groups. Indeed, socially isolated individuals have reduced options to discuss their experiences with others, which limits the opportunity to disconfirm their paranoid ideation (Freeman, 2007).

As hypothesized, we did not find any evidence that self-esteem mediates the pathways from social connectedness to AVH and perceptual aberration. Interestingly, this was consistent across all measures employed to assess social connectedness and perceptual PLE, including the analyses performed in the realm of daily life. This finding clarifies the mixed results reported by McIntyre et al. (2017), who found that self-esteem mediated the link between social identification and AVH in one sample but not in the other. Similarly, self-esteem was not involved in the pathways from social connectedness to negative PLE, supporting that this mechanistic pathway seems to be unique for positive-like symptoms related to distortions in thought content (i.e., paranoia, ideas of reference, magical thinking, etc.). The lack of a mediating role of self-esteem for negative PLE was also consistent across trait-like and momentary measures and all measures of social connectedness. The only exception was the association of social longing and social anhedonia, which was partly explained by lower levels of self-esteem. Altogether, the symptom-specific approach establishes a more comprehensive picture of how social connectedness could drive specific symptoms of psychosis and the role that self-esteem has in the potential pathways to specific symptom development or exacerbation.

Finally, none of the pathways from social contact (frequency of social interactions) to paranoia or positive and negative PLE were explained by self-esteem. Additionally, low social contact only had significant associations with physical and social anhedonia, but not with paranoia or any other positive PLE. This is in line with a recent meta-analysis that found that social network size was unassociated with positive symptoms (Degnan et al., 2018). Overall, these findings highlight the relevance of separately examining the quality and quantity of social relationships, since the strength and the subjective quality of social relationships, that is, social connectedness, would be the key ingredient acting as a protective factor for mental disorders. Although frequency of social contact could also provide valuable information (Macdonald et al., 2000; Tee et al., 2022) and, of course, it can be related to the quality of social relationships, studying the subjective appraisals (sense of belonging, loneliness, perceived social support, social identification) may be critical to better understand the social determinants of psychosis.
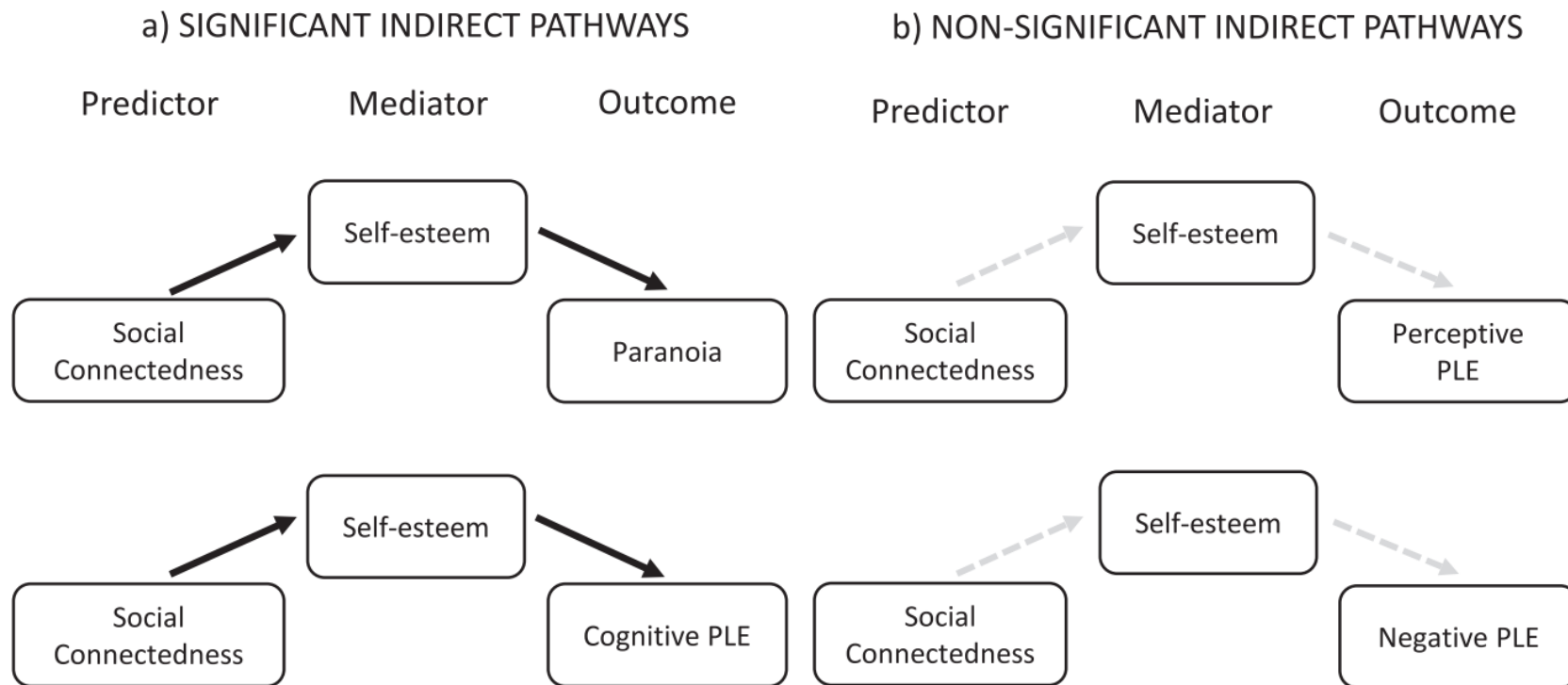
Table 2.
Unilevel meditation analyses examining the indirect effects of measures of social connectedness on psychosis spectrum personality traits and experience.

	SPQ-Suspiciousness		SPQ-Suspiciousness		DES-item 24 (AVH)	
	Raw parameter estimate (SE)	95 % bias-corrected CI	Raw parameter estimate (SE)	95 % bias-corrected CI	Raw parameter estimate (SE)	95 % bias-corrected CI
Social support						
Total effect	**-0.044 (0.010)**	**-0.064 to -0.024**	**-0.034 (0.011)**	**-0.056 to -0.012**	0.019 (0.013)	-0.007 to 0.044
Direct effect	**-0.033 (0.010)**	**-0.053 to -0.012**	**-0.024 (0.011)**	**-0.047 to -0.002**	0.021 (0.014)	-0.006 to 0.048
Indirect effect	**-0.012 (0.005)**	**-0.023 to -0.005**	**-0.010 (0.004)**	**-0.020 to -0.003**	-0.003 (0.004)	-0.014 to 0.003
Loneliness & social longing						
Total effect	**0.861 (0.174)**	**0.518 to 1.204**	**0.748 (0.188)**	**0.376 to 1.191**	0.072 (0.226)	-0.375 to 0.519
Direct effect	**0.634 (0.183**	**0.273 to 0.995**	**0.575 (0.201)**	**0.178 to 0.972**	0.071 (0.246)	-0.414 to 0.556
Indirect effect	**0.227 (0.091)**	**0.080 to 0.451**	**0.173 (0.084)**	**0.029 to 0.364**	0.001 (0.053)	-0.114 to 0.100
Loneliness						
Total effect	**0.643 (0.085)**	**0.476 to 0.811**	**0.566 (0.095)**	**0.378 to 0.752**	0.012 (0.120)	-0.225 to 0.248
Direct effect	**0.566 (0.099)**	**0.371 to 0.762**	**0.521 (0.111)**	**0.303 to 0.740**	0.005 (0.141)	-0.273 to 0.283
Indirect effect	0.077 (0.053)	-0.016 to 0.197	0.044 (0.066)	-0.094 to 0.165	0.007 (0.042)	-0.069 to 0.101
Social contact						
Total effect	-0.171 (0.133)	-0.433 to 0.091	0.082 (0.141)	-0.094 to 0.165	0.229 (0.161)	-0.547 to 0.090
Direct effect	-0.106 (0.126)	-0.354 to 0.143	0.138 (0.137)	-0.132 to 0.408	0.229 (0.163)	-0.550 to 0.092
Indirect effect	-0.065 (0.049)	-0.177 to 0.019	-0.055 (0.045)	-0.165 to 0.014	0.001 (0.012)	-0.019 to 0.031

Table 2. *(Continued)*

	WSS Magical Ideation		WSS Perceptual Aberration		WSS Physical Anhedonia		WSS Social Anhedonia	
	Raw paramet. estimate (SE)	95 % bias-corrected CI	Raw paramet. estimate (SE)	95 % bias-corrected CI	Raw paramet. estimate (SE)	95 % bias-corrected CI	Raw paramet. estimate (SE)	Raw paramet. estimate (SE)
Social support								
Total effect	-0.013 (0.008)	-0.029 to 0.004	**-0.015 (0.007)**	**-0.029 to -0.002**	**-0.046 (0.013)**	**-0.071 to -0.021**	**-0.099 (0.015)**	**-0.128 to -0.069**
Direct effect	-0.007 (0.009)	-0.024 to 0.011	-0.014 (0.007)	-0.028 to 0.001	**-0.049 (0.013)**	**-0.075 to -0.023**	**-0.092 (0.016)**	**-0.123 to -0.061**
Indirect effect	**-0.006 (0.004)**	**-0.024 to -0.011**	-0.002 (0.002)	-0.005 to 0.002	0.003 (0.005)	-0.004 to 0.016	-0.007 (0.007)	-0.018 to 0.009
Loneliness & social longing								
Total effect	0.234 (0.146)	-0.055 to 0.523	**0.368 (0.117)**	**0.137 to 0.598**	0.041 (0.228)	-0.410 to 0.492	**0.899 (0.284)**	**0.339 to 1.459**
Direct effect	0.105 (0.157)	-0.205 to 0.415	**0.360 (0.128)**	**0.110 to 0.610**	0.086 (0.248)	-0.404 to 0.575	**0.663 (0.304)**	**0.063 to 1.264**
Indirect effect	**0.129 (0.075)**	**0.010 to 0.318**	0.008 (0.040)	-0.076 to 0.078	0.045 (0.090)	-0.137 to 0.216	**0.236 (0.129)**	**0.003 to 0.505**
Loneliness								
Total effect	**0.161 (0.077)**	**0.009 to 0.314**	**0.233 (0.061)**	**0.112 to 0.354**	0.226 (0.120)	-0.011 to 0.462	**0.656 (0.146)**	**0.368 to 0.945**
Direct effect	0.079 (0.090)	-0.098 to 0.256	**0.260 (0.072)**	**0.118 to 0.401**	**0.278 (0.140)**	**0.001 to 0.555**	**0.571 (0.171)**	**0.233 to 0.908**
Indirect effect	0.083 (0.055)	-0.025 to 0.196	-0.027 (0.035)	-0.104 to 0.035	-0.052 (0.071)	-0.188 to 0.097	0.085 (0.101)	-0.108 to 0.297
Social contact								
Total effect	0.068 (0.106)	-0.140 to 0.276	0.045 (0.086)	-0.124 to 0.215	**-0.389 (0.161)**	**-0.706 to -0.072**	**-0.859 (0.198)**	**-1.250 to -0.468**
Direct effect	0.099 (0.104)	-0.106 to 0.305	0.059 (0.086)	-0.112 to 0.229	**-0.387 (0.162)**	**-0.708 to -0.067**	**-0.800 (0.196)**	**-1.186 to -0.414**
Indirect effect	-0.031 (0.030)	-0.105 to 0.009	-0.013 (0.018)	-0.062 to 0.009	-0.002 (0.023)	-0.054 to 0.045	-0.059 (0.052)	-0.181 to 0.023

Note. AVH: Auditory-verbal hallucinations; SPQ: Schizotypal Personality Questionnaire; DES: Dissociative Experience Scale; CI: Confidence interval; Significant effects are presented in bold.

Fig. 3. Diagrams of hypothesized pathways examined in the study (multilevel analyses with momentary daily-life measures). Note. PLE: Psychotic-like experiences.

Table 3
Multilevel mediation analyses examining the indirect effects of social connectedness on paranoia and other PLE via self-esteem.

Pathways	Estimate	*S.D.*	95 % CI
SC ➔ SE ➔ Paranoia			
Total effect	**-0.142**	**0.014**	**-0.168 to -0.116**
Direct effect	**-0.097**	**0.010**	**-0.115 to -0.075**
Indirect effect	**-0.045**	**0.009**	**-0.065 to -0.027**
SC ➔ SE ➔ Cognitive PLE			
Total effect	**-0.035**	**0.009**	**-0.053 to -0.019**
Direct effect	-0.006	0.006	-0.018 to 0.007
Indirect effect	**-0.029**	**0.007**	**-0.045 to -0.018**
SC ➔ SE ➔ Perceptive PLE			
Total effect	**-0.012**	**0.004**	**-0.020 to -0.005**
Direct effect	-0.009	0.004	-0.017 to 0.000
Indirect effect	-0.004	0.003	-0.010 to 0.003
SC ➔ SE ➔ Negative PLE			
Total effect	**-0.044**	**0.010**	**-0.062 to -0.025**
Direct effect	**-0.042**	**0.010**	**-0.061 to -0.023**
Indirect effect	-0.002	0.005	-0.012 to 0.009

Note. SC: Social connectedness index; SE: Self-esteem index; PLE: Psychotic-like experiences; CI: Confidence interval; Significant direct and indirect effects are presented in bold.

The present study is not without limitations. The cross-sectional design limits causal inferences, which require longitudinal, experimental or ESM time-lagged studies. An alternative hypothesis not tested in this study would be that negative PLEs and schizotypy would drive poor social connectedness rather than vice versa (as assessed in this paper). Future longitudinal or time-lagged ESM studies are needed to explore whether these potential pathways operate in both directions, from social connectedness to negative PLE and from negative PLE to social connectedness. It could be other external factors not addressed in the present study that may affect the interplay between the variables analyzed. Furthermore, gender differences in the composition of the sample may also limit the generalizability of findings. Finally, social contact was assessed with a single item and only self-report measures (retrospective and momentary) were employed in the present study. Additional observed-based rating of the measures employed would have allowed for a more differentiated view and a clear interpretation of the results.

In summary, the interaction between social connectedness and self-esteem seems to be critical for paranoia as well for other forms of cognitive distortions. Overall, this study supports the protective role that sound social bonds can have on paranoia and other positive symptoms, highlighting the relevance of the interplay between psychosocial aspects (appraisals of social context and self-esteem) in the development of psychosis. The interplay between social connectedness and self-beliefs (self-efficacy and self-esteem) also impacted on social functioning in first-episode of psychosis patients (Gonzalez-Blanch ´ et al., 2020). Thus, addressing the inadequacies of social connectedness is a major therapeutic target as they can substantially affect not only self-esteem but also symptomatic and functional outcomes of psychosis. Meaningful social relationships protect against physical and mental ill health, including depression and paranoia (Cruwys et al., 2013; Haslam et al., 2009; McIntyre et al., 2021; Sani et al., 2017), a phenomenon referred to as the "social cure" (Jetten et al., 2012). This is especially relevant considering that pharmacological treatments do not improve psychosocial

disabilities and actually can worsen symptoms like asociality, avolition or anhedonia (Correll and Schooler, 2020; Kirschner et al., 2017). Moving forward, it is critical to address the complexity of the social connectedness construct to better understand the key social determinants of psychosis and, thereby, being able to devise more refined psychosocial interventions and shape supportive social contexts that prevent the development of mental disorders (Jeste and Pender, 2022).

Supplementary data to this article can be found online at https://doi.org/10.1016/j.schres.2023.03.006.

References

Asparouhov, T., Muthén, B., 2019. Latent variable centering of predictors and mediators in multilevel and time-series models. Struct. Equ. Model. 26 (1), 119–142. https://doi.org/10.1080/10705511.2018.1511375.

Badcock, J.C., Shah, S., Mackinnon, A., Stain, H.J., Galletly, C., Jablensky, A., Morgan, V. A., 2015. Loneliness in psychotic disorders and its association with cognitive function and symptom profile. Schizophr. Res. 169 (1–3), 268–273. https://doi.org/10.1016/j.schres.2015.10.027.

Barrantes-Vidal, N., Chun, C.A., Myin-Germeys, I., Kwapil, T.R., 2013a. Psychometric schizotypy predicts psychotic-like, paranoid, and negative symptoms in daily life. J. Abnorm. Psychol. 122 (4), 1077–1087. https://doi.org/10.1037/a0034793.

Barrantes-Vidal, N., Gross, G., Sheinbaum, T., Mitjavila, M., Ballespí, S., Kwapil, T.R., 2013b. Positive and negative schizotypy are associated with prodromal and schizophrenia-spectrum symptoms. Schizophr. Res. 145 (1–3), 50–55. https://doi.org/10.1016/j.schres.2013.01.007.

Baumeister, R.F., Leary, M.R., 1995. The need to belong: desire for interpersonal attachments as a fundamental human motivation. Psychol. Bull. 117 (3), 497–529. https://doi.org/10.1037/0033-2909.117.3.497.

Bentall, R.P., Corcoran, R., Howard, R., Blackwood, N., Kinderman, P., 2001. Persecutory delusions: a review and theoretical integration. Clin. Psychol. Rev. 21 (8), 1143–1192. https://doi.org/10.1016/s0272-7358(01)00106-4.

Bentall, R.P., Wickham, S., Shevlin, M., Varese, F., 2012. Do specific early-life adversities lead to specific symptoms of psychosis? A study from the 2007 the adult psychiatric morbidity survey. Schizophr. Bull. 38 (4), 734–740. https://doi.org/10.1093/schbul/sbs049.

Berkman, L.F., Glass, T., 2000. Social integration, social networks, social support, and health. In: Berkman, L.F., Kawachi, I. (Eds.), Social Epidemiology. Oxford University Press, New York, pp. 158–162.

Bernstein, E.M., Putnam, F.W., 1986. Development, reliability, and validity of a dissociation scale. J. Nerv. Ment. Dis. 174 (12), 727–735. https://doi.org/10.1097/00005053-198612000-00004.

Chau, A., Zhu, C., So, S.H., 2019. Loneliness and the psychosis continuum: a metaanalysis on positive psychotic experiences and a meta-analysis on negative psychotic experiences. Int. Rev. Psychiatry 31 (5–6), 471–490. https://doi.org/10.1080/09540261.2019.1636005.

Coid, J.W., Ullrich, S., Kallis, C., Keers, R., Barker, D., Cowden, F., Stamps, R., 2013. The relationship between delusions and violence: findings from the East London first episode psychosis study. JAMA Psychiatry 70 (5), 465–471. https://doi.org/10.1001/jamapsychiatry.2013.12.

Cornwell, E.Y., Waite, L.J., 2009. Measuring social isolation among older adults using multiple indicators from the NSHAP study. J. Gerontol. B. Psychol. Sci. Soc. Sci. 64 (Suppl. 1), i38–i46. https://doi.org/10.1093/geronb/gbp037.

Correll, C.U., Schooler, N.R., 2020. Negative symptoms in schizophrenia: a review and clinical guide for recognition, assessment, and treatment. Neuropsychiatr. Dis. Treat. 16, 519–534. https://doi.org/10.2147/NDT.S225643.

Cruwys, T., Dingle, G., Haslam, C., Haslam, S.A., Jetten, J., Morton, T.A., 2013. Social group memberships protect against future depression, alleviate depression symptoms and prevent depression relapse. Soc. Sci. Med. 98, 179–186. https://doi.org/10.1016/j.socscimed.2013.09.013.

Cruwys, T., Haslam, S.A., Dingle, G.A., Haslam, C., Jetten, J., 2014. Depression and social identity. Personal. Soc. Psychol. Rev. 18 (3), 215–238. https://doi.org/10.1177/1088868314523839.

Degnan, A., Berry, K., Sweet, D., Abel, K., Crossley, N., Edge, D., 2018. Social networks and symptomatic and functional outcomes in schizophrenia: a systematic review and meta-analysis. Soc. Psychiatry Psychiatr. Epidemiol. 53 (9), 873–888. https://doi.org/10.1007/s00127-018-1552-8.

Freeman, D., 2007. Suspicious minds: the psychology of persecutory delusions. Clin. Psychol. Rev. 27 (4), 425–457. https://doi.org/10.1016/j.cpr.2006.10.004.

Freeman, D., Garety, P.A., Kuipers, E., Fowler, D., Bebbington, P.E., 2002. A cognitive model of persecutory delusions. Br. J. Clin. Psychol. 41 (4), 331–347. https://doi.org/10.1348/014466502760387461.

Freeman, D., McManus, S., Brugha, T., Meltzer, H., Jenkins, R., Bebbington, P., 2011. Concomitants of paranoia in the general population. Psychol. Med. 41 (5), 923–936. https://doi.org/10.1017/S0033291710001546.

Geldhof, G.J., Preacher, K.J., Zyphur, M.J., 2014. Reliability estimation in a multilevel confirmatory factor analysis framework. Psychol. Methods 19, 72–91. https://doi.org/10.1037/a0032138.

Gonzalez-Blanch, ´ C., Medrano, L., Bendall, S., D'Alfonso, S., Cagliarini, D., McEnery, C., O'Sullivan, S., Valentine, L., Gleeson, J.F., Alvarez-Jimenez, M., 2020. The role of social relatedness and self-beliefs in social functioning in first-episode psychosis: are we overestimating the contribution of illness-related factors? Eur. Psychiatry 63 (1), e92. https://doi.org/10.1192/j.eurpsy.2020.90.

Greenaway, K.H., Cruwys, T., Haslam, S.A., Jetten, J., 2016. Social identities promote well-being because they satisfy global psychological needs. Eur. J. Soc. Psychol. 46, 294–307. https://doi.org/10.1002/ejsp.2169.

Greenaway, K.H., Haslam, S.A., Bingley, W., 2019. Are "they" out to get me? A social identity model of paranoia. Group Process. Intergr. Relat. 22 (7), 984–1001. https://doi.org/10.1177/1368430218793190.

Hare-Duke, L., Dening, T., de Oliveira, D., Milner, K., Slade, M., 2019. Conceptual framework for social connectedness in mental disorders: systematic review and narrative synthesis. J. Affect. Disord. 245, 188–199. https://doi.org/10.1016/j.jad.2018.10.359.

Haslam, C., Cruwys, T., Haslam, S.A., Jetten, J., 2015. Social connectedness and health. In: Pachana, N.A. (Ed.), Encyclopedia of Geropsychology. Springer, Singapore, pp. 2174–2182.

Haslam, S.A., Jetten, J., Postmes, T., Haslam, C., 2009. Social identity, health and well being: an emerging agenda for applied psychology. Appl. Psychol. 58 (1), 1–23. https://doi.org/10.1111/j.1464-0597.2008.00379.x.

Hawkley, L.C., Burleson, M.H., Berntson, G.G., Cacioppo, J.T., 2003. Loneliness in everyday life: cardiovascular activity, psychosocial context, and health behaviors. J. Pers. Soc. Psychol. 85 (1), 105–120. https://doi.org/10.1037/0022-3514.85.1.105.

Hayes, A.F., 2018. Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regresssion-based Approach, second ed. The Guilford Press, New York. Hektner, J.M., Schmidt, J.A., Csikszentmihalyi, M., 2007. Experience Sampling Method: Measuring the Quality of Everyday Life. SAGE Publications, Thousand Oaks.

Horton, L.E., Barrantes-Vidal, N., Silvia, P.J., Kwapil, T.R., 2014. Worries about being judged versus being harmed: disentangling the association of social anxiety and paranoia with schizotypy. PLoS One 9 (6). https://doi.org/10.1371/journal.pone.0096269.

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. Res. Aging 26 (6), 655–672. https://doi.org/10.1177/0164027504268574.

Jaya, E.S., Hillmann, T.E., Reininger, K.M., Gollwitzer, A., Lincoln, T.M., 2016. Loneliness and psychotic symptoms: the mediating role of depression. Cognit. Ther. Res. 41 (1), 106–116. https://doi.org/10.1007/s10608-016-9799-4.

Jeste, D.V., Pender, V.B., 2022. Social determinants of mental health: recommendations for research, training, practice, and policy. JAMA Psychiatry 79 (4), 283–284. https://doi.org/10.1001/jamapsychiatry.2021.4385.

Jetten, J., Branscombe, N.R., Haslam, S.A., Haslam, C., Cruwys, T., Jones, J.M., Cui, L., Dingle, G., Liu, J., Murphy, S.C., Thai, A., Walter, Z., Zhang, A., 2015. Having a lot of a good thing: multiple important group memberships as a source of self-esteem. PLoS One 10 (5), e0124609. https://doi.org/10.1371/journal.pone.0124609.

Jetten, J., Haslam, C., Haslam, S.A., 2012. The Social Cure: Identity, Health and WellBeing. Psychology Press, London.

Kesting, M.-L., Lincoln, T.M., 2013. The relevance of self-esteem and self-schemas to persecutory delusions: a systematic review. Compr. Psychiatry 54 (7), 766–789. https://doi.org/10.1016/j.comppsych.2013.03.002.

Kesting, M.-L., Bredenpohl, M., Klenke, J., Westermann, S., Lincoln, T.M., 2013. The impact of social stress on self-esteem and paranoid ideation. J. Behav. Ther. Exp. Psychiatry 44 (1), 122–128. https://doi.org/10.1016/j.jbtep.2012.07.010.

Kirschner, M., Aleman, A., Kaiser, S., 2017. Secondary negative symptoms - a review of mechanisms, assessment and treatment. Schizophr. Res. 186, 29–38. https://doi.org/10.1016/j.schres.2016.05.003.

Kwapil, T.R., Barrantes-Vidal, N., 2015. Schizotypy: looking back and moving forward. Schizophr. Bull. 41 (Suppl. 2) https://doi.org/10.1093/schbul/sbu186.

Kwapil, T.R., Barrantes-Vidal, N., Silva, P.J., 2008. The dimensional structure of the Wisconsin Schizotypy Scales: factor identification and construct validity. Schizophr. Bull. 34 (3), 444–457. https://doi.org/10.1093/schbul/sbm098.

Kwapil, T.R., Kemp, K.C., Mielock, A., Sperry, S.H., Chun, C.A., Gross, G.M., BarrantesVidal, N., 2020. Association of multidimensional schizotypy with psychotic-like experiences, affect, and social functioning in daily life: comparable findings across samples and schizotypy measures. J. Abnorm. Psychol. 129 (5), 492–504. https://doi.org/10.1037/abn0000522.

Lamster, F., Lincoln, T.M., Nittel, C.M., Rief, W., Mehl, S., 2017. The lonely road to paranoia. A path-analytic investigation of loneliness and paranoia. Compr. Psychiatry 74, 35–43. https://doi.org/10.1016/j.comppsych.2016.12.007.

Lim, M.H., Rodebaugh, T.L., Zyphur, M.J., Gleeson, J.F., 2016. Loneliness over time: the crucial role of social anxiety. J. Abnorm. Psychol. 125 (5), 620–630. https://doi.org/10.1037/abn0000162.

Lim, M.H., Gleeson, J., Alvarez-Jimenez, M., Penn, D.L., 2018. Loneliness in psychosis: a systematic review. Soc. Psychiatry Psychiatr. Epidemiol. 53 (3), 221–238. https://doi.org/10.1007/s00127-018-1482-5.

Ludwig, K.A., Nye, L.N., Simmons, G.L., Jarskog, L.F., Pinkham, A.E., Harvey, P.D., Penn, D.L., 2020. Correlates of loneliness among persons with psychotic disorders. Soc. Psychiatry Psychiatr. Epidemiol. 55 (5), 549–559. https://doi.org/10.1007/s00127-019-01789-5.

Macdonald, E.M., Hayes, R.L., Baglioni Jr., A.J., 2000. The quantity and quality of the social networks of young people with early psychosis compared with closely matched controls. Schizophr. Res. 46 (1), 25–30. https://doi.org/10.1016/s0920-9964(00)00024-4.

Maslow, A.H., 1943. A theory of human motivation. Psychol. Rev. 50 (4), 370–396. https://doi.org/10.1037/h0054346.

McIntyre, J.C., Elahi, A., Barlow, F.K., White, R.G., Bentall, R.P., 2021. The relationship between ingroup identity and paranoid ideation among people from African and African Caribbean backgrounds. Psychol. Psychother. 94 (1), 16–32. https://doi.org/10.1111/papt.12261.

McIntyre, J.C., Elahi, A., Bentall, R.P., 2016. Social identity and psychosis: explaining elevated rates of psychosis in migrant populations. Soc. Pers. Psychol. Compass 10, 619–633. https://doi.org/10.1111/spc3.12273.

McIntyre, J.C., Wickham, S., Barr, B., Bentall, R.P., 2017. Social identity and psychosis: associations and psychological mechanisms. Schizophr. Bull. 44 (3), 681–690. https://doi.org/10.1093/schbul/sbx110.

 Michalska da Rocha, B., Rhodes, S., Vasilopoulou, E., Hutton, P., 2018. Loneliness in psychosis: a meta-analytical review. Schizophr. Bull. 44 (1), 114–125. https://doi.org/10.1093/schbul/sbx036.

Monsonet, M., Kwapil, T.R., Barrantes-Vidal, N., 2020. Deconstructing the relationships between self-esteem and paranoia in early psychosis: an experience sampling study. Br. J. Clin. Psychol. 59 (4), 502–522. https://doi.org/10.1111/bjc.12263.

Monsonet, M., Kwapil, T.R., Barrantes-Vidal, N., 2022. A time-lagged study of predictors of paranoia and psychotic-like experiences in daily life across the schizotypy continuum. J. Psychopathol. Clin. Sci. 131 (1), 98–108. https://doi.org/10.1037/abn0000726.

Moutoussis, M., Williams, J., Dayan, P., Bentall, R.P., 2007. Persecutory delusions and the conditioned avoidance paradigm: towards an integration of the psychology and biology of paranoia. Cogn. Neuropsychiatry 12 (6), 495–510. https://doi.org/10.1080/13546800701566686.

Murphy, P., Bentall, R.P., Freeman, D., O'Rourke, S., Hutton, P., 2018. The paranoia as defence model of persecutory delusions: a systematic review and meta-analysis. Lancet Psychiatry 5, 913–929. https://doi.org/10.1016/S2215-0366(18)30339-0.

Muthén, L.K., Muthén, B.O., 1998–2010. Mplus User's Guide, sixth ed. Muthén & Muthén, Los Angeles. Myin-Germeys, I., Kasanova, Z., Vaessen, T., Vachon, H., Kirtley, O., Viechtbauer, W., Reininghaus, U., 2018. Experience sampling methodology in mental health research: new insights and technical developments. World Psychiatry 17 (2), 123–132. https://doi.org/10.1002/wps.20513.

Myin-Germeys, I., Oorschot, M., Collip, D., Lataster, J., Delespaul, P., van Os, J., 2009. Experience sampling research in psychopathology: opening the black box of daily life. Psychol. Med. 39 (9), 1533–1547. https://doi.org/10.1017/S0033291708004947.

Newcomb, M.D., 1990. Social support by many other names: towards a unified conceptualization. J. Soc. Pers. Relat. 7 (4), 479–494. https://doi.org/10.1177/0265407590074005.

Pilton, M., Varese, F., Berry, K., Bucci, S., 2015. The relationship between dissociation and voices: a systematic literature review and meta-analysis. Clin. Psychol. Rev. 40, 138–155. https://doi.org/10.1016/j.cpr.2015.06.004.

Preacher, K.J., Zhang, Z., Zyphur, M.J., 2011. Alternative methods for assessing mediation in multilevel data: the advantages of multilevel SEM. Struc. Equ. Model. 18, 161–182. https://doi.org/10.1080/10705511.2011.557329.

Raine, A., 1991. The SPQ: a scale for the assessment of schizotypal personality based on DSM-III-R criteria. Schizophr. Bull. 17 (4), 555–564. https://doi.org/10.1093/schbul/17.4.555.

Rector, N.A., Beck, A.T., Stolar, N., 2005. The negative symptoms of schizophrenia: a cognitive perspective. Can. J. Psychiatr. 50 (5), 247–257. https://doi.org/10.1177/070674370505000503.

Reinhardt, J.P., Boerner, K., Horowitz, A., 2006. Good to have but not to use: differential impact of perceived and received support on well-being. J. Soc. Pers. Relat. 23 (1), 117–129. https://doi.org/10.1177/0265407506060182.

Reininghaus, U., Gayer-Anderson, C., Valmaggia, L., Kempton, M.J., Calem, M., Onyejiaka, A., Hubbard, K., Dazzan, P., Beards, S., Fisher, H.L., Mills, J.G., McGuire, P., Craig, T.K., Garety, P., van Os, J., Murray, R.M., Wykes, T., MyinGermeys, I., Morgan, C., 2016. Psychological processes underlying the association between childhood trauma and psychosis in daily life: an experience sampling study. Psychol. Med. 46 (13), 2799–2813. https://doi.org/10.1017/S003329171600146X.

Rosenberg, M., 1965. Society and the Adolescent Self-image. Princeton University Press, Princeton, N. J.

Rosenberg, M., 1979. Conceiving the Self. Basic Books, New York. Russell, D., Peplau, L.A., Cutrona, C.E., 1980. The revised UCLA loneliness scale: concurrent and discriminant validity evidence. J. Pers. Soc. Psychol. 39 (3), 472–480. https://doi.org/10.1037//0022-3514.39.3.472.

Saeri, A.K., Cruwys, T., Barlow, F.K., Stronge, S., Sibley, C.G., 2018. Social connectedness improves public mental health: investigating bidirectional relationships in the New Zealand attitudes and values survey. Aust. N. Z. J. Psychiatry 52 (4), 365–374. https://doi.org/10.1177/0004867417723990.

Sani, F., Wakefield, J.R., Herrera, M., Zeybek, A., 2017. On the association between greater family identification and lower paranoid ideation among non-clinical individuals: evidence from Cypriot and Spanish students. J. Soc. Clin. Psychol. 36 (5), 396–418. https://doi.org/10.1521/jscp.2017.36.5.396.

Selten, J.P., van der Ven, E., Rutten, B.P., Cantor-Graae, E., 2013. The social defeat hypothesis of schizophrenia: an update. Schizophr. Bull. 39 (6), 1180–1186. https://doi.org/10.1093/schbul/sbt134.

Shiffman, S., Stone, A.A., Hufford, M.R., 2008. Ecological momentary assessment. Annu. Rev. Clin. Psychol. 4 (1), 1–32. https://doi.org/10.1146/annurev.clinpsy.3.022806.091415.

Stefanis, N.C., Hanssen, M., Smirnis, N.K., Avramopoulos, D.A., Evdokimidis, I.K., Stefanis, C.N., Verdoux, H., van Os, J., 2002. Evidence that three dimensions of psychosis have a distribution in the general population. Psychol. Med. 32 (2), 347–358. https://doi.org/10.1017/s0033291701005141.

Sündermann, O., Onwumere, J., Kane, F., Morgan, C., Kuipers, E., 2014. Social networks and support in first-episode psychosis: exploring the role of loneliness and anxiety. Soc. Psychiatry Psychiatr. Epidemiol. 49 (3), 359–366. https://doi.org/10.1007/ s00127-013-0754-3.

Switaj, P., Grygiel, P., Anczewska, M., Wciorka, J., 2015. Experiences of discrimination and the feelings of loneliness in people with psychotic disorders: the mediating effects of self-esteem and support seeking. Compr. Psychiatry 59, 73–79. https://doi.org/10.1016/j.comppsych.2015.02.016.

Tajfel, H., Turner, J.C., 1979. An integrative theory of intergroup conflict. In: Austin, W. G., Worchel, S. (Eds.), The Social Psychology of Intergroup Relations. Brooks/Cole, Monterey, CA, pp. 33–37.

Tee, H., Chevalier, A., Webber, M., Xanthopoulou, P., Priebe, S., Giacco, D., 2022. Who wants more social contacts? A cross-sectional study of people with psychotic disorders in England. Schizophr. Res. 240, 46–51. https://doi.org/10.1016/j.schres.2021.11.047.

Thewissen, V., Bentall, R.P., Lecomte, T., van Os, J., Myin-Germeys, I., 2008. Fluctuations in self-esteem and paranoia in the context of daily life. J. Abnorm. Psychol. 117 (1), 143–153. https://doi.org/10.1016/10.1037/0021-843x.117.1.143.

Thewissen, V., Bentall, R.P., Oorschot, M., Campo, A.J., van Lierop, T., van Os, J., MyinGermeys, I., 2011. Emotions, self-esteem, and paranoid episodes: an experience sampling study. Br. J. Clin. Psychol. 50 (2), 178–195. https://doi.org/10.1348/014466510X508677.

Thomas, J., Bentall, R.P., Hadden, L., Ohara, L., 2017. Ethnic identity and paranoid thinking: implicit out-group preference and language dominance predict paranoia in Emirati women. J. Behav. Ther. Exp. Psychiatry 56, 122–128. https://doi.org/10.1016/j.jbtep.2016.10.004.

Tiernan, B., Tracey, R., Shannon, C., 2014. Paranoia and self-concepts in psychosis: a systematic review of the literature. Psychiatry Res. 216 (3), 303–313. https://doi.org/10.1016/j.psychres.2014.02.003

Weissman, M., 2007. Social Adjustment Scale – Self-report: Short (SAS-SR: Short) & Social Adjustment Scale – Self-report: Screener (SAS-SR: Screener) Technical Manual. Multi-Health Systems, Toronto, OT.

Zhang, T., Li, H., Woodberry, K.A., Seidman, L.J., Zheng, L., Li, H., Zhao, S., Tang, Y., Guo, Q., Lu, X., Zhuo, K., Qian, Z., Chow, A., Li, C., Jiang, K., Xiao, Z., Wang, J., 2014. Prodromal psychosis detection in a counseling center population in China: an epidemiological and clinical study. Schizophr. Res. 152 (2–3), 391–399. https://doi.org/10.1016/j.schres.2013.11.039.

Zimet, G.D., Dahlem, N.W., Zimet, S.G., Farley, G.K., 1988. The multidimensional scale of perceived social support. J. Pers. Assess. 52 (1), 30–41. https://doi.org/10.1207/s15327752jpa5201_2.