Understanding the Influence of Social Media and Loneliness on Mental Health Outcomes Among People with Psychosis

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Thesis Abstract

Background: Social connection and participation are central to recovery in psychosis, yet key social constructs remain under-researched and inconsistently assessed. This thesis examined loneliness as a subjective experience of isolation and social media use as a contemporary social behaviour. It aimed to clarify how these constructs relate to socio-occupational functioning (SOF) and clinically meaningful outcomes in psychosis.

Methods: A systematic review narratively synthesised evidence on loneliness and SOF in psychosis. An empirical study was conducted using de-identified electronic health records to examine associations between social media use and service use and clinical outcomes among patients accessing early intervention in psychosis (EIP) services.

Results: Twelve studies met inclusion criteria for the systematic review. Findings demonstrated an association between higher loneliness and poorer SOF, particularly in social participation, community integration and everyday functioning. However, associations varied by measurement approach and covariates included. Qualitative evidence suggested a bidirectional relationship between loneliness and SOF. In the empirical study (*N*=562), information about social media use was recorded for fewer than half of patients. Patients recorded as using social media were younger than non-users, with no differences observed in other sociodemographic characteristics. Recorded social media use was associated with higher odds of suicidal ideation, but not with admissions, compulsory detention, length of stay, or symptom severity and functioning. Social media engagement style provided additional information: compared

with passive use, active use was associated with increased admissions and higher odds of compulsory detention.

Conclusions: The findings support the clinical relevance of social experience and behaviours in psychosis, while highlighting limitations in measurement and recording. Addressing subjective experiences (loneliness) and contemporary behaviours (including social media use) in routine care may inform risk and recovery. Further longitudinal, mixed-method and co-produced research is required to clarify mechanisms.

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Chapter One
General Introduction

General Introduction

Psychosis refers to a collection of symptoms characterised by significant disturbances in perception, thinking and behaviour. These include positive symptoms such as hallucinations, delusions and disorganised thinking, as well as negative symptoms including emotional blunting, loss of motivation and social withdrawal (National Institute for Health and Care Excellence, 2026). The nature of these symptoms means that psychosis can be extremely difficult for individuals to comprehend and communicate (Fusar-Poli et al., 2022). Psychosis is understood to result from a complex interaction between biological, social and environmental factors (Broome et al., 2005), and the term encompasses a heterogeneous group of experiences and clinical presentations.

In England, psychosis is estimated to affect 0.7% of the adult population (McManus et al., 2016), with approximately 31.7 new cases per 100,000 people each year (Kirkbride et al., 2012). These overall estimates sit alongside evidence of variation in psychosis prevalence and incidence, including by ethnicity. National survey data indicate a higher prevalence of psychotic disorder in the past year among Black men (3.2%) compared with White men (0.3%; NHS Digital, 2021a), while first-episode psychosis (FEP) research has reported elevated incidence among Black African, Black Caribbean and Pakistani groups compared with White British populations (Kirkbride et al., 2017). Without appropriate treatment, psychosis can become a long-term condition, with high relapse rates, inpatient admissions and detention under the Mental Health Act 1983 (NHS England, 2023). The annual cost of psychosis is estimated at £11.8 billion, including direct healthcare costs, lost productivity, and informal care

costs (NHS England, 2023), making it a key issue for individuals, families, the government and society. People with psychosis are substantially more likely to be unemployed than the general population (National Institute for Health and Care Excellence, 2015), contributing to marginalisation, symptom exacerbation, and homelessness (Rinaldi et al., 2010). Beyond these societal costs, the personal impact of psychosis is profound. Difficulties in forming and maintaining relationships, engaging in education or employment, and sustaining meaningful social roles are common and may persist even when symptoms improve (Addington et al., 2008; Velthorst et al., 2017). This population also faces a significantly higher risk of suicide, particularly in the early years of the illness, with suicide among patients experiencing psychosis for the first time accounting for 5% of national suicide deaths (Power & Robinson, 2009).

Before an episode of psychosis, individuals can experience an at-risk mental state (ARMS), which may include subthreshold psychotic symptoms, brief psychotic episodes lasting less than seven days, or reduced social functioning (Public Health England, 2016; Yung et al., 1996). The first occurrence of psychosis is commonly known as first-episode psychosis (FEP; Public Health England, 2016). In England, early intervention in psychosis (EIP) services support individuals typically aged 14-65 who are experiencing ARMS or FEP. Between 2019 and 2020, 14,384 people entered the EIP treatment pathway (NHS Digital, 2021b). EIP treatment has been associated with increased employment, improved housing stability, and improved emotional well-being, alongside cost savings of approximately £4,031 per person per year (Tsiachristas et al., 2016).

In these early stages of psychosis, social functioning often deteriorates and is thought to be influenced by the negative symptoms associated with the illness (Moe et al., 2021). Experts by experience describe the emergence of social withdrawal in ARMS and FEP stages (Fusar-Poli et al., 2022). Across the psychosis spectrum, social networks and social connectedness have been found to play a key role in recovery and are associated with improvements in social functioning and quality of life, alongside reductions in symptom severity and psychiatric hospitalisations (Becker et al., 1997; Bengtsson-Tops & Hansson, 2001; Norman et al., 2005; Bjornestad et al., 2017; Vázquez Morejón et al., 2018). This aligns with stress-buffering models which suggest that social relationships perceived as emotionally supportive can buffer the effects of stress (Cohen & Wills, 1985), underscoring the importance of social networks in maintaining mental health.

Psychosis is associated with substantial disruption to social relationships, daily functioning, and long-term recovery trajectories. Traditionally, treatment for psychosis has prioritised symptom alleviation (Wood et al., 2010). However, there has been increasing recognition of the importance of social and functional recovery, a treatment priority consistently endorsed by people with lived experience (Byrne et al., 2010). Alongside symptom outcomes, quality of life and functioning are now more frequently incorporated in clinical trials and treatment studies (Wood et al., 2010). Psychological interventions have similarly begun to emphasise social recovery, including approaches such as Social Recovery Therapy (SRT; Fowler et al., 2019), which aims to support engagement in meaningful, structured activities. Understanding how social experiences and behaviours relate to clinically meaningful outcomes in psychosis is therefore an important clinical and research priority.

These clinical and social consequences provide the context for the present thesis, which focuses on specific aspects of social experience and behaviour alongside, rather than instead of, symptom processes.

Socio-Occupational Functioning

Psychosis is, in part, characterised by impairments in social and occupational functioning (American Psychiatric Association, 2013). Socio-occupational functioning (SOF) is understood throughout this portfolio as the extent to which a person can and is engaging in "self-care and activities of daily living, communication and interpersonal relations, instrumental living skills, and work" (Saraswat et al., 2006, p. 302). Instrumental living skills refer to activities that enable individuals to live independently, such as cooking, cleaning, managing finances, and using transportation (Guo & Sapra, 2022).

Impairments in social functioning are consistently documented across the psychosis spectrum, from ARMS and FEP to chronic schizophrenia (Grant et al., 2001; Addington et al., 2008; Velthorst et al., 2017). Occupational outcomes similarly remain poor, with employment rates as low as 8% (Royal College of Psychiatrists, 2021). Indeed, quitting work or education and increased social withdrawal have been identified as potential dimensions of prodromal behaviour (Møller & Husby, 2000). In psychosis, poorer functioning is associated with lower quality of life (Nevárez-Flores et al., 2019), and both social functioning and functional capacity predict key outcomes such as residential independence (Dickerson et al., 1999; Mausbach et al., 2008). Improving SOF is therefore a major treatment priority, reflected in clinical guidelines that emphasise functional recovery and recommend social and occupational

interventions as core components of care (National Institute for Health and Care Excellence, 2014). Notably, improvements in social and occupational functioning can occur independently of changes in psychotic symptoms (Wood & Alsawy, 2018). Together, this suggests a role of SOF in the onset, lived experience and treatment of psychosis, highlighting the value of clarifying factors that may contribute to SOF impairments.

This focus underpins the first study in the present thesis, which examines loneliness as a social experience associated with SOF.

Loneliness

Loneliness is highly prevalent in psychosis, with around 80% of individuals reporting experiences of loneliness (Stain et al., 2012), and is associated with greater symptom severity, poorer quality of life and reduced cognitive functioning (Badcock et al., 2015; Lee et al., 2025; Świtaj et al., 2018).

Loneliness can be defined as a subjective, often distressing experience that arises when the relationships a person has do not match those they want or feel they should have (Peplau & Perlman, 1982; Perlman & Peplau, 1998). It has been positioned as the social equivalent of physical pain, hunger, and thirst and is considered a motivating factor for social connection (Hawkley & Cacioppo, 2010). Although it can serve an adaptive function by encouraging reconnection following loss or transition, loneliness represents a chronic and enduring experience for approximately 15–30% of the population (Heinrich & Gullone, 2006; Theeke, 2009).

Hawkley and Cacioppo (2010) propose a self-reinforcing cycle in which loneliness heightens vigilance for social threat, biases interpretations of social cues and contributes to social withdrawal. Qualitative evidence in psychosis populations describes a similar pattern, whereby experiences of rejection, stigma, fear and anxiety lead to social withdrawal, whilst acute psychotic episodes and psychological and structural barriers further deepen loneliness (Lee et al., 2025). In psychosis populations, social interventions relevant to loneliness, such as befriending, have been linked to recovery markers (e.g., symptom reduction and improvements in functioning; Jackson et al., 2008). However, increases in quantity of contact alone may not reduce loneliness if social pleasure is blunted or negative cognitions persist (Badcock et al., 2015; Michalska da Rocha et al., 2018).

In this thesis, loneliness is examined as a subjective social experience associated with domains of SOF and recovery-relevant outcomes.

Social Media Use

The social environments in which psychosis occurs and is managed have changed substantially in recent decades, with increasing proportions of social interaction taking place in online contexts (Bjornestad et al., 2019). Social media can be broadly defined as user-driven online platforms that enable content sharing, communication and interaction (Kapoor et al., 2018), emphasising different forms of social engagement and social cognition (Yang & Crespi, 2025). The science and technology studies literature emphasises the reciprocal relationship between technology and society, suggesting that technological developments can shape social environments and communication patterns (Jasanoff, 2016). Specific technologies,

such as social media, not only expand the possibilities of communication but also change the nature of communication processes (Bjornestad et al., 2019).

Social media use is a heterogeneous behaviour, and patterns of engagement vary considerably between individuals and across time. A popular approach to understanding social media engagement is to dichotomise social media use into active and passive styles (Meier & Krause, 2023; Verduyn et al., 2017). Active use refers to "all mediated actions that promote social exchanges with others, such as sending direct messages, commenting on others' content, and broadcasting one's own", whilst passive use describes "the consumption of social media content without direct engagement in social interactions, such as browsing others' profiles, textual or audiovisual posts, stories, reels, or comments" (Meier & Krause, 2023, p. 169).

In 2025, there were over five billion social media users worldwide (Kemp, 2025). Social media use is common among people with mental health difficulties, with rates broadly comparable to the general population (Jakubowska et al., 2019; Naslund et al., 2020). Mental health professionals are increasingly addressing social media's impact on mental health in clinical settings. Despite this growing interest, the implications of social media use for mental health in psychosis remain incompletely understood (Marciano, 2025). Understanding social media is complex, however its use is known to interact with the development and treatment of a range of mental health problems. Research has highlighted various mental health benefits associated with social media use, including providing social support, fostering connections, sharing coping strategies, accessing information, promoting self-expression, and reducing isolation (Karim et al., 2020; Naslund et al., 2016; Sharma et al., 2020). Social media platforms

can also offer spaces for minority groups to share experiences and seek support (Escobar-Viera et al., 2018) and have helped disseminate psychoeducation in various languages (Lam et al., 2017). However, there are concerns that social media use can increase the risk of depression, anxiety, poor sleep quality, and decrease overall well-being (Karim et al., 2020; Sharma et al., 2020). Further risks may include increased uncertainty about one's health condition, exposure to misleading information and negative or hostile responses from others online (Naslund et al., 2016). In an American study, 42.9% of psychiatrically hospitalised adolescents reported that digital media-related experiences contributed to their hospitalisation through excessive use, engagement in suicide-related content, and relational issues with peers on social media (Nesi et al., 2022). The role of social media in self-harm behaviours is complex, with both negative (normalisation, glorification or encouragement of self-harm) and positive (facilitating distress communication and help-seeking) aspects, though studies often have small sample sizes and mixed results (Marchant et al., 2017). Problematic use of social media and cyberbullying has been associated with self-harm ideation and behaviours (Nesi et al., 2021).

Social media use may be particularly relevant in the context of psychosis for several reasons. Many people with psychosis, including those at-risk of developing psychosis, experience long-standing difficulties in their social lives, including smaller social networks, experiences of stigma and social functioning difficulties, all of which can restrict opportunities for social connection and support (Addington et al., 2008; Gayer-Anderson & Morgan, 2013; Burke et al., 2016). Social withdrawal, a core negative symptom (Marder & Galderisi, 2017), may manifest differently in a social media context compared to an offline context (Bjornestad et al., 2019). For example, existing studies

suggest that many individuals with psychosis engage with the internet and social media at rates comparable to, or in some cases higher than, control groups, despite having fewer offline social contacts (Highton-Williamson et al., 2015), with higher levels of use often observed among younger people and those in the early stages of illness (Birnbaum et al., 2018). Therefore, social media may constitute a relatively accessible social context for this group, even when offline social participation is more limited.

In this thesis, social media use is examined as a contemporary form of social behaviour that may relate to clinically meaningful outcomes independently of loneliness.

Thesis Aims and Overview

The overall aim of this thesis was to contribute to an understanding of how social experiences and behaviours relate to clinically meaningful outcomes in psychosis. This thesis adopts a portfolio approach, comprising two distinct but related studies that examine loneliness and social media use as key aspects of contemporary social life and their associations with mental health outcomes in psychosis.

This aim was addressed through two complementary studies. First, a systematic review examined associations between loneliness and SOF in psychosis. This review synthesised quantitative and qualitative evidence to clarify how loneliness and functioning are conceptualised and measured, and to identify patterns and limitations in the existing literature. A bridging chapter (Chapter Three) follows the systematic review and provides a conceptual and methodological link between the two papers included in this thesis. Second, an empirical study (Chapter Four) using de-identified electronic health records to examine social media use among individuals with ARMS

and FEP, and to explore associations with mental health service use and clinical outcomes. A final discussion and critical evaluation chapter (Chapter Five) summarises the findings of both papers, situating them within the wider literature and clinical context, critically appraising the methodological approaches taken and considering implications for future research and clinical practice.

Chapter Two
Systematic Review

Loneliness and Socio-Occupational Functioning in Psychosis: A Systematic Review

This paper has been developed for submission to *Psychiatry Research*.

Author guidelines are outlined in Appendix A.

Word count limit: 5,000 words

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Loneliness and Socio-Occupational Functioning in Psychosis: A Systematic Review

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Abstract

Loneliness is highly prevalent in psychosis and is associated with poorer clinical and quality-of-life outcomes. In nonclinical populations, loneliness is linked to a range of social and occupational difficulties. Difficulties with socio-occupational functioning (SOF) are common in psychosis and are consistently identified as a key recovery priority. However, the relationship between loneliness and SOF in psychosis remains unclear. A systematic review was conducted. Database searches (PubMed, Scopus, PsycINFO and CINAHL) identified 1,053 records, of which 12 met inclusion criteria and were synthesised narratively. Studies examined a range of SOF domains, including global, social, community and everyday functioning across various designs. Most studies indicated that greater loneliness was associated with reduced SOF in psychosis, particularly in domains of social participation, community integration and everyday functioning. Qualitative data provided insight into factors that may shape the loneliness-SOF relationship, including withdrawal, barriers to participation and feeling disconnected from others. Several psychosocial factors, including internalised stigma and social support, appeared to shape the loneliness-SOF relationship. Overall, the findings suggest that loneliness is an important correlate of how people with psychosis participate in social and community life. Clarifying directionality and testing whether changes in loneliness and SOF influence one another should be priorities for future longitudinal and intervention research.

Keywords: Schizophrenia, Psychotic Disorders, Social Participation, Social Support, Interpersonal Relations, Functional Status

1. Introduction

Loneliness is highly prevalent in psychosis, with rates of around 80% (Stain et al., 2012), and is associated with greater symptom severity, poorer quality of life and reduced cognitive functioning (Badcock et al., 2015; Świtaj et al., 2018; Lee et al., 2025). People living with psychosis describe a self-reinforcing cycle, whereby experiences of rejection, stigma, fear and anxiety lead to social withdrawal, whilst acute psychotic episodes and psychological and structural barriers further deepen loneliness (Lee et al., 2025). In psychosis populations, social interventions relevant to loneliness, such as befriending, have been linked to symptom reduction and improvements in functioning (Jackson et al., 2008). However, increases in quantity of contact alone may not reduce loneliness if social pleasure is blunted or negative cognitions persist (Badcock et al., 2015; Michalska da Rocha et al., 2018).

There is converging evidence that loneliness relates to socio-occupational functioning (SOF) in nonclinical and, more tentatively, psychosis populations. SOF is defined as the extent to which a person can engage in 'self-care and activities of daily living, communication and interpersonal relations, instrumental living skills and work' (Saraswat et al., 2006). In nonclinical samples, loneliness has been linked to occupational difficulties (e.g., absences, inefficiency, burnout), poorer relationship quality, lower social competence and broader adjustment problems (Heinrich & Gullone, 2006; Bowers et al., 2022; Mokros et al., 2022; McCarthy et al., 2026). Loneliness has also been linked to increases in depression and anxiety and to low self-esteem and interpersonal difficulties; processes that may exacerbate psychotic experiences and undermine functioning (Freeman et al., 2002; Heinrich & Gullone, 2006).

Psychosis is characterised by impairments in social and occupational functioning (Grant et al., 2001; Addington et al., 2008; Velthorst et al., 2017). In psychosis, poorer functioning is associated with lower quality of life (Nevárez-Flores et al., 2019) and greater social functioning and functional capacity are associated with living independently in the community (Dickerson et al., 1999; Mausbach et al., 2008). Improving SOF is therefore a treatment priority, reflected in clinical guidelines (National Institute for Health and Care Excellence, 2014). Together, this highlights the importance of clarifying factors that may contribute to SOF impairments, including loneliness.

Despite the clinical importance of both loneliness and SOF in psychosis, the extent to which loneliness may contribute to functional impairment has not been synthesised. Several reviews amalgamate findings on loneliness and psychosis more broadly (Lim et al., 2018; Michalska da Rocha et al., 2018; Badcock et al., 2020; Lee et al., 2025); however, to our knowledge, this is the first to specifically synthesise findings on loneliness and SOF in psychosis. The primary aim of this systematic review was therefore to describe the relationship between loneliness and SOF in psychosis. A secondary aim was to identify relevant factors linked to loneliness and SOF in psychosis. If loneliness is consistently linked with poorer SOF, then addressing loneliness may offer a route to protect, rebuild or improve functioning alongside symptom management, reflecting the recovery priorities of people living with psychosis (Lloyd et al., 2017; Douglas et al., 2022).

2. Methods

The present systematic review was pre-registered in PROSPERO (registration number: CRD42025645383) and followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines (Page et al., 2021).

2.1 Eligibility criteria

Table 1 outlines study inclusion and exclusion criteria for the review using a PECO framework (Morgan et al., 2018).

Table 1

Inclusion and Exclusion Criteria

	Inclusion	Exclusion
Population	Individuals with a diagnosis of a psychotic disorder or an at-risk mental state for psychosis	Individuals who do not meet criteria for a psychotic disorder or at-risk mental state
Exposure	Studies that measure loneliness and SOF	No measure of loneliness and/or SOF reported
Comparison	N/A	N/A
Outcomes	A quantitative or qualitative focus on the association between loneliness and SOF, regardless of the direction of analysis	No analysis or qualitative exploration of the relationship between loneliness and SOF

Both quantitative and qualitative studies were included. Qualitative studies were included if the study focus overlapped with the review questions (e.g., loneliness and SOF in psychosis). Studies reporting on non-pharmacological interventions that directly measure the link between loneliness and SOF were included, for example, loneliness interventions in psychosis populations that measure the effect of loneliness on SOF outcomes via pre- and post-intervention measures. Case studies, grey literature and studies not published in English were excluded. Results were not restricted to a publication period.

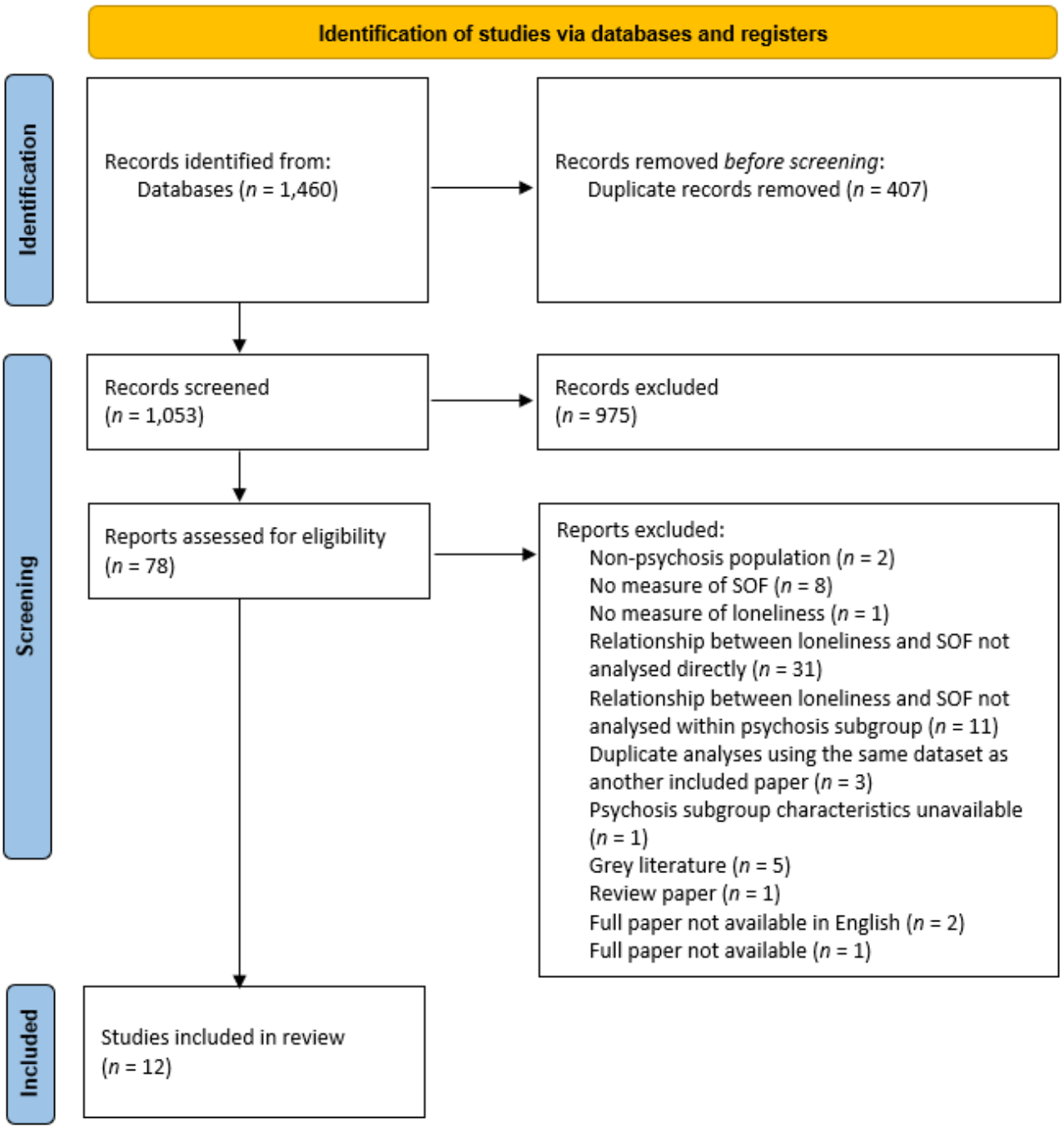
2.2 Search strategy

Searches were conducted in PubMed, Scopus, PsycINFO and CINAHL in May 2025. Search terms for SOF were based on a similar systematic review (Stafford et al., 2024), which used a scoping search to establish terms. Full search terms are presented in Appendix B. Once searches were conducted, duplicates were removed, and titles and abstracts were screened, followed by a full-text review to select studies examining loneliness and SOF in psychosis. Figure 1 details the flow of studies through the screening process. Where multiple articles used the same dataset, only the most comprehensive or relevant analysis was retained, following guidance on duplicate data sources (Mayo-Wilson et al., 2018). Three full-text articles used the same dataset (Nevárez-Flores et al., 2021a, 2021b, 2022). To avoid double-counting participants and prioritise the analysis most aligned with our question, we retained the 2022 article, which directly examined the loneliness-SOF relationship. Two further full-text articles also shared a dataset (Shioda et al., 2016, 2017). The 2016 article was retained, as the 2017 article primarily focused on the reliability and validity of the measure used. References of included studies were hand-searched to identify further suitable articles; however, no additional articles were identified.

To ensure the quality of the review process, a second researcher (WH) independently screened 25% of the articles at the full-text review stage. Inter-rater reliability was high (Cohen's $\kappa = .89$), indicating a substantial agreement (Landis & Koch, 1977), and the single disagreement was resolved through discussion.

Figure 1

Study Selection Process



2.3 Data collection and synthesis

For each included study, the primary researcher (EJ) extracted data on country, sample characteristics, design, loneliness and SOF measures and any findings relevant to the review questions. Where reported, ethnicity data were harmonised under "race/ethnicity" for consistency across studies, with original category labels standardised (e.g., "Caucasian" reported as "White"). These data were summarised in tables to provide an overview of study characteristics and results.

Due to variation in designs, measures, and outcomes, a meta-analysis was not possible; therefore, a narrative synthesis was undertaken, drawing on Popay et al.'s (2006) framework. After familiarisation with the extracted data, studies were organised into broad SOF categories reflecting the outcomes assessed, which served as the structure for the results. Within each category, we compared the direction and size of associations between loneliness and functioning. We then examined patterns across studies in relation to population, setting, reporter and measurement choices and noted psychosocial, clinical and contextual factors that studies reported as influencing loneliness and SOF. Finally, we considered these patterns alongside quality assessment to inform our interpretation of the strength and consistency of the findings.

2.4 Risk of bias assessment

The methodological quality of the studies was assessed using the Mixed Methods Appraisal Tool (MMAT; Hong et al., 2018). Each study was appraised according to the criteria relevant to its design, with individual criterion ratings reported rather than an overall score, in line with author guidance. The quality of all included studies was rated by the primary reviewer (EJ), and 25% of included studies were also independently

rated by a second reviewer (WH). Disagreements were resolved through discussion and consensus. Agreement between reviewers was high (89%); however, because the second reviewer answered “Yes” to all criteria, κ was not meaningful and is not reported.

3. Results

3.1 Study characteristics

Of the 12 included studies, all except one (Ludwig et al., 2022) were quantitative. In terms of study design, 10 were cross-sectional, one was longitudinal, and one was a qualitative study using thematic analysis. Samples covered a range of stages of psychosis; seven focused on schizophrenia-spectrum disorders, one on psychotic disorders, two on non-affective psychotic disorders, one on first-episode psychosis and one on UHR. Sample sizes ranged from 16 (Ludwig et al., 2022) to 1642 (Nevárez-Flores et al., 2022), with a mean of 264 (*SD* = 443.42). Average participant ages ranged from 19.2 to 52.12 years, and the proportion of male participants ranged from 37% to 76%. Ethnicity was reported in six studies (Sündermann et al., 2014; Robustelli et al., 2017; Ludwig et al., 2020; Culbreth et al., 2021; Ludwig et al., 2022; Chi et al., 2024). Studies were conducted across eight countries, including the USA, Australia, Taiwan, Japan, Poland, the UK, China and Israel.

3.2 Quality assessment

Methodological quality across studies was generally good (see Table 2), with eight of the 12 studies assessed as having low risk of bias across all criteria. For representativeness (criterion 3.1), almost all studies were rated “yes”; only Schwartz

and Gronemann (2009) received a “can’t tell” rating because inclusion and exclusion criteria were not clearly specified.

Most studies used validated measures of loneliness, symptoms and functioning (criterion 3.2). However, in two studies, loneliness was assessed using a single item: Sündermann et al. (2014) used an unvalidated item, and Nevárez-Flores et al. (2022) used a single item with a 12-month recall period. Although there is evidence supporting single-item loneliness questions, explicitly using the word ‘lonely’ (as these studies do) may influence responding (Russell, 1982), so measurement bias cannot be ruled out.

Outcome data were generally complete (criterion 3.3). An 80% completion threshold was agreed a priori (Thomas et al., 2004; Zaza et al., 2000). All but one study met this threshold; Shioda et al. (2016) had a usable response rate below 80% (264/560), resulting in a “can’t tell” rating.

Most studies adequately controlled for relevant confounders (criterion 3.4), including demographic and clinical variables such as age, sex and symptom severity. One study (Schwartz & Gronemann, 2009) did not adjust for key clinical confounders, meaning the risk of confounding could not be ruled out.

All studies were rated “yes” for criterion 3.5: data were collected as intended, with no major protocol deviations or measurement inconsistencies reported.

Table 2

MMAT Quality Assessment

Study	Qualitative criterion					Quantitative criterion				
	1.1	1.2	1.3	1.4	1.5	3.1	3.2	3.3	3.4	3.5
Schwartz & Gronemann (2009)						CT	Y	Y	CT	Y
Sündermann et al. (2014)						Y	CT	Y	Y	Y
Switaj et al. (2014)						Y	Y	Y	Y	Y
Chrostek et al. (2016)						Y	Y	Y	Y	Y
Shioda et al. (2016)						Y	Y	CT	Y	Y
Robustelli et al. (2017)						Y	Y	Y	Y	Y
Ludwig et al. (2020)						Y	Y	Y	Y	Y
Culbreth et al. (2021)						Y	Y	Y	Y	Y
Nevárez-Flores et al. (2022)						Y	CT	Y	Y	Y
Chen et al. (2024)						Y	Y	Y	Y	Y
Chi et al. (2024)						Y	Y	Y	Y	Y
Ludwig et al. (2022)	Y	Y	Y	Y	Y					

Y = yes; CT = can't tell. MMAT qualitative criteria: 1.1 appropriateness of qualitative approach; 1.2 adequacy of data collection; 1.3 adequacy of findings derived from the data; 1.4 substantiation of interpretations; 1.5 coherence between data sources, collection, analysis and interpretation. MMAT quantitative non-randomised criteria: 3.1 representativeness of participants; 3.2 appropriateness of measurements; 3.3 completeness of outcome data; 3.4 accounting for confounding; 3.5 intervention/exposure occurred as intended during the study period

3.3. Assessment tools

All studies used subjective, self-report loneliness measures, most commonly variants of the University of California, Los Angeles Loneliness Scale (UCLA LS; *n* = 7). The UCLA LS produces a global loneliness score and is widely considered the gold standard measure of loneliness (Lim & Gleeson, 2014).

A wide range of tools were used to measure SOF, including self-report questionnaires, semi-structured interviews, researcher or informant ratings, performance-based assessments, objective indicators and time-use measures. Most

SOF measures were used in a single study, with only the Global Assessment of Functioning (GAF; Piersma & Boes, 1997) and the Specific Level of Functioning Scale (SLOF; Schneider & Struening, 1983) appearing in two studies each. The GAF is a clinician-rated scale measuring psychological, interpersonal and occupational functioning, whilst the SLOF is a behavioural rating scale assessing everyday social, interpersonal and community-living skills and can be completed by clinicians, informants, or participants.

3.4. Primary findings

The results of the 12 included studies are presented in Table 3. Overall, eight of the 11 quantitative studies reported at least one significant association between loneliness and an SOF domain. Where findings were non-significant, effect directions were generally similar: higher loneliness was associated with poorer functioning. All three studies comparing participants with psychosis to healthy controls found that the psychosis group was significantly lonelier than the control group (Robustelli et al., 2017; Ludwig et al., 2020; Culbreth et al., 2021). The narrative synthesis is presented according to the type of functioning assessed, and studies that examined more than one SOF outcome appear in multiple categories.

Table 3

Results

Reference	Country	Participant characteristics	*N*	Study design	Loneliness measure(s)	SOF measure(s)	Relevant findings	Is loneliness associated with SOF?	Effect size
Ludwig et al. (2020).	USA	Sample = outpatients with schizophrenia spectrum disorders (SSD). Age (mean and *SD*) = 39.35 (11.18) in SSD group and 41.67 (12.75) in control group. Male (*n* and %) = 53 (71.6%) in SSD sample and 40 (69%) in HC group. Race/ethnicity (*n* and %) in SSD group: White 48 (64.9%), Black 23 (31.1%), Asian 1 (1.4%), Other 2 (2.8%); HC group: White 32 (55.2%), Black 23 (39.7%), Asian 1 (1.7%), Other 2 (3.4%).	132	Cross-sectional	UCLA LS	SLOF (informant completed), SLOF (research assistant completed) and UPSA-B	Greater loneliness in the clinical group was associated with lower social functioning on the researcher-completed SLOF (p < .05). However, this did not meet the corrected significance threshold of p < .01, and the trend-level association was eliminated when controlling for depression. Loneliness was not significantly associated with the informant-completed SLOF (p > .05) or functional capacity on the UPSA-B (p > .05). Loneliness was not significantly related to any measures of functional outcome in the control group.	No (ps ≥ .01, corrected threshold)	r = −.252 to .044
Robustelli et al. (2017)	USA	Sample = UHR young adults. Age (mean and *SD*) = 19.17 (1.73) in UHR sample and 19.20 (2.56) in control group. Male (*n* and %) = 26 (59%) in UHR sample and 15 (37%) in HC group. Race/ethnicity (% whole sample) = White (65%); Central/South American (18%); Asian (10%); Interracial (5%); Black (2%); Native American (1%).	85	Cross-sectional	UCLA LS (revised)	GAF, Number of close friends (SNI single item; “How many friends do you see or talk to at least once every 2 weeks?”)	In the UHR group, poorer functioning (b = -.39, p < .01) and engaging with fewer close friends (B = −3.94, SE = .87, p < .001) were associated with higher loneliness.	Yes (p < .01)	r = .43
Culbreth et al. (2021)	USA	Sample = 35 stable outpatients with schizophrenia or schizoaffective disorder (SZ). Age (mean and *SD*) = 37.8	72	Cross-sectional	UCLA LS (revised), EMA Loneliness (“How lonely do you	SLOF (participant rated)	In the SZ group, trait loneliness was negatively correlated with participant-rated functioning (r = -.65, p < .001). This association remained significant	Partially (significant ps < .001 – .006)	r = -.65; β = -.40 to -.01

Reference	Country	Participant characteristics	*N*	Study design	Loneliness measure(s)	SOF measure(s)	Relevant findings	Is loneliness associated with SOF?	Effect size
		(11.8) in SZ group and 36.2 (11.3) in HC group. Male (*n* and %) = 24 (69.0%) in SZ group and 28 in (76.0%) in HC group. Race/ethnicity (*n* and %) in SZ group: White 16 (45.7%), Black 17 (48.6%), Other 2 (5.7%); HC: White 8 (21.6%), Black 24 (64.9%), Other 5 (13.5%).			feel right now?) on a five-point Likert scale (1 = not at all to 5 = extremely)		(standardised β coefficient = -.40, p = .006) after covarying for the severity of depressive and negative symptoms. However, SLOF was not a significant predictor of EMA loneliness (standardised β coefficient = -.01, p = .25)		
Nevárez-Flores et al. (2022).	Australia	Sample = interviewees in the 2010 Australian National Survey of Psychosis (Morgan et al., 2012) with a psychotic disorder. Age (mean and *SD*) = 38.24 (11.09). Male (*n* and %) = 1,008 (61.4%).	1642	Cross-sectional	Single five-level item 'In the last 12 months, have you felt lonely?' with a choice of five responses: I have (1) plenty of friends, not lonely, (2) friends, lonely occasionally, (3) some friends but lonely for company, (4) socially isolated and lonely and (5) not known.	Interviewer rated social dysfunction (based on participant descriptions of the extent of their involvement in social activities, relationships and contact with friends and family and frequency of time spent alone) and frequency of contact with friends/relatives in the last 12 months.	Tests of univariate associations showed that contact with relatives (ORs = 1.11-1.34, ps = .14 – .40) did not have a significant association with loneliness. Social dysfunction and contact with friends, among other clinical variables, were tested as independent contributors to loneliness in a composite model using ordinal logistic regression. Obvious social dysfunction (OR 2.09, CI 1.69-2.59, p < .001), severe social dysfunction (OR 4.86, CI 3.38-6.99, p < .001) and contact with friends: at least weekly (OR 1.35, CI 1.07-1.69, p = .01), at least monthly (OR 1.44, CI 1.06-1.96, p = .021), Less than once a month (OR 2.29, CI 1.56-3.37, p < .001), Not at all in the last 12 months (OR 2.78, CI 1.11-6.99, p = .029) and No friends (OR 3.95, CI 2.57-6.09, p < .001) were, along with other clinical outcomes, significant predictors of loneliness.	Partially (significant ps < .001 – .029)	ORs = 1.11 – 4.86

Reference	Country	Participant characteristics	*N*	Study design	Loneliness measure(s)	SOF measure(s)	Relevant findings	Is loneliness associated with SOF?	Effect size
Chen et al. (2024)	Taiwan	Sample = psychiatric inpatients with schizophrenia. Age (mean and *SD*) = 52.12 (8.42). Male (*n* and %) = 110 (60.4%).	182	Longitudinal	Three-item UCLA LS (Chinese version)	IADL	Associations were found between loneliness and IADL at baseline (r = .151, p < .05) and at the two-year follow-up (r = .246, p < .01). Higher loneliness at baseline was also significantly associated with greater IADL impairment at follow-up (B = .148, CI .031-.264, p = .013).	Yes (ps < .01–.05)	r = .151–.246
Shioda et al. (2016)	Japan	Sample = community-dwelling people diagnosed with schizophrenia. Age (mean and *SD*) = 46.1 (9.6). Male (*n* and %) = 183 (69.3).	264	Cross-sectional	UCLA LS V3 (Japanese Version)	CIM (Japanese version), Employment status	Loneliness was significantly correlated with employment status (r = 0.182, p = .003) and community integration (r = 0.573, p < .001). Lower community integration was associated with higher loneliness (β = −.220, p < .001).	Yes (ps < .001 - .003)	r = .182-.573, β = −.22
Switaj et al. (2014)	Poland	Sample = adults with non-affective psychotic disorders. Age (mean and *SD*) = 38.4 (11.4). Male (*n* and %) = 43 (39.1%).	110	Cross-sectional	DJGLS (short version)	GAF	Loneliness was not significantly associated with global functioning (r = −.07, p > .05).	No (p > .05)	r = −.07
Sündermann et al. (2014)	UK	Sample = individuals with first-episode psychosis. Age (mean and *SD*) = 32.3 (9.6). Male (*n* and %) = 23 (60.5%). Race/ethnicity (*n* and %): White 20 (52.6 %), Black 13 (34.2%), Other 5 (13.3%).	38	Cross-sectional	Single-item self-report: number of lonely days in the past week	TBM	Loneliness was not significantly associated with functioning (r = −.30, p > .05).	No (p > .05)	r = −.30
Chi et al. (2024)	China	Sample = adults with chronic schizophrenia. Age (mean and *SD*) = 46.4 (11.2). Male (*n* and %) = 136 (42.1%). Race/ethnicity: Han Chinese (100%).	323	Cross-sectional	UCLA LS V3	SII (objective: unmarried status; < monthly contact with children, relatives, or friends; non-	Higher loneliness scores were significantly associated with greater social isolation in both males (p = .046) and females (p = .006).	Yes (males p = .046; females p = .006)	Unavailable

Reference	Country	Participant characteristics	*N*	Study design	Loneliness measure(s)	SOF measure(s)	Relevant findings	Is loneliness associated with SOF?	Effect size
						participation in social activities)			
Schwartz & Gronemann (2009)	Israel	Sample = adults with schizophrenia living in supported residences. Age (mean and *SD*) = 43.0 (10.1). Male (*n* and %) = 65 (67%).	97	Cross-sectional	UCLA LS V3	Participation and Use of Services in the Community Questionnaire and employment status	Greater community participation predicted lower loneliness (β = −.57, $p < .01$). Employment status was not significantly associated with loneliness (β = .06, $p > .05$).	Partially (significant $p < .01$)	β = −.57 to .06 (model $R^2 = .458$)
Chrostek et al. (2016)	Poland	Sample = adults with non-affective psychotic disorders. Age (mean and *SD*) = 39.6 (12.0). Male (*n* and %) = 127 (61.4%).	207	Cross-sectional	DJGLS	SOFAS and Independence-Performance subscale of the SFS	Loneliness was significantly associated with lower global functioning (SOFAS; $r = −.21$, $p < .001$) and poorer independent living skills ($r = −.25$, $p < .001$). However, in multivariate regression, these associations were no longer significant after adjusting for sociodemographic, psychosocial and clinical variables.	Partially (significant bivariate *p*s < .001; not significant after adjustment)	$r = −.25$ to −.21
Ludwig et al. (2022)	USA	Sample = community outpatients with schizophrenia spectrum disorders. Age (mean and *SD*) = 39 (7.15). Male (*n* and %) = 10 (62.5%). Race/ethnicity (*n* and %): White 12 (75.0%), Black 3 (18.7%), Other 1 (6.3%)	16	Thematic Analysis	Three-item UCLA LS (screening) and semi-structured interviews on lived experience of loneliness	Employment status; community participation (work, recreation, social activities); relationship quality and stability (friendships, family, romantic partners)	Loneliness was linked to unemployment, financial hardship and lack of transport, limiting community participation. Disrupted friendships and absence of romantic partners also heightened loneliness. Structured activities (work and recreation) and social contact were described as protective.	Qualitative evidence	Unavailable

CIM, Community Integration Measure; DJGLS, De Jong Gierveld Loneliness Scale; EMA, Ecological Momentary Assessment; HC, Healthy Control; IADL, Instrumental Activities of Daily Living; GAF, Global Assessment of Functioning; SFS, Social Functioning Scale; SII, Social Isolation Index; SLOF, Specific Level of Functioning Scale; SNI, Social Network Index; SOFAS, Social and Occupational Functioning Assessment Scale; TBM, Time Budget Measure; UCLA LS, UCLA Loneliness Scale; UCLA LS V3, UCLA Loneliness Scale Version 3; UPSA-B, UCSD Performance-Based Skills Assessment-Brief.

3.4.1 Loneliness and global functioning

Three quantitative cross-sectional studies examined loneliness and clinician-rated global functioning (Robustelli et al., 2017; Chrostek et al., 2016; Świtaj et al., 2014). Global functioning was assessed using the GAF or SOFAS, and loneliness using standard self-report scales.

Findings were mixed. Robustelli et al. (2017) found that higher loneliness was associated with lower functioning in UHR young adults. Chrostek et al. (2016) reported a similar bivariate association in adults with non-affective psychosis, although this became non-significant after adjustment for covariates. Świtaj et al. (2014) found no significant association in adults with non-affective psychotic disorders, although this may reflect restricted variability in GAF scores, as ratings were based on the highest level of functioning during the past year.

Taken together, these studies suggest a modest association between loneliness and poorer clinician-rated global functioning, although this association can attenuate once broader psychosocial context is accounted for.

3.4.2 Loneliness and social participation, communication and community integration

Seven quantitative cross-sectional studies examined social participation, communication, or community integration as aspects of SOF in UHR and psychosis-spectrum samples (Schwartz & Gronemann, 2009; Shioda et al., 2016; Robustelli et al., 2017; Ludwig et al., 2020; Culbreth et al., 2021; Nevárez-Flores et al., 2022; Chi et al., 2024). Most used multi-domain community functioning scales (e.g., SLOF, CIM); others used interviewer-rated social dysfunction or structural indicators, such as how often

participants saw friends, the number of close friends, or broader isolation indices. Loneliness was typically assessed with self-report scales, with one study also using EMA to capture momentary loneliness (Culbreth et al., 2021).

Across studies, greater loneliness was generally linked with poorer social participation and weaker community integration, although effect sizes and significance varied by reporter and measure. For example, community-dwelling adults with schizophrenia who reported lower community integration also tended to report higher loneliness (Shioda et al., 2016). A similar pattern emerged in supported housing, where more frequent participation in community and leisure activities predicted lower loneliness (Schwartz & Gronemann, 2009). Among stable outpatients, trait loneliness strongly predicted participant-rated community functioning, whereas momentary loneliness was unrelated to functioning (Culbreth et al., 2021). In a national psychosis survey, interviewer-rated social dysfunction and reduced friend contact (but not family contact) showed graded associations with loneliness (Nevárez-Flores et al., 2022). In UHR young adults, fewer close friends were associated with higher loneliness (Robustelli et al., 2017) and in chronic schizophrenia, higher loneliness co-occurred with greater structural isolation, such as less frequent participation in activities and social contact (Chi et al., 2024). By contrast, associations in Ludwig et al. (2020) were small and either non-significant or became non-significant after correction for multiple comparisons.

Overall, the studies point to a link between loneliness and reduced social participation or community integration, particularly when participants report their own functioning or when indicators of social contact are used.

3.4.3 Loneliness and everyday functioning, capacity and time use

Six quantitative studies examined everyday functioning (IADL, SFS), performance-based functional capacity (UPSA-B) and time-use or role indicators (TBM, employment status) as aspects of SOF (Schwartz & Gronemann, 2009; Sündermann et al., 2014; Chrostek et al., 2016; Shioda et al., 2016; Ludwig et al., 2020; Chen et al., 2024). Loneliness was measured using standard or single-item self-report measures.

Overall, higher loneliness was generally associated with greater difficulty in everyday functioning, whereas associations with capacity measures and time-use indicators were smaller or non-significant. Chen et al. (2024) reported the clearest temporal relationship. In inpatients with schizophrenia, higher loneliness was associated with more IADL difficulty at baseline and follow-up, and baseline loneliness predicted worsening IADL over two years, even after accounting for baseline functioning. Chrostek et al. (2016) also observed cross-sectional associations between greater loneliness and poorer independence in everyday tasks, although these fell below significance after adjustment for psychosocial and clinical covariates. Ludwig et al. (2020) found no significant associations between loneliness and functional capacity on the UPSA-B, and loneliness was also unrelated to total time-use on the TBM (Sündermann et al., 2014). Employment findings were mixed: employment was not associated with loneliness in supported residences (Schwartz & Gronemann, 2009), but was associated with loneliness in a community-dwelling sample (Shioda et al., 2016).

Taken together, these studies suggest loneliness is more consistently associated with self-reported difficulties in everyday functioning than with performance-based capacity or time-use.

3.4.4 Factors influencing the loneliness–SOF association

Ten studies provided findings that helped explain variability in the loneliness-SOF association (Robustelli et al., 2017; Chrostek et al., 2016; Świtaj et al., 2014; Culbreth et al., 2021; Ludwig et al., 2020; Nevárez-Flores et al., 2022; Shioda et al., 2016; Chi et al., 2024; Sündermann et al., 2014; Chen et al., 2024), and one qualitative study described potential pathways (Ludwig et al., 2022). Most were cross-sectional, with one longitudinal study (Chen et al., 2024).

In some studies, adjustment for symptoms and psychosocial context reduced the size of associations. In Chrostek et al. (2016), associations with global and everyday functioning were no longer significant once internalised stigma, perceived support, network size and interpersonal competence were taken into account, and in Ludwig et al. (2020), small correlations disappeared once depression was controlled for. In contrast, in Culbreth et al. (2021), trait loneliness remained associated with participant-rated community functioning after controlling for depressive and negative symptoms. Similarly, Chen et al. (2024) showed that baseline loneliness predicted worsening instrumental daily functioning two years later, even after adjusting for confounders, suggesting that cross-sectional confounding does not fully explain the relationship.

A range of psychosocial and contextual factors were also associated with loneliness and may shape its relationship with functioning. Across studies, loneliness was associated with internalised stigma and reduced social support (Chrostek et al., 2016; Schwartz & Gronemann, 2009; Shioda et al., 2016). Several studies highlighted the role of self-concept and coping resources: lower self-esteem, reduced self-efficacy in community life and guilt were all associated with higher loneliness (Ludwig et al.,

2020; Shioda et al., 2016). In Świtaj et al. (2014), loneliness partly explained how internalised stigma related to depression. Nevárez-Flores et al. (2022) reported that loneliness partially mediated the relationships between social dysfunction, reduced friend contact, clinical symptoms, physical and trauma-related factors and health-related quality of life. In early psychosis, anxiety partly mediated the association between loneliness and paranoia (Sündermann et al., 2014). Qualitative accounts from one study described avoidance, low motivation and energy, practical barriers (e.g. transport, finances), a lack of work or routine and difficulties connecting with others as limiting social roles and daily activities (Ludwig et al., 2022).

Measurement and reporting differences also appeared to influence effect sizes. Larger associations tended to emerge when functioning was self-reported or indexed by structural indicators, such as frequency of friend contact or composite isolation indices (Culbreth et al., 2021; Nevárez-Flores et al., 2022; Chi et al., 2024). Smaller or non-significant findings were more common for researcher or informant ratings and for performance-based measures (Sündermann et al., 2014; Ludwig et al., 2020).

Findings also varied by population and setting. In UHR young adults, higher loneliness was associated with poorer global functioning and smaller social networks (Robustelli et al., 2017). In chronic schizophrenia, greater loneliness co-occurred with greater structural isolation, with some sex-specific patterns (Chi et al., 2024). In mixed-diagnosis adult samples recruited from inpatient, day-ward or community services, associations were often reduced or non-significant once symptoms and psychosocial factors were accounted for (Świtaj et al., 2014; Chrostek et al., 2016; Ludwig et al., 2020).

The analytic approach also influenced whether associations were detected. Studies in which the loneliness-SOF relationship was a central, pre-specified focus tended to report clearer associations (e.g., Culbreth et al., 2021; Chen et al., 2024). In contrast, where loneliness or SOF were examined as one correlate among many, or where strict alpha corrections and extensive covariate sets were applied, associations weakened or became non-significant even when effect directions were consistent (e.g., Chrostek et al., 2016; Ludwig et al., 2020).

Overall, variability in the strength of the loneliness-SOF association appears to reflect both genuine differences across samples, settings and methodological differences, including how loneliness and SOF are measured, which confounders are included and whether analyses prioritise the loneliness-SOF relationship.

4. Discussion

The primary aim of this review was to describe the relationship between loneliness and SOF in psychosis populations. Most quantitative studies reported at least one significant association between loneliness and an SOF domain, although effect sizes and consistency varied. The emergence of associations despite methodological heterogeneity strengthens confidence that loneliness is meaningfully related to SOF in psychosis. This aligns with broader loneliness research, which shows that loneliness predicts poorer occupational functioning, relationship difficulties and social withdrawal (Cacioppo & Hawkley, 2009; Hawkley & Cacioppo, 2010). However, variation in SOF measurement across studies likely contributed to inconsistency in findings and reflects the absence of a widely agreed gold standard, in contrast to areas such as symptom assessment, where measurement consensus is stronger (Cowman et al., 2024). Addressing the secondary aim of this review, several psychosocial, clinical

and contextual factors also appeared to shape the strength and consistency of the loneliness-SOF relationship.

With respect to the primary research question, most studies examined specific elements within functioning rather than global SOF, and effects were typically domain-specific. This is unsurprising, given that social and occupational functioning can vary independently of one another (Niv et al., 2007). The most consistent associations were observed between loneliness and social participation, communication and community integration. The largest effects were reported for loneliness and community functioning (Culbreth et al., 2021), community participation and integration (Schwartz & Gronemann, 2009; Shioda et al., 2016). These findings are consistent with qualitative accounts of people living with psychosis, who describe social withdrawal, loneliness and psychotic experiences as mutually reinforcing (Lee et al., 2025). In Nevárez-Flores et al. (2022), loneliness increased in a graded manner with greater social dysfunction and less frequent contact with friends, with the strongest associations in obvious or severe social dysfunction or minimal friend contact. These patterns align with broader evidence that people with psychosis typically experience smaller social networks, lower social support and reduced social contact, which are associated with greater loneliness (Lim et al., 2018; Giacco et al., 2016). Together, these findings suggest that loneliness is particularly related to social and community-based aspects of functioning.

Regarding other domains of SOF, evidence for links between loneliness and everyday functioning was more limited. Loneliness was sometimes associated with greater self-reported difficulty in daily functioning, though effect sizes were small and sometimes attenuated after adjusting for psychosocial and clinical factors. Although

evidence in psychosis populations is limited, research in older adults suggests reduced independence in daily tasks is associated with greater loneliness (Hacihasanoğlu et al., 2012; Masoudi et al., 2024). Performance-based capacity and time-use measures showed little evidence of association, suggesting that loneliness may relate more strongly to perceived or socially embedded aspects of functioning than to objective task performance.

Addressing the secondary aim, this review also identified several factors that appeared to shape whether loneliness and SOF were related. Associations varied depending on the inclusion of covariates (e.g., stigma, social support), the reporter of functioning, clinical stage and whether loneliness or SOF were central outcomes or secondary correlates. These factors may explain why studies with similar samples produced divergent results. The heterogeneity mirrors findings from broader loneliness models, in which the impact of loneliness depends on cognitive style, social expectations and available social resources (Cacioppo & Hawkley, 2009; Lim et al., 2018). Associations tended to weaken when internalised stigma, social support and interpersonal competence were controlled (Chrostek et al., 2016), but remained robust when analyses prioritised the loneliness-SOF relationship (Culbreth et al., 2021). This supports models situating loneliness within a network of mood, cognition and social context rather than as a standalone determinant (Freeman et al., 2002; Gayer-Anderson & Morgan, 2013).

4.1 Clinical implications

Several implications for clinical practice follow from these findings. The consistent associations between loneliness and measures of social participation and

community integration suggest loneliness is closely related to how people live, relate and take part in everyday life. People with psychosis who are and remain severely lonely, with limited social connections, appear to recover poorly following a crisis (Ma et al., 2021). Screening for loneliness, alongside more traditional assessments of symptoms and functioning, may therefore provide clinically useful information about risk and recovery potential. This is particularly relevant given the high prevalence of loneliness across the psychosis continuum (Stain et al., 2012; Meltzer et al., 2013) and its established links to distress, suicidality and poorer quality of life (Heinrich & Gullone, 2006; Michalska da Rocha et al., 2018).

The variability in associations after controlling for clinical and psychosocial factors suggests addressing loneliness in isolation is unlikely to be sufficient. In some samples, the loneliness-SOF relationship weakened after adjusting for depression, internalised stigma and social support (Chrostek et al., 2016; Ludwig et al., 2020), suggesting that interventions may need to target these domains together. Approaches that integrate work on mood, self-concept and social networks, alongside opportunities for meaningful activity and high-quality social contact, may have the greatest potential to shift both loneliness and functioning (Badcock et al., 2015; Michalska da Rocha et al., 2018).

4.2 Strengths and limitations

This review has several strengths. The protocol was pre-registered, eligibility criteria were clearly defined using a PECO framework, and a comprehensive search strategy was applied across four databases, informed by existing SOF literature. Screening and quality appraisal were conducted by two reviewers for a subset of

studies, with high inter-rater agreement. Both quantitative and qualitative designs were included and synthesised using Popay's narrative approach, allowing a richer understanding of how loneliness and SOF intersect across clinical stages of psychosis.

However, limitations should be considered when interpreting the findings. Although the inclusion of qualitative evidence allowed for consideration of contextual factors, only one qualitative study met inclusion criteria. This limits the extent to which conclusions can be drawn about lived-experience perspectives on the loneliness-SOF relationship. Therefore, qualitative findings should be interpreted as contextual and hypothesis-generating rather than as evidence of consistent lived-experience patterns across psychosis populations. This also highlights the need for further qualitative research to explore how people with psychosis understand and experience the relationship between loneliness and SOF. Additionally, the evidence base was relatively small and methodologically heterogeneous: only 12 studies met inclusion criteria, with considerable variation in sample size, setting, diagnostic composition and psychosis stage. This heterogeneity in design and outcome measurement precluded meta-analysis, limiting the precision with which the loneliness-SOF association can be estimated. Although one longitudinal study suggested loneliness may precede deterioration in instrumental daily functioning (Chen et al., 2024), most evidence was cross-sectional, constraining inferences about directionality. In many studies, loneliness was examined as one of many correlates rather than a primary outcome, limiting the specificity of conclusions. Furthermore, although some studies adjusted for key confounders (e.g., age, sex, symptom severity), others did not, and several used extensive covariate sets that may have introduced statistical over-adjustment, masking genuine associations.

A further limitation concerns measurement. Loneliness and SOF were predominantly assessed using participant-derived measures (e.g., self-report scales, interview-based ratings, structural indicators such as contact frequency). These indices are valuable because they reflect lived experience, but are susceptible to shared-method variance and may reflect psychological factors such as functional self-efficacy. For instance, self-efficacy predicts self-reported, but not clinician-rated or performance-based functioning in schizophrenia (Wright et al., 2021), raising the possibility that some of the stronger loneliness-SOF associations observed in this review may reflect perceived rather than objective functional impairment.

Finally, as is common in psychosis research, most studies recruited patients already engaged with services, often using convenience sampling, and primarily from Western clinical settings. Recruiting individuals already engaged with services may result in samples with higher levels of functioning, given evidence that people who access psychosis services earlier tend to have higher global functioning than those who present later (Hagler et al., 2023). Furthermore, only half of the included studies reported participants' ethnicity, limiting generalisability. More consistent reporting and proactive recruitment of underrepresented groups would strengthen the inclusivity and generalisability of this evidence base.

4.3 Directions for future research

Longitudinal research is needed to clarify whether loneliness leads to poorer SOF, or whether SOF difficulties increase loneliness, or whether shared underlying factors drive both. Cohort studies in early psychosis and UHR groups would be particularly informative, given evidence that social dysfunction and loneliness can

emerge prior to established psychosis (Cornblatt et al., 2003; Stefanidou et al., 2021). Although there is currently limited evidence for explicit loneliness interventions for psychosis populations (Olsson et al., 2025), established interventions targeting aspects of SOF, including social recovery approaches (Fowler et al., 2019), may provide an opportunity to examine whether improvements in SOF are associated with reductions in loneliness. Future intervention studies should incorporate both constructs as outcomes to determine whether change in one domain is associated with change in the other, using validated measures of loneliness and SOF alongside assessment of symptoms, mood, stigma and social support.

Mechanistic research is another priority. Qualitative findings from one study and existing models point to possible pathways through which loneliness may relate to functioning, including withdrawal, reduced motivation and energy, negative social expectations and practical barriers to participation (Cacioppo & Hawkley, 2009; Ludwig et al., 2022), while psychotic symptoms and stigma may, in turn, maintain loneliness (Gayer-Anderson & Morgan, 2013; Michalska da Rocha et al., 2018). Emerging review evidence further suggests that multi-level interventions targeting individual (e.g., self-esteem, internalised stigma), interpersonal and structural factors may be required to meaningfully reduce loneliness in psychosis (Olsson et al., 2025). Intervention studies could test pathways directly, for example, by examining whether social recovery interventions reduce loneliness via increased activity engagement, or whether loneliness-focused approaches improve SOF through changes in social expectations or participation. Testing these pathways through mediation, longitudinal modelling, or network approaches may help identify causal processes and clarify which mechanisms are most responsive to intervention.

Future research would also benefit from greater clarity and consistency in measurement. Building on existing critiques of functional assessment in psychosis (Cowman et al., 2024; Niv et al., 2007), studies should justify their use of global or domain-specific tools and, where possible, separate social and occupational functioning. Measures distinguishing social participation, community integration, instrumental living skills and occupational role performance, combined with validated loneliness scales, would allow more precise tests of which aspects of SOF are most closely linked to loneliness. Comparisons between subjective and objective measures and between self-report and observer-rated functioning would also help determine whether the stronger associations observed for participant-reported SOF in this review reflect genuine experiential links or shared method variance.

4.4 Conclusion

Overall, the quantitative evidence included in this review suggests that loneliness is linked to SOF in people with psychosis, particularly in domains of social participation, community integration and everyday functioning. While findings were not uniform across all measures and samples, the overall pattern was reasonably consistent: higher loneliness tended to align with poorer functioning and vice versa. The review also identified psychosocial and contextual factors, including internalised stigma, social support and depressive symptoms, that appear to shape the strength and consistency of this relationship. These findings highlight the need for longitudinal and intervention research to clarify the directionality of the loneliness-SOF relationship.

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Chapter Three
Bridging Chapter

Bridging Chapter

This chapter summarises the systematic review presented in Chapter Two and provides the conceptual and methodological foundation for the empirical study in Chapter Four. The systematic review synthesised evidence examining the relationship between loneliness and socio-occupational functioning (SOF) in psychosis, considering any additional factors relevant to the relationship. Loneliness was conceptualised as a subjective experience of perceived social isolation, and SOF was defined as engagement in everyday, social, community and occupational roles (Saraswat et al., 2006). Across studies, greater loneliness was generally associated with poorer functioning. The findings suggested that loneliness and SOF are closely related across the psychosis spectrum, particularly in domains of social participation, communication, community integration and everyday functioning. This review highlighted the relevance of social experience to everyday life and functional recovery, elements consistently identified as important by people with lived experience of psychosis (Byrne et al., 2010).

The review focused deliberately on loneliness and SOF as traditionally defined and measured. Most established measures of social and occupational functioning were primarily developed before the widespread use of social media and predominantly focus on offline social roles and interactions (Bjornestad et al., 2019). As such, digitally mediated social behaviour was outside the scope of the review. However, it has been argued that not assessing social media activity may lead to low scores on social functioning in young people with psychosis, increasing the likelihood of false positives (Bjornestad et al., 2019).

Contemporary social interaction increasingly occurs within digital environments. Social media platforms now constitute a central context for how many people communicate, maintain relationships and experience social connection. Evidence suggests that social media not only extends offline social interactions but may fundamentally alter them, with online interactions often disembodied and shaped by imagined audiences rather than direct social feedback (Yang & Crespi, 2025). As such, attempts to include online-mediated communication processes should consider that these may not be reflective of offline communication (Bjornestad et al., 2019). These differences support examining social media use as a distinct domain of social behaviour rather than assuming it reflects established constructs such as loneliness or social functioning.

Failing to consider digital social contexts may risk incomplete assessment of functioning in populations for whom online interaction constitutes a substantial component of social life. This is particularly relevant in early psychosis populations, where illness-related changes in social behaviour (e.g., social anxiety, withdrawal and stigma) can impact in-person interactions (Tran et al., 2025). Reduced social network sizes are commonly observed in early psychosis; however, these have historically been defined in terms of in-person relationships and may miss the benefits of online relationships, which are potentially rich sources of social interaction (Tran et al., 2025).

Despite growing interest in digital mental health and online social behaviour, empirical research examining social media use in psychosis remains limited. Existing studies are predominantly small-scale, cross-sectional, or self-report-based (e.g. Krishna et al., 2013; Nitzan et al., 2011; Oluğ et al., 2024). Much of the literature focuses

on subjective experience or the feasibility of online interventions, with little quantitative investigation of associations between social media use and clinically meaningful outcomes in psychosis.

To date, no epidemiologically derived study has examined associations between recorded social media use and clinician-rated outcomes or service-level indicators in early psychosis populations using routinely collected electronic health records. This represents a gap in the literature, particularly given the high prevalence of social media use among individuals experiencing first-episode psychosis (Birnbaum et al., 2019).

The empirical study presented in Chapter Four utilised de-identified electronic health records from early intervention in psychosis (EIP) services within the South London and Maudsley NHS Foundation Trust, accessed via the Clinical Record Interactive Search (CRIS) system. EIP services provide care to individuals experiencing first-episode psychosis (FEP) and those meeting criteria for at-risk mental states (ARMS). Focusing on early psychosis is clinically relevant, as this captures the clinical caseload of EIP services and has been conceptualised as a critical period during which patterns of social engagement and service use are still emerging and may have lasting implications for longer-term outcomes (Birchwood et al., 1998; McGorry et al., 2008). Examining social media use within early intervention services may therefore offer insight into how contemporary social behaviour relates to illness course and recovery. Using CRIS, the empirical study examined recorded social media use, engagement style (active, passive or both) and associations with mental health service use and clinical outcomes.

To conclude, the systematic review and empirical paper address complementary aspects of social experience in psychosis. The review focuses on subjective social isolation and everyday functioning as assessed within a research setting, whilst the empirical paper examines recorded contemporary social behaviour and clinically relevant outcomes (including overall functioning) within routine care. Together, these two studies contribute to a broader understanding of how subjective social experiences and observable social behaviours relate to clinically meaningful outcomes in psychosis.

Chapter Four
Empirical Study

Investigating the Relationship Between Social Media Use and Mental Health Outcomes in People With At-Risk Mental States and First-Episode Psychosis: A Mental Health Electronic Records Analysis

This paper has been developed for submission to *Social Psychiatry and Psychiatric Epidemiology*.

Author guidelines are outlined in Appendix C.

Word count limit: 4,500 words (excluding references, tables and figures)
Word count: 4,497 words

Investigating the Relationship Between Social Media Use and Mental Health Outcomes in People With At-Risk Mental States and First-Episode Psychosis: A Mental Health Electronic Records Analysis

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Abstract

Purpose Social media use is common among people with psychosis, yet its relationship with mental health outcomes remains poorly understood, particularly in early psychosis. We examined the prevalence and correlates of social media use and its associations with outcomes in individuals accessing early intervention in psychosis (EIP) services, including those with at-risk mental states or first-episode psychosis.

Methods Using de-identified electronic health records from EIP services within a large mental health provider in South London, we identified 562 patients aged 14–65 years accepted in 2023. We examined record of social media use and associations with clinical and service use outcomes using regression analyses, adjusting for confounders.

Results Of the 562 patients identified, social media use was recorded for 266 (47.3%); among these, most (93.6%) were recorded as using social media. Patients recorded as using social media were younger than those not using it, with no differences by gender, ethnicity, education, deprivation, EIP pathway, or diagnosis. Social media use was associated with higher odds of suicidal ideation. Engagement style was associated with service use, with active use associated with increased admissions and higher odds of compulsory detention compared with passive use. No associations were observed with length of stay or Health of the Nation Outcome Scales scores.

Conclusions Social media use is inconsistently recorded in routine clinical data. While overall use was associated with suicidal ideation, engagement style was associated with service use. Routine assessment of social media use may inform risk assessment and service planning in early psychosis services.

Keywords At-risk mental states – First-episode psychosis – Early intervention – Clinical outcomes – Functioning – Social media

Introduction

Social media use is common among people experiencing mental health problems, with rates of use at least as high as the general population, ranging from 70% to over 97% [1]. Among young adults experiencing first-episode psychosis (FEP), 90% report daily social media use [2]. Prior work suggests social media use varies within clinical populations; for example, in schizophrenia, differences in social media use have been observed by age, clinical characteristics and socioeconomic factors [3]. This variation may extend to ethnicity; in an acute transdiagnostic psychiatric sample that included patients with psychotic disorders, patients categorised as non-White had approximately 72% lower odds of frequent social media use than White patients [4]. Studies of young people experiencing FEP have identified changes in social media engagement and variations in the timing and frequency of its use preceding psychiatric hospitalisation, suggesting social media behaviours may change in clinically meaningful ways around the onset and course of early psychosis [2, 5].

The use of social media has been linked to potential benefits, including fostering social support and connections, sharing coping strategies, accessing information, promoting self-expression and reducing isolation [6-8]. However, its use has also been linked to an increased risk of depression, anxiety and poor sleep, and reduced overall well-being [6, 8]. For individuals with psychosis, social media has the potential to increase social networks and reduce isolation [9]. Review evidence suggests people with psychosis use online social networking for peer support and establishing, maintaining and re-establishing contacts [9].

How people engage with social media, rather than overall use alone, may be particularly relevant in psychosis. A decrease in active social media use (i.e., engaging in and creating interactions) has been observed among adolescents with psychotic disorders, which researchers suggest may be related to negative symptoms or impaired social functioning [10]. Similarly, among social media users in a sample of individuals with psychosis and related diagnoses, Eisner [11] found that participants with schizophrenia or psychosis diagnoses were less likely to report previously posting about mental health on social media than those with other diagnoses. Self-reported mental health posting also varied by ethnicity in the wider sample, with the highest rates reported by White and mixed ethnic group participants. While the impact of social media use on mood, self-esteem and paranoia appears to be broadly similar between individuals with or without psychosis, psychosis has been found to moderate the relationship between venting online and negative affect [12]. This raises questions about whether differential social media engagement styles are associated with broader indicators of illness severity and social functioning, beyond subjective experience.

Berry [12] proposed that individuals with psychosis may be more affected by social media content, particularly during passive use, where cognitive biases may lead to misinterpretation of others' content as personally referential or threatening. A further factor may be the role of platform algorithms, which curate content based on prior engagement and increase exposure to similar content. In the context of psychosis, such processes have been hypothesised to interact with emerging delusional beliefs by reinforcing perceived patterns or meanings, beyond perceptual or cognitive biases [13]. Changes in social media behaviour have also been observed preceding hospitalisation in psychosis, including increased use of words related to death, anger, swearing and

negative affect, as well as increased friending, co-tagging and late-night or early-morning posting activity [14]. This suggests online behaviour may signal clinical deterioration or relapse and may contribute to interpersonal or social difficulties during periods of acute illness.

Research on social media use in psychosis is dominated by case reports and self-report studies, with little quantitative evidence examining clinical outcomes [13]. Recently, researchers in Turkey published the first study examining the relationship between internet, social media and technology use and illness severity and functioning in individuals with bipolar and schizophrenia spectrum disorders in remission [15]. They reported higher levels of functioning among social media users, who were younger and more highly educated. However, they relied on unadjusted group comparisons, and sociodemographic differences between users and non-users were not accounted for in analyses of illness severity and functioning, raising the possibility that observed differences reflected age or educational attainment rather than social media use. Additionally, the focus on individuals in remission limits conclusions about the relationship between social media use and clinical outcomes during active illness. It remains unclear whether similar patterns would be observed using clinician-rated or service-level outcomes, particularly during clinically important stages such as early psychosis [16]. Research in early psychosis, including at-risk mental states (ARMS) and FEP, is further limited by a focus on adolescent and young adult samples (e.g., [10, 17]). To our knowledge, no epidemiologically derived study has investigated associations between social media use and clinical outcomes among adults living with psychosis and related presentations while accounting for potential confounders.

The current study aimed to address this gap by examining social media use and its associations with clinical outcomes and mental health service use in people with ARMS and FEP. We addressed the following research questions:

1. How common is social media use among individuals with ARMS and FEP?
2. Which sociodemographic and clinical characteristics are associated with social media use?
3. Are there differences in mental health service use and clinical outcomes between social media users and non-users, and across social media engagement styles (i.e. active and passive)?

Methods

Study Design, Setting and Data Source

A cross-sectional study was conducted using de-identified electronic health records from the South London and Maudsley NHS Foundation Trust (SLaM).

SLaM serves a population of 1.3 million people across the four South London boroughs of Croydon, Lewisham, Lambeth and Southwark [18], and provides care for over 45,000 people annually [19]. An early intervention in psychosis (EIP) service is provided within each borough for people aged 14-65 presenting with FEP, and individuals aged 14-35 presenting with ARMS. Both pathways provide two to three years of psychological, medical and social support. Both ARMS and FEP groups were included to reflect the full caseload of EIP services, which provide distinct but related interventions across the psychosis continuum.

Data were extracted from the Clinical Record Interactive Search (CRIS) system, which de-identifies SLaM electronic clinical records for research purposes [20, 21]. Clinical information in CRIS appears in two forms: structured fields (e.g., dates, demographics and diagnosis) and unstructured free-text fields (e.g., clinical information in medical notes and correspondence) [22]. A range of Natural Language Processing (NLP) applications has been developed to support free-text data extraction in CRIS, achieving moderate-to-high precision [23].

Ethical Approval

CRIS has been approved by the Oxfordshire Research Ethics Committee (reference 23/SC/0257) as a secondary research dataset. We obtained SLaM/CRIS Oversight Committee approval for this study (reference 24-047). Patient consent was not required under UK law, and the study was conducted in accordance with UK research governance and data protection standards.

Case Identification and Inclusion Criteria

We searched the CRIS system using Structured Query Language (SQL) to identify patients who met the following inclusion criteria: (a) aged 14-65 years (inclusive) in line with service eligibility criteria; and (b) accepted to SLaM EIP services within the study period (1 January–31 December 2023).

The study cohort was restricted to patients accepted in 2023 to ensure recency and the feasibility of manual data extraction as required.

Data Extraction

Social Media Use

Social media data were extracted manually from each patient record [22]. Free-text entries were searched using predefined social media search terms, including general terms (e.g. “social media”), specific platforms and related language (see Appendix D for full search strategy). The search strategy was informed by prior social media research and CRIS projects [9, 24, 25], with additional terms included to reflect current platforms [26].

Retrieved text was reviewed and coded by a single researcher using a prespecified framework developed by the research team (see Appendix E) to support the consistent application of decision rules. Independent double-coding was not feasible. Coding issues were resolved through discussion between researchers. Social media use was coded as yes/no when explicit evidence of use or non-use was recorded. Where no relevant evidence of use was identified, including mentions not indicating use, this was coded as not recorded. Social media use was defined as the use of any online platform enabling social interaction, content sharing, or engagement with others.

Where social media use was recorded, we categorised engagement as active: creating content or engaging directly with others (e.g., posting, commenting, liking, messaging); passive: consumption-based behaviours (e.g., scrolling, browsing, watching without direct interaction); both: where active and passive engagement were recorded, consistent with established conceptualisations [27]. Platform names were extracted, and a derived variable representing the number of platforms used was created by summing distinct platforms recorded for each patient.

Sociodemographic Characteristics

Sociodemographic data were extracted from CRIS structured fields using SQL (age, gender, ethnicity, area-level deprivation) and free-text fields using NLP (education). Age was defined as age at acceptance to EIP services.

Ethnicity is recorded in CRIS according to UK census ethnic classifications [28]. Due to small group sizes and for analysis, categories were collapsed into broader groups in line with prior CRIS research [29, 30] and research recommendations [31]. Ethnic categories were collapsed into: White British; White non-British (White Irish, White Gypsy and White Other); South Asian (Indian, Pakistani, Bangladeshi); Asian Other (Chinese, Asian Other); Black Caribbean; Black African; Black British; Mixed (White & Black Caribbean, White & Black African, Mixed Other); Other (Arab, any Other Ethnic group); and not recorded.

Education reflects the highest recorded level of educational attainment, coded as: No qualifications; General Certificate of Secondary Education (GCSE; or equivalent); A-level (or equivalent); and University, consistent with CRIS categories and prior CRIS research [32].

Area-level Deprivation is recorded in CRIS using the Index of Multiple Deprivation (IMD) 2019 [33], derived from patients' residential Lower Super Output Areas (LSOAs). IMD ranks closest to the start of the study window were used and collapsed into quintiles ranging from 1 (most deprived) to 5 (least deprived), consistent with prior CRIS-based research [30].

Clinical Characteristics

Clinically relevant variables identified in similar studies were extracted from CRIS structured fields using SQL, including EIP pathway (ARMS or FEP) and diagnosis [30, 34].

EIP Pathway indicated whether patients were assessed and accepted to ARMS or FEP care pathways within EIP services.

Diagnosis was defined as the first primary psychiatric diagnosis recorded on or after service acceptance, documented in CRIS using the International Classification of Diseases, Tenth Revision (ICD-10) codes [35]. Due to small group sizes and for analysis, diagnoses were collapsed into broader ICD-10 categories: Acute psychosis; Delusional disorder; Schizophrenia; Schizoaffective disorder; Unspecified psychosis; Other (all other diagnoses); and not recorded.

Mental Health Service Use and Clinical Outcomes

Service use and clinical outcomes were ascertained within a pre-defined outcome window spanning 1 January 2023 to 31 December 2024 to ensure adequate coverage of outcomes within routine EIP care.

Service use data relating to hospital admissions, length of hospital stay and compulsory detention under the Mental Health Act 1983 (MHA; [36]) were extracted from CRIS structured fields using SQL. We operationalised the variables as follows:

Number of Admissions to psychiatric hospitals and cumulative **Length of Stay** were measured over the outcome window as count variables.

Compulsory Detention under the MHA (UK legislation allowing involuntary detention for mental health assessment or treatment) was measured as a binary outcome (yes/no), defined as any detention during the outcome window.

Clinical outcome data included Health of the Nation Outcome Scales (HoNOS) scores extracted from CRIS structured fields using SQL, and suicidal ideation extracted from free-text fields using NLP. We operationalised these variables as follows:

HoNOS Total Scores were used as an indicator of overall symptom severity and functioning, measured as a continuous variable using the most recent score within the outcome window. The HoNOS is a clinician-rated scale of behaviour, impairment, symptoms and social functioning. HoNOS measures are mandated within English mental health services and have demonstrated adequate or better psychometric performance [37]. Within early psychosis populations, the HoNOS has demonstrated satisfactory sensitivity and validity as an outcome measure [38].

Suicidal Ideation (thinking about, considering, or planning suicide) was measured as a binary outcome (yes/no), defined as any recorded occurrence during the outcome window. Suicidal ideation was included as it is common in early psychosis and associated with greater symptom severity, poorer quality of life and less favourable recovery trajectories [39, 40].

Statistical Analysis

Data were analysed using Stata version 18. Significance was set at $p \leq .05$. Analyses were conducted using complete-case data for each outcome; patients with missing outcome data were excluded from relevant models. Descriptive statistics, including frequencies and percentages for categorical variables, means and standard deviations, or medians and ranges for continuous and count variables, were used to describe the sample. Continuous and count data were checked for normality. To address research question one, descriptive percentages were used to estimate the

prevalence of recorded social media use in the full sample. Engagement style and platform information were described among patients with recorded social media use. Subsequent inferential analyses were restricted to patients with recorded social media information.

For research question two, we performed an ANOVA (for age) and Fisher's exact tests (for all categorical variables due to small expected cell counts) to examine differences between social media use and non-use across sociodemographic and clinical characteristics. For area-level deprivation, cases with missing IMD data were excluded from inferential analysis, as IMD scores can only be derived from valid LSOA data and 'not recorded' is not a meaningful deprivation category.

For research question three, two sets of regression analyses were conducted to assess associations between outcome variables and social media use and non-use, and engagement styles (active, passive and both). First, we estimated crude associations (Model 1); then we adjusted for age, gender and ethnicity as a priori confounders (Model 2). Binary outcomes were analysed using logistic regression, and results are reported as odds ratios (ORs) with 95% confidence intervals. Count outcomes (number of admissions and length of stay) were analysed using negative binomial regression due to overdispersion (LR test of $\alpha = 0$, $p < .05$), with results reported as incidence rate ratios (IRRs). HoNOS total scores were analysed using linear regression. For all social media engagement style regression analyses, passive use was the reference group.

Table 1 *Sample Characteristics*

	N = 562 (%) [a]
Age *M*(*SD*)	32.1 (12.3)
Gender	
Male	341 (60.7)
Female	218 (38.8)
Other	3 (0.5)
Ethnicity	
White British	107 (19.0)
White non-British	61 (10.9)
Mixed	35 (6.2)
South Asian	28 (5.0)
Asian Other	17 (3.0)
Black Caribbean	56 (10.0)
Black African	130 (23.1)
Black British	44 (7.8)
Other	36 (6.4)
Not Recorded	48 (8.5)
Highest level of education	
No Qualifications	7 (1.3)
GCSE	23 (4.1)
A Level	21 (3.7)
University	381 (67.8)
Not Recorded	130 (23.1)
Area-Level Deprivation	
1 (*Most Deprived*)	156 (27.8)
2	270 (48.0)
3	92 (16.4)
4	23 (4.1)
5 (Least Deprived)	7 (1.3)
Not Recorded	14 (2.5)
EIP Pathway	
ARMS	78 (13.9)
FEP	484 (86.1)
Primary Diagnosis	
Acute Psychosis	11 (2.0)
Delusional Disorder	2 (0.4)
Schizophrenia	15 (2.7)
Schizoaffective Disorder	5 (0.9)
Unspecified Psychosis	245 (43.6)
Other	5 (0.9)
Not Recorded	279 (49.6)
Median Number of Admissions (IQR)	0 (0-1)
Median LOS in days (IQR)	0 (0-45)
Compulsory detention	
Yes	164 (29.2)
No	398 (70.8)
Suicidal Ideation	
Yes	304 (54.1)
No	258 (45.9)
HoNOS Total *M*(*SD*)	22.3 (15.4)
Social Media Use	
Yes	249 (44.3)
No	17 (3.0)
Not Recorded	296 (52.7)
Social Media Engagement Style (*n* = 249)	
Active	66 (26.5)
Passive	76 (30.5)
Both	55 (22.1)
Not Recorded	52 (20.9)
Median Number of Platforms (IQR)	1 (1-2)

SD Standard Deviation, IQR Interquartile Range

[a] Percentages may not sum to 100% due to rounding to one decimal place

Results

Sample Characteristics

Five hundred and sixty-two patients met inclusion criteria. Sociodemographic and clinical characteristics are presented in Table 1. The mean age was 32.1 (*SD* = 12.3). Most patients were male (60.7%), and the most common ethnicity was Black African (23.1%). The majority were accepted by EIP as FEP (86.1%), with ARMS accounting for the remaining 13.9%. Unspecified psychosis was the most common diagnosis (43.6%).

Social Media Use

Of the 562 patients included, social media use was recorded in clinical records for 266 (47.3%) patients and not recorded for 296 (52.7%). Among those with recorded data, 249 (93.6%) were recorded as using social media and 17 (6.4%) as not using it.

Among patients recorded as using social media, engagement style was recorded for 197 (79.1%; see Table 1), and platform information for 188 (75.5%; see Table 2).

Table 2 *Social Media Platforms Recorded Among Patients With Recorded Social Media Use*

Social media platform [a]	*n* = 188 *(%)*
YouTube	75
Instagram	59
Facebook	48
TikTok	40
WhatsApp	26
Snapchat	25
Twitter/X	15
Other platforms [b]	30

[a] Platform categories were not mutually exclusive; multiple platforms could be recorded for an individual. [b] Other platforms included Discord, Reddit, LinkedIn, Pinterest, Telegram, Twitch, Threads, Wattpad, Tagged, Myspace and online forums.

Comparisons Between Social Media Use and Non-Use by Sociodemographic and Clinical Characteristics

Comparisons of social media use and sociodemographic and clinical characteristics are summarised in Table 3. Patients with recorded social media use were younger than those recorded as non-users, $F(1,264) = 7.60$, $p = .006$, $\eta^2 = .03$. No differences were observed between users and non-users by gender, ethnicity, area-level deprivation, EIP pathway, or diagnosis.

Table 3 *Comparisons Between Social Media Use and Sociodemographic and Clinical Characteristics*

	Users *n* = 249 (%) [a]	Non-users *n* = 17 (%) [a]	Test statistic / *p* value
Age *M*(*SD*)	29.0 (11.3)	37 (16.0)	$F(1,264) = 7.60$, $p = .006$
Gender			
Male	135 (54.2)	11 (64.7)	Fisher's exact $p = .560$
Female	111 (44.6)	6 (35.3)	
Other	3 (1.2)	0 (0.0)	
Ethnicity			
White British	42 (16.9)	6 (35.3)	Fisher's exact $p = .368$
White non-British	26 (10.4)	1 (5.9)	
Mixed	13 (5.2)	0 (0.0)	
South Asian	13 (5.2)	1 (5.9)	
Asian Other	8 (3.2)	1 (5.9)	
Black Caribbean	28 (11.2)	0 (0.0)	
Black African	58 (23.3)	4 (23.5)	
Black British	25 (10.0)	1 (5.9)	
Other	19 (7.6)	3 (17.7)	
Not Recorded	17 (6.8)	0 (0.0)	
Highest level of education			
No Qualifications	2 (0.8)	0 (0.0)	Fisher's exact $p = .521$
GCSE	12 (4.8)	0 (0.0)	
A Level	11 (4.4)	2 (11.8)	
University	185 (74.3)	13 (76.5)	
Not Recorded	39 (15.7)	2 (11.8)	
Area-Level Deprivation [b]			
1 (*Most Deprived*)	67 (27.8)	5 (29.4)	Fisher's exact $p = .885$
2	123 (51.0)	9 (52.9)	
3	38 (15.8)	2 (11.8)	
4	9 (3.7)	1 (5.9)	
5 (*Least Deprived*)	4 (1.7)	0 (0.0)	
EIP Pathway			
ARMS	47 (18.9)	3 (17.7)	Fisher's exact $p = 1.000$
FEP	202 (81.1)	14 (82.4)	
Diagnosis			
Acute Psychosis	6 (2.4)	0 (0.0)	Fisher's exact $p = .484$
Delusional Disorder	1 (0.4)	0 (0.0)	
Schizophrenia	9 (3.6)	1 (5.9)	
Schizoaffective Disorder	2 (0.8)	0 (0.0)	
Unspecified Psychosis	114 (45.8)	6 (35.3)	
Other	4 (1.6)	1 (5.9)	
Not Recorded	113 (45.4)	9 (52.9)	

[a] Percentages are column percentages. Percentages may not sum to 100% due to rounding to one decimal place

[b] Area-Level Deprivation (*n* = 258), comprising social media users (*n* = 241) and non-users (*n* = 17)

Associations With Mental Health Service Use and Clinical Outcomes by Social Media Use and Engagement Style

Unadjusted regression analyses (Model 1, Table 4) showed an association between social media use and suicidal ideation. Compared with patients recorded as not using social media, those with recorded social media use had higher odds of at least one instance of suicidal ideation. This association remained after adjustment for age, gender and ethnicity (Model 2, Table 4). No association was found between social media use and the number of psychiatric hospital admissions, length of stay, compulsory detention, or HoNOS scores, including after adjustment for confounders.

Table 4 *Associations of Social Media Use and Mental Health Service Use and Clinical Outcomes*

	Model 1		Model 2	
	Unadjusted	95% CI	Adjusted	95% CI
Number of Admissions (IRR)	1.18	0.59-2.38	1.08	0.54-2.14
Length of Stay (IRR)	1.24	0.33-4.69	1.13	0.27-4.82
Compulsory Detention (OR)	0.78	0.28-2.17	0.51	0.16-1.59
Suicidal Ideation (OR)	3.40*	1.16-9.95	3.70*	1.16-11.73
HoNOS Total (*B*)	7.34	-0.06-14.74	5.62	-2.05-13.28

Model 1 – Unadjusted
Model 2 – Adjusted for age, gender, ethnicity
IRR Incidence Rate Ratio, OR Odds Ratio, *B* Beta Coefficient, CI Confidence Interval
*$p \leq .05$

Table 5 presents unadjusted and adjusted regression models examining associations between social media engagement style and service use and clinical outcomes. In unadjusted analyses, recorded engagement style was associated with compulsory detention and the number of psychiatric hospital admissions (Model 1). Compared with patients recorded as passive users, those recorded as active users had a higher expected number of psychiatric admissions and higher odds of compulsory

detention. These associations remained after adjusting for age, gender and ethnicity (Model 2). Engagement involving both active and passive use was not associated with admissions or compulsory detention. There was no evidence that engagement style was associated with suicidal ideation, HoNOS scores, or length of stay.

Table 5 *Associations of Social Media Engagement Style and Mental Health Service Use and Clinical Outcomes*

	Model 1		Model 2	
	Unadjusted	95% CI	Adjusted	95% CI
Number of Admissions (IRR)				
Active vs Passive	1.88*	1.20-2.93	1.86*	1.21-2.85
Both vs Passive	1.53	0.94-2.47	1.15	0.72-1.83
Length of Stay (IRR)				
Active vs Passive	1.45	0.61-3.45	2.13	0.79-5.75
Both vs Passive	0.98	0.39-2.44	1.06	0.38-2.91
Compulsory Detention (OR)				
Active vs Passive	3.32**	1.60-6.92	3.15*	1.43-6.93
Both vs Passive	1.28	0.56-2.91	1.04	0.42-2.57
Suicidal Ideation (OR)				
Active vs Passive	1.40	0.72-2.74	1.18	0.58-2.40
Both vs Passive	1.49	0.73-3.04	1.22	0.56-2.63
HoNOS Total (*B*)				
Active vs Passive	-0.71	-5.65-4.23	-1.00	-6.14-4.14
Both vs Passive	2.68	-2.53-7.88	1.85	-3.70-7.40

Model 1 – Unadjusted
Model 2 – Adjusted for age, gender, ethnicity
IRR Incidence Rate Ratio, OR Odds Ratio, *B* Beta Coefficient, CI Confidence Interval
*p≤.05
**p≤.001

Discussion

Main Findings

This study used de-identified electronic health records to examine social media use and mental health outcomes among individuals with ARMS and FEP in South London. Social media use was recorded for fewer than half of patients. Among those with social media data, the majority (93.6%) were recorded as users. Patients recorded as using social media were younger than those recorded as non-users, with no

differences observed by gender, ethnicity, education, deprivation, EIP pathway, or diagnosis. Social media use was associated with higher odds of suicidal ideation, even after adjustment for age, gender and ethnicity. While overall use was not associated with admissions, detention, or HoNOS scores, engagement style was informative: compared to passive use, active use was associated with a higher number of psychiatric hospital admissions and increased likelihood of compulsory detention.

Social Media Use

A central finding was the limited recording of social media use in clinical records. Over half of the sample had no record of social media use. This is consistent with evidence from UK youth mental health settings, where over a third of patients reported never being asked about digital technology use, and fewer than half of clinicians reported routinely asking about it despite recognising its importance for risk assessment and potential benefits and harms for mental health [41]. Routine assessment frameworks in psychosis services seldom include social media use, and in-person relationships are often prioritised over online interactions [17, 42]. Clinicians may feel under-skilled, and young people report social media is seldom raised unless introduced by themselves, highlighting potential barriers to assessment [43].

When social media use was recorded, most patients were identified as users, with only a small minority explicitly recorded as non-users. While this is higher than recent estimates of 81.8% within English EIP services [11], it reflects rates observed in psychosis and the general population [2, 24]. Many patients engaged in both active and passive social media use. Previous studies have investigated only active or passive engagement [12, 44], but this finding suggests real-world social media behaviour is

more complex, supporting arguments that binary classifications oversimplify online behaviour [45]. The present findings highlight the potential utility of incorporating social media use and engagement into clinical assessment frameworks.

Social Media Use and Sociodemographic and Clinical Correlates

Despite limited research on sociodemographic correlates of social media use in early psychosis, the literature on serious mental illness consistently reports greater use among younger and more educated individuals [3, 15, 24]. Our findings partially align with this literature. Age emerged as the only significant correlate of social media use, with recorded users significantly younger than non-users. This is unsurprising, given younger adults are among the most frequent social media users and represent the peak risk period for psychosis onset [5, 46]. These findings touch on debates about youth susceptibility during a developmental period characterised by identity formation and heightened sensitivity to social context and connectedness [47]. However, age-related differences may also reflect differential clinician enquiry across age groups observed in broader research [41].

Social media use did not differ by EIP pathway, despite ARMS populations typically being younger than FEP in England [35]. This may indicate that age-related differences operate independently of clinical pathway within EIP services, although limited power to detect subgroup differences cannot be ruled out.

No differences in social media use were observed by gender, ethnicity, education, or area-level deprivation. This contrasts with psychosis research reporting socioeconomic associations with social media use, particularly in relation to education and income [3, 24]. This may reflect widespread social media use in our sample,

reducing the ability to detect statistical associations. However, it may be that factors influencing social media use are more individual (e.g., personality traits) and independent of sociodemographic characteristics [48].

Social Media Use and Mental Health Outcomes

Social media use was associated with higher odds of suicidal ideation. However, no differences were observed between recorded users and non-users in psychiatric admissions, compulsory detention, HoNOS scores, or length of stay. This suggests social media use may be more closely related to subjective distress or disclosure than to broader indicators of illness severity and functioning. Suicidal ideation is common in early psychosis and follows heterogeneous trajectories, not always mirrored by functioning or service-use indicators [39]. In the context of routine clinical data, this association may also reflect shared documentation pathways.

In contrast to the present findings, Oluğ [15] reported higher levels of functioning among social media users with serious mental illness, including psychosis. Differences in outcome measures, sample characteristics and study design may account for this discrepancy. The absence of associations with symptom severity and functioning in our study also appears at odds with clinician perspectives. In a UK survey of early psychosis clinicians, the majority endorsed potential adverse effects of social media on psychotic symptoms, while simultaneously recognising benefits for social interaction [49]. This highlights a gap between clinician expectations and routinely recorded outcomes.

Compared with passive social media use, active use was associated with increased odds of psychiatric admissions and compulsory detention. One interpretation is that active online behaviour correlates with acute distress,

interpersonal conflict, or increased visibility of emerging difficulties to carers or services, thereby coinciding with pathways into care. Social media behaviour may also become clinically relevant when it forms part of the psychosis presentation or raises risk or safeguarding concerns, thereby increasing the likelihood of documentation in clinical records. Prior work has shown measurable changes in social media behaviour surrounding relapse and hospitalisation, including alterations in online language use and social connectivity [14, 50]. In one study, 24% of individuals with FEP reported that others noticed changes in their online activity during symptom emergence [2]. This supports the interpretation of social media behaviour as a correlate or signal of clinical change.

There were no associations between social media engagement style and HoNOS scores, suicidal ideation, or length of stay. The absence of associations with length of stay may reflect limited power to detect effects in skewed admission data. These findings align with evidence that greater online engagement in early psychosis is associated with positive social experiences and victimisation, without direct associations with psychotic symptoms [44]. Broader evidence suggests the psychological impact of active and passive social media use is highly context-dependent, with substantial variability across individuals and situations [45], such that global indicators of symptom severity, functioning, or service use may not capture potential benefits or harms.

Strengths and Limitations

To our knowledge, this is the first quantitative study conducted in a UK clinical population to examine associations between social media use and mental health

outcomes in ARMS and FEP. A key strength is the use of de-identified routine clinical records, drawing the study sample from a large and established EIP service [51]. This enabled examination of social media use and mental health outcomes at scale in a real-world early psychosis population, extending beyond self-report approaches used in previous research [15]. Additionally, routine clinical data provided ecologically valid measures of illness severity and functioning, such as hospital admissions, compulsory detention and HoNOS scores. The demographic profile of the cohort was broadly consistent with previous CRIS-based SLaM early psychosis samples in terms of age, gender distribution and ethnic composition [52, 53], supporting the representativeness of the study population for this service context. The ethnic diversity of our sample also reflects the diverse South London context in which SLaM services operate, where 2021 Census data show that White British residents comprise around 36–38% of the populations of Croydon, Lambeth, Lewisham and Southwark [54]. The ethnic diversity of the sample is a particular strength, given evidence that social media use and mental-health-related posting may vary across ethnic groups [4, 11].

Although the overall sample size was relatively large and sufficient for planned analyses, social media data were available for just over half of patients, and the recorded non-use subgroup was small. This limited statistical power and reflected reliance on clinician documentation, such that social media use in this study represented what was recorded in clinical notes rather than actual use. Individuals without recorded data may have included both users and non-users, introducing potential misclassification and bias. In line with this, collapsing some clinical and sociodemographic categories (ethnicity, diagnosis) due to small numbers may have obscured subgroup differences. Manual coding methods are common in CRIS projects

but typically limit sample sizes to several hundred or fewer [22]. Automated extraction methods could enable larger samples to be examined in future research.

Social media data were manually extracted following a priori coding rules, but lacked independent verification. This increased the chance of rater error, which is inherent to data extraction from routine clinical documentation [55], although this is expected in a minority of cases. The manual extraction framework developed for this study may help inform future automated approaches to identifying social media use within clinical records.

Finally, the cross-sectional design limits causal inference. The direction of the relationship between social media use and mental health outcomes remains unclear. Longitudinal studies are required to clarify temporal relationships.

Research and Clinical Implications

Taken together, these findings highlight important implications for research and clinical practice. Research using electronic health records to study social media-related behaviour in early psychosis is likely to underestimate prevalence, and should treat the absence of recording as missing information rather than evidence of non-use. Given the lack of standardised measures of social media use [42], future research should develop and incorporate standardised assessments of social media use, including engagement style and perceived impact. Future work should focus on expanding definitions of social media use and engagement beyond use versus non-use to include information on frequency, content and duration.

Clinically, the inconsistent recording of social media use suggests a potential gap in routine assessment, particularly given increasing interest in the role of online environments in social functioning, well-being and symptom experience in early psychosis. Throughout assessment and treatment, clinicians routinely explore social relationships, especially when individuals identify social goals or difficulties. However, these conversations often focus on in-person relationships and may overlook online experiences that impact symptoms, distress or risk. One practical approach to addressing this gap may be to incorporate enquiry about online interactions alongside offline relationships within existing clinical assessments [17]. This may help identify potential risks and benefits of social media use for individuals.

Given the observed associations between social media use, suicidal ideation and service use outcomes, routine assessment of online experiences may provide clinically relevant information to inform formulation and risk assessment. This may be pertinent in the context of suicidal ideation and among younger patients who are more likely to engage with social media. This aligns with youth mental health literature, indicating that many clinicians feel under-skilled in discussing digital technology and express a need for training and guidance [41]. Zhang [49] reported mixed clinician attitudes toward social media use in early psychosis and recommended staff training to support assessment of online behaviour in clinical practice. These findings highlight the potential value of routine enquiry about social media use in early psychosis services and the need for clinician training in this area.

Conclusion

This study used routine clinical data to examine social media use and mental health outcomes in people with ARMS and FEP. The findings suggest that social media behaviour, particularly engagement styles, may reflect distress and service use rather than illness severity and functioning. Routine, structured assessment of online experiences may improve clinical formulation and research validity in early psychosis.

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Chapter Five
Discussion and Critical Evaluation

Word Count: 4,183

Discussion and Critical Evaluation

This chapter synthesises findings from the systematic review and empirical study and considers their contributions to the field. Findings are situated within relevant theoretical models, implications for clinical practice and future research are discussed, and the strengths and limitations of the research process as a whole are presented. Additionally, reflections on the research process are presented. The chapter closes with a summary of key conclusions.

Summary of Findings

Together, the systematic review and empirical study examined how subjective and behavioural aspects of social experience relate to outcomes in psychosis, offering a multidimensional perspective across at-risk states and early and established psychosis. Although the papers focused on different constructs (loneliness in the review and social media use in the empirical study), both address aspects of social connection and participation: loneliness as a subjective experience of disconnection and social media use as a contemporary behavioural context.

The systematic review included 12 studies examining the relationship between loneliness and socio-occupational functioning (SOF) in psychosis. Overall, most studies suggested that greater loneliness is associated with poorer SOF, particularly in relation to social participation, community integration and everyday functioning. Evidence for links with global functioning was more mixed, and associations with performance-based measures were weaker. The review also found that factors such as internalised stigma, depression, social support and self-concept appeared to shape the relationship, suggesting that it may be embedded within a broader network of

psychosocial processes. The empirical study analysed data from electronic health records for 562 patients with at-risk mental states (ARMS) or first-episode psychosis (FEP) accessing early intervention in psychosis (EIP) services in South London. It examined associations between social media use and mental health outcomes. Social media use was inconsistently recorded in clinical records. Where information was available, recorded social media use was associated with suicidal ideation but not with other clinical or service use outcomes. Social media engagement style appeared to provide additional information: compared with passive use, active use was associated with a higher number of psychiatric hospital admissions and greater odds of compulsory detention under the Mental Health Act 1983. The findings of the empirical study suggest that clinical assessment of social media behaviour may have value for risk assessment and service planning in early psychosis.

Taken together, the two studies suggest that social experience in psychosis, encompassing both subjective and behavioural dimensions, can be understood as spanning both offline and online contexts. This is consistent with Tran et al.'s (2024) argument that the distinction between online and offline activities is becoming increasingly blurred, and that to support the social goals of individuals living with psychosis, it is important to understand their online interactions without a bias towards in-person interactions. The review shows that loneliness is closely tied to how people with psychosis participate in social and community life, while the empirical study suggests that online engagement may also carry clinically relevant signals, particularly around distress and service use. These findings suggest that social functioning in psychosis cannot be reduced simply to the amount of contact someone has: what matters is the quality, meaning and context of social experience, whether face-to-face

or digital. For people living with psychosis, including at-risk mental states (ARMS), social media may offer opportunities for connection (Highton-Williamson et al., 2015), but it may also become entangled with distress, suicidality, or crisis pathways. Overall, the findings highlight the potential value of considering loneliness, community participation and online experiences together, rather than treating social media behaviour as separate from broader social functioning.

Overall, the findings align with the recovery-oriented priorities of people living with psychosis, which extend beyond symptom reduction to include social connection, meaningful activity and participation (Alyahya et al., 2022) and recovery frameworks emphasising connectedness and participation (Leamy et al., 2011).

Researcher Reflections

Conducting this portfolio deepened my understanding of psychosis and of the practical and ethical realities of research. A consistent motivation throughout was wanting to represent, as accurately as possible, the experiences of people whose clinical records (empirical study) and research data (systematic review) formed the basis of this work. Working with routine clinical data exposed me to the human impact of psychosis, which strengthened my commitment and care in producing research that is not over-interpretive and is clinically useful.

In hindsight, I would have liked to involve people with lived experience more directly, particularly in shaping research questions, defining outcomes and interpreting findings. The feasibility of this was limited by the use of secondary data and the timeframe of the thesis. To partly address this, I prioritised including qualitative evidence where possible in the review and used lived-experience literature to guide the

research process. In hindsight, earlier and more formal collaboration, such as consulting experts by experience at the stage of protocol development and coding framework design, could have strengthened both papers and is a priority for future work.

One of the most challenging parts of the empirical study was manually extracting and coding social media information from electronic health records. This required hundreds of hours of screening and careful judgment calls, often involving reading emotive content. Although this process was time-consuming, I found it valuable in emphasising both the richness of routine clinical data and its limits for research (such as the variation in what is asked and recorded by clinicians). This process highlighted to me the importance of accurate and detailed record-keeping in clinical practice. The process of manual extraction also reinforced the ethical responsibility to handle secondary data respectfully and to avoid over-interpretation in coding and analysis.

The process of writing both research papers taught me a great deal about research quality. Appraising study quality as part of my systematic review developed my understanding of how research quality is established and communicated. I found the application of a quality appraisal tool particularly challenging, given the subjective application in many cases. This strengthened my appreciation for having a second reviewer to appraise study quality to ensure reliability. Appraising the quality of other studies as part of the systematic review process was also valuable when writing the empirical paper, as I kept in mind the elements a high-quality study should include, informed by my experience of analysing the quality of other papers.

More broadly, conducting research in an area with relatively few closely comparable studies meant I had to engage with the existing literature in detail. In some cases, checking the sources of highly cited papers revealed that their summaries of other research did not always match the original arguments. This experience increased my confidence in critical evaluation and reinforced the importance of accurate citation and cautious claims, particularly when findings may inform clinical practice, when clinicians may not have time to check the accuracy of claims. Of course, I am a human researcher, and there will inevitably be errors, but I can feel ethically sound about publishing, knowing that, to the best of my knowledge, I have summarised others' arguments as accurately as possible.

Strengths and Limitations

The portfolio has several key strengths. It brings together evidence synthesis and empirical analysis to advance understanding of social experience and participation in psychosis. Both papers focus on constructs that are highly relevant to recovery-oriented care, including social connection, participation and engagement in contemporary social contexts. The use of a systematic approach throughout, alongside the inclusion of both research literature and routine clinical data, supports the clinical relevance of the findings. In addition, the empirical study draws on a large and representative early intervention in psychosis cohort, while the systematic review includes studies from a range of international contexts.

The two papers also inform one another. The systematic review highlights challenges in how socio-occupational functioning is conceptualised and measured, which are reflected in the empirical study, where social media use was inconsistently

recorded and captured in relatively broad categories. This convergence suggests that measurement difficulties are not limited to a single study but reflect broader challenges in operationalising complex constructs such as SOF (Stafford et al., 2024; Schjølberg Marques et al., 2025) and social media use (Meier & Krause, 2023).

At the same time, several limitations constrain the strength of the conclusions that can be drawn. First, across the portfolio, measurement relied on self-report, clinician-recorded data, or structured assessments. While the empirical study included real-world clinical outcomes (e.g. hospital admissions and compulsory detention), neither study directly measured social behaviour or social media activity within naturalistic contexts. As such, findings reflect how social experiences are reported or recorded, rather than how they occur in everyday life. Similarly, in the empirical study, social media variables were derived from clinician-recorded free text and were therefore dependent on whether clinicians had asked about and recorded this information. As a result, over half of the cohort had no recorded data on social media use, and the absence of recording cannot be interpreted as non-use. Restricting analyses to those with recorded information may therefore have introduced selection bias and may limit the generalisability of the findings. Furthermore, because data in CRIS are recorded as part of routine clinical practice rather than for specific research purposes, the quality of the information may be affected. This reflects well-documented challenges in the use of unstructured clinical data for research, including missing information, inconsistencies and inaccuracies in recording practices and information bias (including observer bias) associated with electronic health record data (Sedlakova et al., 2023).

In addition, the approach to data extraction reflects broader trade-offs within the research process. Although the study initially aimed to utilise a natural language processing (NLP) approach, this was not feasible due to limitations in available methods, and manual coding was undertaken. Although the manual coding approach was based on a prespecified framework and consistent with established CRIS methodology (Perera et al., 2016), it limited the feasible sample size within the thesis timeframe. This reflects a recognised limitation of manual extraction from electronic health records, which is labour-intensive, particularly when compared to automated approaches (Kang et al., 2025). The reduced sample size relative to the population available through the CRIS database, combined with the small number of patients recorded as not using social media, may have limited power to detect associations. Furthermore, while manual coding allowed for more detailed interpretation of free-text entries, coding was completed by a single researcher and inter-rater reliability was not assessed, introducing the possibility of subjective interpretation and limiting scalability. Although double-coding was not feasible within the timeframe of the thesis, this would be an important step prior to submission for publication. More broadly, while NLP approaches were not sufficiently robust for use in this study, the coding framework developed here may help to inform future work in this area, particularly in supporting the development and validation of NLP methods for extracting clinically meaningful social media data from electronic health records.

Many studies included in the systematic review recruited individuals already engaged with mental health services. Similarly, although the empirical study builds on previous research (Oluğ et al., 2024) by including individuals experiencing active illness, the sample was drawn from a cohort already engaged in services. Across the portfolio,

individuals living with psychosis who are not in contact with services are therefore likely to be underrepresented, which may limit the generalisability of findings to broader populations. This is particularly relevant given that a considerable number of people with psychosis do not present to mental health services, and may also be less likely to participate in research studies (McGranahan et al., 2021).

Additionally, both studies were limited in their ability to draw causal inferences. The systematic review was largely based on cross-sectional studies, while the empirical study used observational electronic health record data. As a result, for both papers, it is not possible to determine the direction of the relationship between social experience and outcomes, or whether shared underlying factors explain the associations.

Appraising the research process more broadly, the use of secondary data from electronic health records and evidence synthesis reflected a pragmatic balance between feasibility and ecological validity. Compared with prospective or intensive longitudinal designs, this approach reduced opportunities for temporal and mechanistic inference, but enabled analysis of clinical data within routine service contexts. Likewise, manual coding prioritised contextual judgement over scalability, which approaches such as natural language processing might offer. Upon reflection, these trade-offs appear appropriate for early-stage work conducted within applied early psychosis services and were feasible within the scope of the thesis.

Additionally, although qualitative findings and lived-experience-informed literature were incorporated where possible, the portfolio did not involve direct co-production or primary qualitative data collection, which limited experiential depth and the extent to which the findings were grounded in lived experience. Only one qualitative

study was identified within the systematic review, limiting the depth of insight into potential mechanisms linking SOF and loneliness in psychosis. The predominance of top-down, academically framed approaches within the psychosis literature (Fusar-Poli et al., 2022) may influence how constructs within social experience and behaviour are defined and operationalised, potentially limiting the extent to which lived experience shapes the examination of relational mechanisms. More direct involvement of people with lived experience would strengthen future work.

Overall, these strengths and limitations position the portfolio as an early-stage contribution to an emerging evidence base, identifying clinically relevant associations while highlighting ongoing challenges in measuring and understanding social experience and social behaviour in psychosis.

Implications

Clinical Implications

Both papers suggest that social experience is clinically relevant in psychosis and warrants consideration within routine care. This aligns with recovery-oriented and person-centred approaches to psychosis care (Alyahya et al., 2022; Fusar-Poli et al., 2022) and broader conceptual frameworks for recovery in mental health (Leamy et al., 2011).

The systematic review suggests that loneliness is closely related to how people participate in social and community life and may signal risk of poorer functional recovery. Clinically, this supports incorporating routine, structured enquiry about loneliness and perceived social connectedness alongside assessment of SOF in

psychosis services, including early intervention settings. The University of California, Los Angeles Loneliness Scale (UCLA-LS-20; Russell, 1996; Russell et al., 1980) is widely used in research, including in psychosis populations (Badcock et al., 2020), and several studies in the review used a variant of this measure. In clinical practice, Badcock et al. (2020) recommend using the shorter eight-item UCLA Loneliness Scale (ULS-8; Hays & DiMatteo, 1987) for screening and routine outcome monitoring, which may represent a more feasible option in EIP services and place less burden on both clinicians and patients. This could be considered alongside the Health of the Nation Outcome Scales (HoNOS), which are mandated in mental health services in England (James et al., 2018) and routinely used in EIP services. The HoNOS includes subscales relevant to SOF, including problems with relationships and problems with occupation and activities (Royal College of Psychiatrists, 2018). It may be useful to capture self-reported SOF alongside HoNOS scores, given that the review found stronger associations between loneliness and SOF when self-report methods were used. However, further research is needed to determine whether the addition of a loneliness measure provides added value beyond existing clinical assessments and to evaluate the feasibility and acceptability of such measures in routine psychosis services.

Given that associations between loneliness and SOF were weaker after accounting for factors such as depression, stigma and social support in several studies, interventions that focus solely on increasing contact quantity may be insufficient to reduce loneliness. This is consistent with broader loneliness intervention literature, which suggests that approaches targeting maladaptive social cognition and relationship quality yield larger effects than contact-based strategies alone (Cacioppo et al., 2015; Masi et al., 2011). However, qualitative accounts suggest that loneliness in psychosis is

also shaped by broader social and structural factors, including external stigma, social exclusion and limited opportunities for meaningful participation (Lee et al., 2025), suggesting that interventions at a community or service level may be important alongside approaches focused on the individual. Approaches that combine work on mood, self-concept, and stigma, alongside opportunities for meaningful activity and high-quality relationships, such as Social Recovery Therapy (Fowler et al., 2019), may therefore be particularly well placed to influence both loneliness and SOF outcomes. However, intervention research is needed to directly test whether targeting these mechanisms improves both loneliness and SOF.

The empirical findings indicate that social media use is often not assessed or recorded within clinical notes. Given its relevance to contemporary social life in both the general population and among individuals with serious mental illness, including psychosis (Naslund et al., 2020), this may represent a gap in routine assessment. Improving assessment of online interactions could help clinicians better understand individuals' access to and quality of social support, a key factor in improving outcomes in FEP (Tran et al., 2025). A practical implication is to integrate enquiry about online social experiences into existing assessment conversations about relationships, safety and coping. For example, this might include asking about online interactions, experiences of harassment or paranoia-related online beliefs and whether online environments provide support, distress or triggers. However, this requires careful consideration to avoid placing additional demands on clinicians within time-limited assessment contexts and to minimise the risk of overwhelming individuals accessing services during what may already be a distressing period.

The association between recorded social media use and recorded suicidal ideation suggests that social media contexts may be clinically relevant when assessing distress and risk, even when indicators of functioning and symptom severity do not differ. However, social media use should not be assumed to be uniformly harmful, as online engagement may also provide social connection and peer support, and promote access to and engagement with services (Naslund et al., 2020). Clinicians may benefit from guidance and training to feel confident discussing social media use in a collaborative and balanced manner, including how it is used, whether it contributes to support or distress, and whether particular online experiences (e.g. online conflicts, exposure to harmful content, or online help-seeking) are linked to deteriorations in mental state or increased risk. It is important that clinicians do not overestimate risks or underestimate benefits of social media use, in order to provide individualised advice (Zhang et al., 2025). In this context, active social media use may warrant particular attention, given the association in the present study with greater service use and compulsory detention. At a service level, improving consistency of recording (e.g. via structured fields or prompts) could strengthen both clinical care and the utility of routine data for future research.

Research Implications

The portfolio identifies several priorities for future research. The findings are best understood as preliminary and hypothesis-generating, contributing to the early stages of an emerging evidence base on loneliness, social media use and SOF in psychosis.

For loneliness and SOF, the most pressing need is to establish temporal and potentially causal relationships. Longitudinal designs that repeatedly assess loneliness

and specific SOF domains could clarify whether loneliness predicts subsequent SOF decline, whether SOF constraints increase loneliness, or, as qualitative evidence suggests (Ludwig et al., 2022), whether reciprocal or mutually reinforcing processes operate. Intervention research is also needed to test whether reducing loneliness (either directly or through targets such as stigma, depression, or social cognition) leads to improvements in SOF, whether improving SOF leads to reductions in loneliness, and whether additional factors mediate these relationships.

For social media and early psychosis, including at-risk mental states, the present findings demonstrate both the feasibility and the limitations of relying on unstructured clinical notes. Future work should develop and validate structured assessment items and standardised measures of social media use and engagement to allow more consistent and complete data collection. Given the rapid advances of technological innovation and social media norms, tools designed to measure social functioning (including social media-related behaviours) should capture contemporary trends (Bjornestad et al., 2019). Where electronic health records are used, developing NLP tools to identify social media use and engagement patterns could enable larger samples and reduce resource intensity. Importantly, future work should move beyond binary use versus non-use and broad engagement style categories by incorporating frequency, duration, content, perceived impact and capturing change over time.

Qualitative and co-produced research is also needed. Although this project was not able to use direct quotations or rich qualitative data from clinical notes under governance constraints, the manual screening process highlighted many ways that social media-related experiences may interact with psychosis presentations (e.g.,

social media content interacting with delusions, experiences of paranoia relating to others posting information, videos or photos of them on social media platforms, consuming content on social media as a way of staying well such as videos of coping strategies). These observations generate hypotheses that should be explored through ethically approved qualitative studies with people with lived experience, and through participatory methods that ensure constructs and measures reflect individual priorities and language. Understanding how individuals living with psychosis perceive and experience social media use should be prioritised in future research.

Finally, rapid technological change means that research and clinical guidance can quickly become outdated. Ongoing research should therefore be iterative and responsive, including consideration of emerging technologies (e.g., generative Artificial Intelligence) and their potential relevance to experiences of psychosis (e.g., Pierre et al., 2025). Building flexible measurement frameworks and involving individuals with lived experience of ARMS and FEP in identifying relevant platforms and behaviours will be essential.

Theoretical Implications

These findings support conceptualising social experience and functioning as multidimensional and embedded within both subjective experience (e.g., loneliness) and behavioural contexts (including social media). This aligns with cognitive models of psychosis that conceptualise psychotic experiences as emerging from interacting affective, cognitive and interpersonal processes, rather than viewing social difficulties solely as downstream consequences of symptoms (Garety et al., 2001).

The systematic review findings are consistent with social-cognitive models of loneliness, in which perceived social isolation heightens vigilance to social threat and biases interpersonal appraisals, contributing to behavioural withdrawal and reinforcing disconnection in a reciprocal cycle (Cacioppo & Hawkley, 2009). The moderation of associations by internalised stigma and social support suggests that the loneliness-SOF relationship may be embedded within broader social contexts and identity processes. It is plausible that functional limitations and internalised stigma may further sustain the reciprocal cycle described above by restricting opportunities for positive social engagement and reinforcing withdrawal, given that internalised stigma is associated with reduced social support, poorer social integration and lower self-esteem (Livingston & Boyd, 2010) and can negatively impact social interaction and vocational functioning (Yanos et al., 2010).

The complexity of social functioning in psychosis has led to its conceptualisation within a post-normal science (PNS) context (Bjornestad et al., 2019), in which “facts are uncertain, values in dispute, stakes high and decisions urgent” (Funtowicz & Ravetz, 1993, p. 744). In psychosis, the stakes are high, reflected in the personal and societal costs associated with social functioning impairments (Evensen et al., 2016). Within such contexts, communicating uncertainty, critically appraising measurement approaches and incorporating perspectives from extended peer communities, including people with lived experience, are essential (Bjornestad et al., 2019). This portfolio aligns with this perspective by emphasising careful conceptualisation and measurement, cautious interpretation of causality and the importance of incorporating lived-experience-informed constructs when conceptualising social functioning.

The empirical findings suggest that digital social environments form an increasingly salient component of the lived social worlds of people with early psychosis, including ARMS. Social media may provide opportunities for connection and peer support (Highton-Williamson et al., 2015), whilst also functioning as spaces in which distress and risk become visible (Birnbaum et al., 2019). Differences in engagement style indicate that social media involvement is not uniform in its implications, consistent with broader evidence that active and passive forms of use are associated with different psychosocial outcomes (Verduyn et al., 2017). Together, these findings support conceptualising digital behaviour as part of the broader social ecology of psychosis, with implications for how social functioning and recovery are theorised in contemporary contexts.

Overall, the portfolio indicates that social experience is relevant across at-risk and first-episode psychosis presentations as well as more established psychosis samples, consistent with continuum models of psychosis (van Os et al., 2009). At the same time, the mechanisms linking social experience, behaviour and outcomes are likely to vary by stage, symptom profile and context, reinforcing the need for stage-sensitive and person-centred models.

Conclusions

In conclusion, this thesis portfolio examined social experience and social behaviour as clinically relevant dimensions of psychosis, including at-risk mental states. The systematic review indicates that loneliness is meaningfully associated with SOF, particularly in domains of social participation and community integration, and that this relationship may be shaped by psychosocial factors such as internalised stigma,

social support and mood. The empirical study demonstrates that recorded social media use is common among people with ARMS and FEP accessing early psychosis services, although recording is inconsistent, and that recorded social media use is associated with suicidal ideation, while patterns of engagement (particularly active use) co-occur with increased service utilisation.

The two papers presented in this portfolio highlight the importance of addressing social connection, participation and contemporary social contexts in psychosis research and clinical care, while maintaining appropriate caution regarding causality. This portfolio provides preliminary evidence that social experience and digital contexts are relevant to understanding functional and service-related outcomes in psychosis. Future work should prioritise longitudinal, mixed-method and co-produced approaches to clarify mechanisms and develop interventions that are effective and ecologically valid.

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Appendix A

Psychiatry Research Author Guidelines

About the Journal

Aims and Scope

This journal provides rapid publication of complete research reports and reviews in the field of psychiatry.

The scope of the journal encompasses:

1. Biochemical, physiological, neuroanatomic, genetic, neurocognitive, and psychosocial determinants of psychiatric disorders.
2. Diagnostic assessments of psychiatric disorders.
3. Evaluations that pursue hypotheses about the cause or causes of psychiatric diseases.
4. Evaluations of pharmacologic and non-pharmacologic psychiatric treatments.
5. Basic neuroscience studies related to animal or neurochemical models for psychiatric disorders.
6. Methodological advances, such as instrumentation, clinical scales, and assays directly applicable to psychiatric research. These will be considered only if the scales and assays are included as an appendix to the manuscript in English. If they are too long, the way to obtain them without cost to the reader must be carefully stated in the methods section of the manuscript.
7. Reviews of timely topics in psychiatric research
8. Letters to the editor will be considered for case reports, comments about previously published papers, or secondary data analyses.

Papers with a primary focus on imaging techniques, can be submitted to *Psychiatry Research: Neuroimaging*.

Article types

Review Articles/Full-Length Articles.

Although exceptions will be considered, manuscripts should not exceed 5,000 words, and shorter manuscripts (e.g. 3,000 words) are preferred.

Each article should contain the following major headings:

Introduction (preceded by arabic number 1.), Methods (preceded by number 2.), Results (preceded by number 3.), Discussion (preceded by number 4.), Acknowledgement (optional section following the discussion, which should not be preceded by a numeral), and References (should not be preceded by a numeral).

Subheadings should follow the numbering system used in the major heading; for example, the subheading "Subjects" within the Methods section should be flush left on a separate line and designated 2.1., the subheading "Procedures" should be designated 2.2., etc. Lower level headings, if required, should also be numbered (e.g., "2.1.1. Patients." as a lower order heading under "2.1. Subjects."). Only the first letter of the first word of each heading should be capitalized.

Short Communications.

Short Communications (formally called Brief reports) are brief reports on preliminary new findings limited to 2,500 words, excluding abstract, references, figure legends, acknowledgement and disclosures. Authors may include up to 4 figures and up to 2 tables.

Correspondence.

Correspondence items (formally Letters to the Editor) should be 750-1,000 words or less. It should **not** include a title page, abstract of keywords. Authors' names and affiliations should be listed at the end of the letter, along with the corresponding author's email address. There should be no more than 5 references, and no tables or figures.

Commentary.

This section contains commentaries that accompany papers published in PSY or on issues of wide-reaching concern in psychiatry. Comments linked to policy decisions are welcomed. Most commentaries are commissioned but unsolicited commentaries (no more than 2,000 words, 15 references and one figure or small table) are also welcome. Commentaries may be peer reviewed. At the editors' discretion, commentaries may be shortened in the interest of space.

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This journal follows a single anonymized review process. Your submission will initially be assessed by our editors to determine suitability for publication in this journal. If your submission is deemed suitable, it will typically be sent to a minimum of two reviewers for an independent expert assessment of the scientific quality. The decision as to whether your article is accepted or rejected will be taken by our editors.

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2. Drafting the article or revising it critically for important intellectual content.
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- Any unauthorized authorship changes may result in the rejection of the article, or retraction, if the article has already been published.

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Appendix B

Systematic Review Search Strategy

The search strategy is presented below by database, and aligns with the thesaurus of each database. The terms ‘dementia’ and ‘Parksino*’ were excluded, which otherwise contributed many irrelevant results.

PubMed

(("Schizophrenia Spectrum and Other Psychotic Disorders"[Mesh] OR "Hallucinations"[Mesh] OR "Delusions"[Mesh] OR "Prodromal Symptoms"[Mesh] OR schiz*[Title/Abstract] OR halluc*[Title/Abstract] OR paran*[Title/Abstract] OR delus*[Title/Abstract] OR psychotic[Title/Abstract] OR "at risk"[Title/Abstract] OR "ultra high risk"[Title/Abstract] OR "clinical high risk"[Title/Abstract] OR UHR[Title/Abstract] OR CHR[Title/Abstract] OR prodrom*[Title/Abstract] OR "psychosis risk"[Title/Abstract] OR "psychosis transition"[Title/Abstract] OR "psychosis onset"[Title/Abstract])) AND (("Quality of Life"[Mesh] OR "Activities of Daily Living"[Mesh] OR "Social Adjustment"[Mesh] OR "activity leve*"[Title/Abstract] OR "quality of life"[Title/Abstract] OR HRQoL[Title/Abstract] OR "The Personal Social Performance"[Title/Abstract] OR "Adult Social Relationships Scales"[Title/Abstract] OR "Specific Levels of Functioning Scale"[Title/Abstract] OR "UCSD Performance-Based Skills Assessment"[Title/Abstract] OR "UPSA-B"[Title/Abstract] OR "Work Productivity and Activity Impairment Questionnaire"[Title/Abstract] OR WPAI[Title/Abstract] OR "Work and Social Adjustment Scale"[Title/Abstract] OR "International Physical Activity Questionnaire"[Title/Abstract] OR IPAQ[Title/Abstract] OR "Sheehan Disability Scale"[Title/Abstract] OR "social occupational functio*"[Title/Abstract] OR "social functio*"[Title/Abstract] OR "occupational functio*"[Title/Abstract] OR functioning[Title/Abstract] OR "work productivity"[Title/Abstract] OR "Time Use Survey"[Title/Abstract] OR "Social and Occupational Functioning Assessment Scale"[Title/Abstract] OR "Occupational Functioning Scale"[Title/Abstract] OR "Social functioning questionnaire"[Title/Abstract] OR "Social functioning schedule"[Title/Abstract] OR "Social functioning scale"[Title/Abstract] OR "Social Adjustment Scale Self-Report"[Title/Abstract] OR "SAS-SR"[Title/Abstract] OR "Social Adjustment Scale"[Title/Abstract] OR "The Structured and Scaled Interview to Assess Maladjustment"[Title/Abstract] OR SSIAM[Title/Abstract] OR "Social Behaviour Assessment Schedule"[Title/Abstract] OR "Interview Schedule for Social Interaction"[Title/Abstract] OR "Katz Adjustment Scale"[Title/Abstract] OR "EQ-5D"[Title/Abstract] OR "Health of the Nation Outcome Scales"[Title/Abstract] OR HoNOS[Title/Abstract] OR "Assessment of Occupational Functioning"[Title/Abstract] OR "Global Assessment of Functioning"[Title/Abstract] OR "Functioning Assessment Short Test"[Title/Abstract] OR "Range of Impaired Functioning Tool"[Title/Abstract] OR "Longitudinal Interval Follow-up Evaluation"[Title/Abstract] OR LIFE-RIFT[Title/Abstract] OR "Personal and Social Performance scale"[Title/Abstract] OR

"Specific Level of Functioning Scale"[Title/Abstract] OR "psychological wellbeing"[Title/Abstract])) AND AND ("Loneliness"[Mesh] OR lonel*[Title/Abstract]) NOT ("Dementia"[Mesh] OR dement*[Title/Abstract] OR "Parkinson Disease"[Mesh] OR parkinso*[Title/Abstract])

PsycINFO

"(((MH "Schizophrenia Spectrum and Other Psychotic Disorders"+ OR MH Hallucinations+ OR MH Delusions+ OR TI schiz* OR AB schiz* OR TI halluc* OR AB halluc* OR TI paran* OR AB paran* OR TI delus* OR AB delus* OR TI psychotic OR AB psychotic OR TI "at risk" OR AB "at risk" OR TI "ultra high risk" OR AB "ultra high risk" OR TI "clinical high risk" OR AB "clinical high risk" OR TI UHR OR AB UHR OR TI CHR OR AB CHR OR TI prodrom* OR AB prodrom* OR TI "psychosis risk" OR AB "psychosis risk" OR TI "psychosis transition" OR AB "psychosis transition" OR TI "psychosis onset" OR AB "psychosis onset")) AND ((MH "Quality of Life"+ OR MH "Activities of Daily Living"+ OR MH "Social Interaction"+ OR MH "Social Functioning"+ OR TI functioning OR AB functioning OR TI GAF OR AB GAF OR TI HoNOS OR AB HoNOS OR TI UPSA OR AB UPSA OR TI "UPSA-B" OR AB "UPSA-B" OR TI "Sheehan Disability Scale" OR AB "Sheehan Disability Scale" OR TI "Work and Social Adjustment Scale" OR AB "Work and Social Adjustment Scale" OR TI "Personal Social Performance" OR AB "Personal Social Performance" OR TI "Specific Levels of Functioning Scale" OR AB "Specific Levels of Functioning Scale" OR TI "UCSD Performance-Based Skills Assessment" OR AB "UCSD Performance-Based Skills Assessment" OR TI "LIFE-RIFT" OR AB "LIFE-RIFT" OR TI "Global Assessment of Functioning" OR AB "Global Assessment of Functioning")) AND ((TI lonel* OR AB lonel*)) NOT ((MH Dementia+ OR TI dementia OR AB dementia OR MH "Parkinson's Disease"+ OR TI parkinso* OR AB parkinso*)

CINAHL

(((MH "Schizophrenia Spectrum and Other Psychotic Disorders"+ OR MH Hallucinations+ OR MH Delusions+ OR TI schiz* OR AB schiz* OR TI halluc* OR AB halluc* OR TI paran* OR AB paran* OR TI delus* OR AB delus* OR TI psychotic OR AB psychotic OR TI "at risk" OR AB "at risk" OR TI "ultra high risk" OR AB "ultra high risk" OR TI "clinical high risk" OR AB "clinical high risk" OR TI UHR OR AB UHR OR TI CHR OR AB CHR OR TI prodrom* OR AB prodrom* OR TI "psychosis risk" OR AB "psychosis risk" OR TI "psychosis transition" OR AB "psychosis transition" OR TI "psychosis onset" OR AB "psychosis onset")) AND ((MH "Quality of Life"+ OR MH "Activities of Daily Living"+ OR MH "Social Interaction"+ OR MH "Social Functioning"+ OR TI functioning OR AB functioning OR TI GAF OR AB GAF OR TI HoNOS OR AB HoNOS OR TI UPSA OR AB UPSA OR TI "UPSA-B" OR AB "UPSA-B" OR TI "Sheehan Disability Scale" OR AB "Sheehan Disability Scale" OR TI "Work and Social Adjustment Scale" OR AB "Work and Social Adjustment Scale" OR TI "Personal Social Performance" OR AB "Personal Social Performance" OR TI "Specific Levels of Functioning Scale" OR AB "Specific Levels of

Functioning Scale" OR TI "UCSD Performance-Based Skills Assessment" OR AB "UCSD Performance-Based Skills Assessment" OR TI "LIFE-RIFT" OR AB "LIFE-RIFT" OR TI "Global Assessment of Functioning" OR AB "Global Assessment of Functioning")) AND ((TI lonel* OR AB lonel*)) NOT ((MH Dementia+ OR TI dementia OR AB dementia OR MH "Parkinson's Disease"+ OR TI parkinso* OR AB parkinso*))

Scopus

TITLE-ABS-
KEY (schiz* OR halluc* OR paran* OR delus* OR psychosis OR psychotic OR "at risk" OR "ultra high risk" OR "clinical high
risk" OR uhr OR chr OR prodrom* OR "psychosis risk" OR "psychosis transition" OR "psychosis onset") AND TITLE-ABS-KEY ("quality of life" OR "activities of daily living" OR "social adjustment" OR "activity
leve*" OR hrqol OR ipaq OR wpai OR honos OR gaf OR upsa OR "UPSA-B" OR "LIFE-RIFT" OR "Sheehan Disability Scale" OR "Work and Social Adjustment
Scale" OR "Personal Social Performance" OR "Specific Levels of Functioning
Scale" OR "UCSD Performance-Based Skills Assessment" OR "International Physical Activity Questionnaire" OR "Social and Occupational Functioning Assessment
Scale" OR "Occupational Functioning Scale" OR "Social functioning
questionnaire" OR "Social functioning schedule" OR "Social functioning
scale" OR "Social Adjustment Scale Self-Report" OR sas‑sr OR "The Structured and Scaled Interview to Assess Maladjustment" OR ssiam OR "Social Behaviour Assessment Schedule" OR "Interview Schedule for Social Interaction" OR "Katz Adjustment Scale" OR "EQ-5D" OR "Health of the Nation Outcome
Scales" OR "Assessment of Occupational Functioning" OR "Global Assessment of Functioning" OR "Functioning Assessment Short Test" OR "Range of Impaired Functioning Tool" OR "Longitudinal Interval Follow-up Evaluation" OR "Personal and Social Performance scale" OR "Specific Level of Functioning Scale" OR "psychological wellbeing") AND TITLE-ABS-KEY (lonel*) AND NOT TITLE-ABS-
KEY (dementia OR parkinso*)

Appendix C

Social Psychiatry and Psychiatric Epidemiology Author Guidelines

Instructions for Authors

Types of Papers

- Papers must be written in English.
- Accepted article types: Research, Review, Brief Report, Editorial, Comment, Correspondence, and Study Protocol.
- Research papers or Reviews should not exceed 4,500 words, not including references, plus 5 tables or figures. An abstract (150 to 250 words) and 4-6 keywords are required (please see also section 'title page').
- Submissions for Study Protocols are welcome which describe the rationale, the design, procedures, and sample characteristics of large epidemiological studies in the context of existing research. Papers should not exceed 4,500 words. An abstract (150 to 250 words) and 4-6 keywords are required.
- Brief Reports should not contain more than 1,500 words plus 1 figure or table. Please submit a short abstract of max. 100 words and 4-6 keywords.
- Editorials and Correspondence articles will be considered for publication; they should not contain more than 1,500 words.
- Comments should not contain more than 10,000 characters and less than 10 references. Please do not include an abstract or keywords.
- Exceptions to the word limits can be made only with the agreement of the Editor-in-Chief.
- Authors are required to state the word count of their paper when submitting the manuscript.

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Single-Blind Peer Review.

This journal follows a single-blind reviewing procedure.

Manuscript Submission

Manuscript Submission.

Submission of a manuscript implies: that the work described has not been published before; that it is not under consideration for publication anywhere else; that its publication has been approved by all co-authors, if any, as well as by the responsible authorities – tacitly or explicitly – at the institute where the work has been carried out. The publisher will not be held legally responsible should there be any claims for compensation.

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Please ensure you provide all relevant editable source files at every submission and revision. Failing to submit a complete set of editable source files will result in your article not being considered for review. For your manuscript text please always submit in common word processing formats such as .docx or LaTeX.

Submitting Declarations.

Please note that Author Contribution information and Competing Interest information must be provided at submission via the submission interface. Only the information submitted via the interface will be used in the final published version. Please make sure that if you are an editorial board member and also a listed author that you also declare this information in the Competing Interest section of the interface.

Please see the relevant sections in the submission guidelines for further information on these statements as well as possible other mandatory statements.

Title Page

Please make sure your title page contains the following information.

Title.

The title should be concise and informative.

Author Information.

- The name(s) of the author(s)
- The affiliation(s) of the author(s), i.e. institution, (department), city, (state), country
- A clear indication and an active e-mail address of the corresponding author
- If available, the 16-digit ORCID of the author(s)

If address information is provided with the affiliation(s) it will also be published.

For authors that are (temporarily) unaffiliated we will only capture their city and country of residence, not their e-mail address unless specifically requested.

Large Language Models (LLMs), such as ChatGPT, do not currently satisfy our authorship criteria. Notably an attribution of authorship carries with it accountability for the work, which cannot be effectively applied to LLMs. Use of an LLM should be properly documented in the Methods section (and if a Methods section is not available, in a suitable alternative part) of the manuscript. The use of an LLM (or other AI-tool) for "AI assisted copy editing" purposes does not need to be declared. In this context, we define the term "AI assisted copy editing" as AI-assisted improvements to human-generated texts for readability and style, and to ensure that the texts are free of errors in grammar, spelling, punctuation and tone. These AI-assisted improvements may include wording and formatting changes to the texts, but do not include generative editorial work and autonomous content creation. In all cases, there must be human accountability for the final version of the text and agreement from the authors that the edits reflect their original work.

Abstract.

Please provide a structured abstract of 150 to 250 words which should be divided into the following sections:

- Purpose (stating the main purposes and research question)
- Methods
- Results
- Conclusion

For life science journals only (when applicable)

- Trial registration number and date of registration for prospectively registered trials
- Trial registration number and date of registration followed by “retrospectively registered”, for retrospectively registered trials

Keywords.

Please provide 4 to 6 keywords which can be used for indexing purposes.

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The following statements should be included under the heading "Statements and Declarations" for inclusion in the published paper. Please note that submissions that do not include relevant declarations will be returned as incomplete.

- Competing Interests: Authors are required to disclose financial or non-financial interests that are directly or indirectly related to the work submitted for

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Please see the relevant sections in the submission guidelines for further information as well as various examples of wording. Please revise/customize the sample statements according to your own needs.

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- Use a normal, plain font (e.g., 10-point Times Roman) for text.
- Use italics for emphasis.
- Use the automatic page numbering function to number the pages.
- Do not use field functions.
- Use tab stops or other commands for indents, not the space bar.
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- Use the equation editor or MathType for equations.
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Please use no more than three levels of displayed headings.

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Abbreviations should be defined at first mention and used consistently thereafter.

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Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

Always use footnotes instead of endnotes.

Acknowledgments.

Acknowledgments of people, grants, funds, etc. should be placed in a separate section on the title page. The names of funding organizations should be written in full.

References

Citation.

Reference citations in the text should be identified by numbers in square brackets. Some examples:

1. Negotiation research spans many disciplines [3].
2. This result was later contradicted by Becker and Seligman [5].
3. This effect has been widely studied [1-3, 7].

Reference List.

The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text.

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- Journal article

  Gamelin FX, Baquet G, Berthoin S, Thevenet D, Nourry C, Nottin S, Bosquet L (2009) Effect of high intensity intermittent training on heart rate variability in prepubescent children. Eur J Appl Physiol 105:731-738. https://doi-org.uea.idm.oclc.org/10.1007/s00421-008-0955-8

  Ideally, the names of all authors should be provided, but the usage of “et al” in long author lists will also be accepted:

  Smith J, Jones M Jr, Houghton L et al (1999) Future of health insurance. N Engl J Med 965:325–329

- Article by DOI

  Slifka MK, Whitton JL (2000) Clinical implications of dysregulated cytokine production. J Mol Med. https://doi-org.uea.idm.oclc.org/10.1007/s001090000086

- Book

  South J, Blass B (2001) The future of modern genomics. Blackwell, London

- Book chapter

Brown B, Aaron M (2001) The politics of nature. In: Smith J (ed) The rise of modern genomics, 3rd edn. Wiley, New York, pp 230-257

- Online document

  Cartwright J (2007) Big stars have weather too. IOP Publishing PhysicsWeb. http://physicsweb.org/articles/news/11/6/16/1. Accessed 26 June 2007

- Dissertation

  Trent JW (1975) Experimental acute renal failure. Dissertation, University of California

  Always use the standard abbreviation of a journal's name according to the ISSN List of Title Word Abbreviations, see

  ISSN.org LTWA

  If you are unsure, please use the full journal title.

  Authors preparing their manuscript in LaTeX can use the bibliography style file sn-basic.bst which is included in the Springer Nature Article Template.

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- All tables are to be numbered using Arabic numerals.
- Tables should always be cited in text in consecutive numerical order.
- For each table, please supply a table caption (title) explaining the components of the table.
- Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.
- Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body.

Artwork and Illustrations Guidelines

Electronic Figure Submission.

- Supply all figures electronically.
- Indicate what graphics program was used to create the artwork.
- For vector graphics, the preferred format is EPS; for halftones, please use TIFF format. MSOffice files are also acceptable.
- Vector graphics containing fonts must have the fonts embedded in the files.
- Name your figure files with "Fig" and the figure number, e.g., Fig1.eps.

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- Definition: Black and white graphic with no shading.

- Do not use faint lines and/or lettering and check that all lines and lettering within the figures are legible at final size.
- All lines should be at least 0.1 mm (0.3 pt) wide.
- Scanned line drawings and line drawings in bitmap format should have a minimum resolution of 1200 dpi.
- Vector graphics containing fonts must have the fonts embedded in the files.

Halftone Art.

- Definition: Photographs, drawings, or paintings with fine shading, etc.
- If any magnification is used in the photographs, indicate this by using scale bars within the figures themselves.
- Halftones should have a minimum resolution of 300 dpi.

Combination Art.

- Definition: a combination of halftone and line art, e.g., halftones containing line drawing, extensive lettering, color diagrams, etc.
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- Color art is free of charge for online publication.
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- To add lettering, it is best to use Helvetica or Arial (sans serif fonts).
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- Variance of type size within an illustration should be minimal, e.g., do not use 8-pt type on an axis and 20-pt type for the axis label.
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- Do not include titles or captions within your illustrations.

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- If an appendix appears in your article and it contains one or more figures, continue the consecutive numbering of the main text. Do not number the appendix figures,"A1, A2, A3, etc." Figures in online appendices [Supplementary Information (SI)] should, however, be numbered separately.

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- Each figure should have a concise caption describing accurately what the figure depicts. Include the captions in the text file of the manuscript, not in the figure file.
- Figure captions begin with the term Fig. in bold type, followed by the figure number, also in bold type.
- No punctuation is to be included after the number, nor is any punctuation to be placed at the end of the caption.
- Identify all elements found in the figure in the figure caption; and use boxes, circles, etc., as coordinate points in graphs.
- Identify previously published material by giving the original source in the form of a reference citation at the end of the figure caption.

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- Spreadsheets should be submitted as .csv or .xlsx files (MS Excel).

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- Specialized format such as .pdb (chemical), .wrl (VRML), .nb (Mathematica notebook), and .tex can also be supplied.

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- Name the files consecutively, e.g. “ESM_3.mpg”, “ESM_4.pdf”.

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Accessibility.

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Appendix D

CRIS Database Search Strategy for Social Media Use

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Appendix E

Empirical Study Social Media Data Extraction and Coding Framework

Table 1

Data Extraction and Coding Plan

Variable	Definition	Simplistic procedure and categories
Social media use	Self-, informant- or clinician-reported use of social media by the individual	Following manual review of retrieved free-text entries, social media use was coded as binary: • Yes • No Patients were coded as yes when records clearly indicated personal use of social media, and as no when records explicitly stated the individual did not use social media. Where searches returned no relevant results or where references did not clearly indicate social media use, this was coded as not recorded. Absence of documentation regarding social media use was treated as missing data rather than non-use. To minimise misclassification, yes/no codes were assigned only when use or non-use was explicitly recorded, with records requiring interpretation coded as not recorded. For example, references to concerns about others sharing personal information on social media were not taken as evidence of personal use. Similarly, references to social media solely in the context of service-led communication (e.g. clinicians contacting individuals via WhatsApp, or LinkedIn being discussed within employment support sessions) were coded as not recorded, as this did not necessarily reflect voluntary or regular use. When conflicting information existed across records, the most recent entry was used to determine social media use status.
Social media engagement style	Type of engagement with social media (self-, informant- or clinician-reported) for individuals using social media	Type of use was manually extracted and, in line with established definitions (Orben, 2020), was coded as: • Active - creating content or engaging directly with others (e.g. posting, commenting, or messaging). • Passive - consumption-based behaviours (e.g. scrolling, watching, or listening without direct interaction). • Both
Socia media platforms used	Name(s) of social media platform(s) self-reported or clinician-reported for individuals using social media.	Only platforms explicitly recorded in clinical records were extracted. Absence of documentation was treated as missing data.
Number of social media platforms used	Total number of distinct social media platforms documented for the individual	The specific platforms mentioned were extracted, and a derived variable representing the number of platforms used was created by summing the distinct platforms recorded for each participant.