Self-esteem in individuals at ultra-high risk for psychosis: A systematic review and meta-analysis

Holly V. Bemrose | Isaac O. Akande | Alexis E. Cullen

1Department of Psychosis Studies, Institute of Psychiatry, Psychology & Neuroscience, King’s College London, London, UK
2Outreach and Support in South London (OASIS), South London and Maudsley NHS Foundation Trust, London, UK

Abstract

Aim: Low self-esteem (LSE) has been reported among individuals with psychosis and is hypothesized to act as a risk and maintenance factor for the disorder. However, the extent to which LSE also characterizes individuals deemed at ultra-high risk (UHR) for psychosis (who present features consistent with the prodromal phase of illness), has yet to be quantified using meta-analysis. This is important given that LSE is a potentially modifiable target for early intervention services aiming to reduce the risk of psychosis transition in this population.

Methods: We searched Medline, Embase, PsycINFO and Web of Science Core Collection for studies examining self-esteem in UHR and healthy individuals. Random-effects models were used to examine group differences in self-esteem (Hedges’ g) with exploratory meta-regression analyses employed to investigate the effect of study characteristics (mean age of UHR group, the proportion of male participants in the UHR group and study quality) on standardized mean differences.

Results: Six studies were eligible for inclusion. Significant differences in self-esteem were observed, with individuals at UHR showing reduced self-esteem relative to healthy controls (g = −1.33 [−1.73 to −0.94] P < .001). However, there was evidence of substantial heterogeneity (I² = 75%). Exploratory meta-regression analyses indicated a significant effect of the mean age of the UHR group on effect sizes (β = −0.26, P = .02).

Conclusions: UHR youth present with lower levels of self-esteem than healthy individuals, a difference that appears to be more pronounced with advancing age. We discuss clinical implications and provide recommendations for future studies.

KEYWORDS
prodrome, schizophrenia, self-esteem, self-worth, ultra-high risk

1 | INTRODUCTION

Self-esteem is widely recognized as a central component of psychological health and wellbeing (Orth, Robins, & Widaman, 2012) and a resource for coping with stress (Taylor & Stanton, 2007). Perhaps unsurprisingly, low self-esteem (LSE) has been linked to clinical and subclinical psychopathology (Zeigler-Hill, 2011, 2013), and is an associated feature of several psychiatric disorders, including major depression and schizoaffective disorder (American Psychiatric Association, 2013). Recent reviews indicate that self-esteem changes...
throughout the lifespan, increasing during childhood before stabilizing (and even declining) in adolescence, with further gradual increases throughout adulthood, until an eventual decline in the later years of life (Orth, Erol, & Luciano, 2018; Orth & Robins, 2018; Robins & Trzesniewski, 2005). In addition to these age-related changes, differences across males and females have been observed, with the former reporting higher levels of self-esteem (Bleidorn et al., 2016; Twenge, Carter, & Campbell, 2017).

The presence of LSE among individuals presenting with schizophrenia and related psychotic disorders has long been recognized (Freeman et al., 1998). Recent studies suggest that LSE is present at the point of the first psychotic episode (Ciufolini et al., 2015), and in patients at various stages of illness, is associated with poorer functional outcomes (Vracotas, Iyer, Joober, & Malla, 2012), quality of life (Staring, van der Gaag, van den Berge, Duivenvoorden, & Mulder, 2009) and symptom severity (Romm et al., 2011; Thewissen et al., 2011). Current theories posit that LSE might arise as a product of psychotic experiences (Gureje, Harvey, & Herrman, 2004) and within a cognitive behavioural framework, act as a risk and maintenance factor for psychosis (Freedman, Garety, Kuipers, Fowler, & Bebbington, 2002; Garety, Kuipers, Fowler, Freeman, & Bebbington, 2001). In support of the latter, a large, longitudinal study showed LSE to be associated with an increased risk of developing first-onset psychotic symptoms in the general population (Krabbendam et al., 2002). Examining individuals at elevated risk for psychosis provides an opportunity to further test this hypothesis, we would expect LSE to also characterize these individuals and to be associated with increased risk of full disorder onset.

During the past two decades, a significant shift in the conceptualization and treatment of psychosis has occurred (Fusar-Poli et al., 2013). Embedded in this movement is the ultra-high risk (UHR) approach, which has led to the international implementation of early detection services providing support and intervention for individuals thought to be in the prodromal phase of illness (Kotlicka-Antczak et al., 2020). This approach enables the investigation of antecedents, risk factors and aetiological mechanisms contributing to psychosis, and perhaps represents the best opportunity to deliver interventions to prevent psychosis onset (McHugh et al., 2018). However, as treatment efforts in this population have demonstrated efficacy in delaying, but not averting, the onset of the full-threshold disorder (McGorry & Mei, 2018), there is a need to identify viable intervention targets during this vulnerable period.

Given the malleability of maladaptive views of the self by means of psychological techniques (Stowkowy & Addington, 2012), LSE is one such viable target. However, the extent to which help-seeking youth at UHR present with LSE is currently unclear (van der Gaag, van den Berg, & Ising, 2019). Negative beliefs about the self and others appear to be more prevalent in UHR populations compared to healthy controls (Cowan, McAdams, & Mittal, 2019; Taylor et al., 2014), and persist over time (Stowkowy et al., 2016). Moreover, UHR individuals have been found to show increased negative self-concept (Carol & Mittal, 2015). Although there is overlap between these constructs (ie, self-concept, self-belief) and self-esteem, the latter uniquely reflects an individual’s global evaluation of the self (Fennell, 2016). Overall, these findings of pervasive negative self-views in UHR individuals suggest that LSE may also exist within this population; however, this has yet to be quantified using meta-analytic techniques. We therefore conducted a systematic review and meta-analysis, which aimed to: (1) systematically appraise studies examining self-esteem in UHR populations and healthy controls; and (2) determine the magnitude and consistency of effects using meta-analytic techniques.

2 | METHODS

The protocol for this review was prospectively registered on PROSPERO (CRD42019121900). The search strategy and reporting complied with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance (Moher, Liberati, Tetzlaff, Altman, & Prisma Group, 2009).

2.1 | Search strategy

The systematic search of articles was conducted during October 2019 within Medline, Embase, PsycINFO and Web of Science Core Collection with an English language filter applied. To identify relevant studies, combinations of the following search terms (subject heading and keyword) were used (self-esteem) OR self-concept) OR self-worth) OR self-value) OR self-regard) OR self-confidence) AND (ultra-high risk) OR UHR) OR clinical high-risk) OR CHR) OR at-risk mental state) OR psychosis risk) OR attenuated psycho*) OR prodrome*) OR brief limited intermittent psychosis symptoms) OR psychotic experiences) OR psychotic-like experiences) OR subclinical psychosis) OR non-clinical psychosis) OR brief psychotic disorder). Reference lists of eligible studies and reviews were also manually searched.

2.2 | Study selection

Inclusion and exclusion criteria were established a priori; two researchers (H.V.B and I.O.A) independently screened the titles and abstracts of all articles to identify potentially relevant papers. Disagreements during the title and abstract screen (n = 10) and full-text screen (n = 7) during study selection were resolved by joint discussion. Full-text reviews were then performed in duplicate to determine eligibility. Articles were included if they: (i) were published in peer-reviewed journals; (ii) were written in English; (iii) confirmed UHR status using internationally recognized UHR criteria; (iv) used an established and validated self-esteem measure; (v) included a healthy control comparison group and (vi) were observational studies (cross-sectional, case-control, cohort designs). Book chapters, editorial or review articles and single case studies were all excluded. After reviewing studies identified by the search, conference abstracts and poster presentations were excluded due to limited data (which we were unable to obtain from authors). Studies investigating individuals...
that did not meet formal UHR criteria were not included. Where studies with overlapping samples were identified, only the paper reporting the larger sample was retained.

2.3 | Data extraction

Two researchers (A.E.C. and H.V.B.) independently extracted data from eligible studies, neither were blind to the names of authors, journals or institutions. Any discrepancies in data extraction were resolved by discussion and joint data extraction/computation. Extracted data included: year of publication, sample size, mean age of participants, participant sex/gender, recruitment method, UHR definition, self-esteem measure, and raw self-esteem scores (mean and SD). Raw mean and SD data (not adjusted where available) were extracted from studies to enable comparability across studies and for the exploration of effects of other variables in the meta-analysis. Where information was missing in the papers, we contacted authors via email requesting raw data (Atkinson et al., 2017; Barrantes-Vidal et al., 2013; Jhung et al., 2016; Jongeneel, Pot-Kolder, Counotte, van der Gaag, & Veling, 2018; Kim et al., 2014; Pruessner, Iyer, Faridi, Joober, & Malla, 2011; Song et al., 2013); only one (Barrantes-Vidal et al., 2013) was unable to provide the necessary information and was subsequently excluded.

2.4 | Assessment of studies

Quality assessment was conducted for eligible studies independently by three researchers (I.O.A., A.E.C. and H.V.B.) using the Newcastle-Ottawa Scale (NOS) for case-control studies (Wells et al., 2011), modified to assess areas relevant to the review. The modified NOS tool included eight items (maximum score of nine) assessing: adequate/valid assessment of UHR status (max 1), representative/unbiased UHR group (max 1), representative/unbiased control group (max 1), confirmation of healthy control status (max 1), response rate reporting (max 1), matching factors (max 2) and ascertainment of self-esteem using valid measure (max 1) with the same measure used in both groups (max 1). Any discrepancies were resolved by discussion.

2.5 | Statistical analyses

All analyses were performed using Stata version 15. Standardized mean differences (SMD) in self-esteem scores between UHR individuals and healthy controls were derived with Hedges’ g adjustment (Hedges, 1981). Effect sizes were defined according to Cohen’s classification scheme (Cohen, 1992), where 0.2, 0.5 and 0.8 corresponded to small, medium and large effects, respectively. A meta-analysis was conducted to derive a pooled SMD; as we suspected that the “true effect” may vary across studies due to differences in demographic characteristics and measures of self-esteem, we used a random-effects model with inverse weighting applied (DerSimonian & Laird, 1986). Statistical significance for all analyses was set at $P < .05$ (two-tailed). We assessed heterogeneity using both the Cochran Q statistic (to identify statistically significant heterogeneity) and the $I^2$ statistic (to estimate the percentage of the variability in effect sizes owing to heterogeneity) where the classification of the latter as likely unimportant (0%-40%), moderate (30%-60%), substantial (50%-90%) or considerable (75%-100%) is dependent on the magnitude and/or direction of effects and statistical significance of heterogeneity (Higgins, Green, & Cochrane Collaboration, 2008). As our meta-analysis included fewer than 10 studies, we conducted sensitivity analyses to determine whether excluding each study in turn yielded substantially different effect sizes to the overall model. We additionally performed exploratory univariate meta-regression analyses to examine the influence of study characteristics (mean age of UHR group, proportion male in UHR group and NOS score) on SMD.

3 | RESULTS

3.1 | Search strategy

The systematic search process is summarized in Figure 1. After discarding duplicates, 542 studies were identified in the initial search, 81 articles were read in full. After excluding studies that did not meet eligibility criteria, six papers were included in the meta-analysis (Atkinson et al., 2017; Benavides, Brucato, & Kimhy, 2018; Jongeneel et al., 2018; Park, Bang, Kim, Lee, & An, 2018; Pruessner et al., 2011; Shi et al., 2016). Study details are provided in Table 1.

---

**FIGURE 1** Search process
| Study                  | N    | % Male | Age (years) | Recruitment method                                                                 | UHR measure | Self-esteem measure | Self-esteem score: mean (SD) |
|-----------------------|------|--------|-------------|-------------------------------------------------------------------------------------|-------------|---------------------|-----------------------------|
| Atkinson et al. (2017)| UHR: 102 | 46%    | 18.6        | MinT project: UHR referred via headspace, mental health workers, GPs, counsellors and self-referrals. HC recruited via newspapers, websites, noticeboards and advertisements in hospitals and educational institutions. | CAARMS      | RSES                | 15.5 (6.7)                  |
|                       | HC: 38 | 50%    | 19.5        |                                                      |             |                     | 20.4 (4.7)                  |
| Benavides et al. (2018)| UHR: 36 | 72%    | 21.4        | UHR recruited from the Centre of Prevention and Evaluation in Psychosis at NYSPI. HC recruited from longitudinal studies at the NYSPI. | SIPS        | SPPA                | 14.6 (4.3)                  |
|                       | HC: 40 | 55%    | 22.4        |                                                      |             |                     | 19.9 (4.0)                  |
| Jongeneel et al. (2018)| UHR: 20 | 35%    | 24.0        | UHR identified via psychiatric institutions in Holland. HC recruited from vocational education schools, universities, and dental offices. | CAARMS      | SERS                | -10.0 (23.9)                |
|                       | HC: 53 | 47%    | 24.8        |                                                      |             |                     | 32.3 (14.2)                 |
| Park et al. (2018)    | UHR: 54 | 57%    | 20.5        | UHR recruited from a research clinic for young people at-risk for psychosis. HC recruitment via internet job advertisement. | SIPS        | RSES                | 22.6 (5.2)                  |
|                       | HC: 80 | 48%    | 20.7        |                                                      |             |                     | 29.9 (4.7)                  |
| Pruessner et al. (2011)| UHR: 26 | 50%    | 19.8        | UHR recruited from the CAYR clinic within the PEPP-Montreal programme. HC recruited using newspaper advertisements. | CAARMS      | SERS                | 16.6 (46.2)                |
|                       | HC: 30 | 50%    | 22.5        |                                                      |             |                     | 59.7 (33.4)                 |
| Shi et al. (2016)     | UHR: 32 | 41%    | 18.8        | UHR and HC recruited from pool of university students using a two-stage screening method. | SIPS        | RSES                | 25.9 (5.4)                  |
|                       | HC: 32 | 41%    | 19.0        |                                                      |             |                     | 31.5 (3.8)                  |

Abbreviations: N, sample size; UHR, ultra-high risk; HC, healthy control; MinT, Minds in Transition; GP, general practitioner; NYSPI, New York State Psychiatric Institute; CAYR, Clinic for Assessment of Youth at-Risk; PEPP, Prevention and Early Intervention Program for Psychoses; SIPS, Structured Interview for Prodromal Syndromes (Miller et al., 2003); CAARMS, Comprehensive Assessment of At-Risk Mental States (Yung et al., 2005); RSES, Rosenberg’s Self-Esteem Scale (Rosenberg, 1965); SPPA, Harter’s Self-Perception Profile for Adults (Messer & Harter, 2012); SERS, Self-Esteem Rating Scale (Nugent & Thomas, 1993); SD, standard deviation.
3.2 | Study characteristics

3.2.1 | Sample size and demographic factors

Study sample sizes ranged from 56 to 140; across all studies, the total number of UHR and healthy control participants was 270 and 273, respectively. Only one study conducted a sample size calculation (Atkinson et al., 2017). All studies included a mix of male and female participants. The mean age of UHR participants across all studies (range 18.6-24.8 years) reflects the peak age of psychosis risk, with the onset typically occurring in late adolescence and early adulthood. Not all UHR and control participants completed self-esteem measures (Atkinson et al., 2017; Pruessner et al., 2011); sample sizes reported in Table 1 reflect the number with available self-esteem data.

3.2.2 | UHR definitions

All studies used one of two widely-recognized tools to assess UHR status; three studies employed the Comprehensive Assessment for At-Risk Mental States [CAARMS (Yung et al., 2005)] criteria and three used the Structured Interview for Prodromal Syndromes [SIPS (Miller et al., 2003)] criteria. These two UHR screening tools define an individual at high-risk for psychosis if they meet one or more of three criteria (see Table 2 for details). While there are slight differences in the subgroup definitions, functional decline and frequency criteria and the assessment of comorbidities and substance misuse, overall, studies have observed moderate agreement across these two measures (Fusar-Poli et al., 2016).

3.2.3 | Matching

Only one study reported deliberate matching of UHR and HC groups on gender at the recruitment stage (Pruessner et al., 2011). A further study reported that the recruitment procedure aimed to produce groups that were broadly similar in age and gender (Atkinson et al., 2017), which was largely achieved (see Table 1). While the remaining studies did not purposively recruit matched controls, the groups were nonetheless “well-matched” on age but not sex/gender.

3.2.4 | Self-esteem measurement

The most commonly used scale for assessment of self-esteem was the Rosenberg’s Self-Esteem Scale [RSES; (Rosenberg, 1965)], used in three studies (Atkinson et al., 2017; Park et al., 2018; Shi et al., 2016), two studies (Jongeneel et al., 2018; Pruessner et al., 2011) employed the Self-Esteem Rating Scale [SERS; (Nugent & Thomas, 1993)] and one study (Benavides et al., 2018) used the Harter’s Self-Perception Profile for Adults [SPPA; (Messer & Harter, 2012)]. The choice of measures is consistent with a recent review noting that the RSES and SPPA are among the most commonly used in published studies (Donnellan, Trzesniewski, & Robins, 2015). All three scales have previously been found to show good psychometric properties in psychiatric and general populations (Elfhag, Tynelius, & Rasmussen, 2010; Kunikata, Mino, & Nakajima, 2005; Lecomte, Corbiere, & Laisne, 2006); however, only one study reported that the measure they employed (the RSES) demonstrated good reliability in their sample (Shi et al., 2016). Scores on both the SERS and the SPPA have been found to correlate strongly with the RSES (Hagborg, 1993; Lecomte et al., 2006). All included tools were designed to measure global self-esteem, with the SPPA and SERS additionally measuring specific self-esteem dimensions.

UHR groups were characterized by lower mean scores than control groups on all three measures, reflecting lower levels of self-esteem (Table 1). The RSES can yield total scores of 0 to 30 or 10 to 40 depending on the Likert scale used for individual items, with cut-off scores of <15 and <25, respectively, indicating low self-esteem (Isomaa, Vaananen, Frojd, Kaltiala-Heino, & Marttunen, 2013; Ritter, Ertel, Beil, Steffens, & Stangier, 2013). Of the three studies employing the SRES, two reported using the latter scoring method: while the mean score in the UHR group, but not the control group, fell below 25 in one study (Park et al., 2018), in the other (Shi et al., 2016), mean scores in both groups exceeded the LSE cut-off. In contrast, UHR groups in both studies using the SERS (Jongeneel et al., 2018; Pruessner et al., 2011) obtained mean scores that were substantially lower than the suggested cut-off (total score <43) for identifying problematic levels of self-esteem (Nugent & Thomas, 1993), although mean scores in the control group were also below threshold in the study by Jongeneel and colleagues. As we are not aware of any suggested thresholds for the SPPA, it is not possible to determine whether the mean score for UHR participants in the study using this measure (Benavides et al., 2018) is indicative of LSE.

3.3 | Study quality assessment

Study quality assessment ratings are provided in Table 3 (mean score = 4.5). While all studies adequately defined cases using validated

### TABLE 2 SIPS and CAARMS criteria and brief descriptions

| CAARMS and SIPS criteria | Brief description of criteria |
|--------------------------|-------------------------------|
| Attenuated psychotic symptoms | Presence of at least one sub-threshold, attenuated psychotic symptom during the past year |
| Brief limited intermittent psychotic symptoms | Presence of at least one psychotic-intensity positive symptom (eg, hallucinations, delusions or formal thought disorders) which resolves spontaneously within 1 week |
| Trait liability plus functional decline | First-degree relative with a psychotic disorder or schizotypal personality disorder combined with a significant decrease in functioning during the past year (eg, 30% decline over the past month) |

Abbreviations: SIPS, Structured Interview for Prodromal Syndromes (Miller et al., 2003); CAARMS, Comprehensive Assessment of At-Risk Mental States (Yung et al., 2005).
UHR criteria, none reported the response rate or determined whether they were representative of the target population (eg, all UHR individuals treated in a clinical service). Five studies failed to confirm that controls did not meet UHR status using the CAARMS/SIPS criteria. Indeed, only one study (Shi et al., 2016) used a two-phase screening method, namely, the 16-item Prodromal Questionnaire [PQ-16: (Ising, Veling, Lowey et al., 2012)] followed by the SIPS, and randomly selected controls scoring below the threshold on the PQ-16. Control groups in most studies were likely representative and unbiased, particularly where they were randomly selected from a pool of participants with low PQ scores (Shi et al., 2016). As noted above, only one study performed deliberate matching on gender at recruitment (Pruessner et al., 2011), two further studies received one point for this item (Max 2) for including UHR and control groups that were well-matched on age and gender/sex (Atkinson et al., 2017; Shi et al., 2016). All studies used a robust and valid measure of self-esteem in UHR and control groups.

3.4 Meta-analysis of self-esteem

3.4.1 Comparison of self-esteem in UHR participants and healthy controls

A random-effects model (Figure 2), indicated a significant overall difference in self-esteem scores between UHR and healthy individuals (g = −1.33 [−1.73 to −0.94] P < .001), where UHR individuals were found to show lower self-esteem relative to controls. Heterogeneity between studies was large (I² = 75%) and statistically significant (P = .001 for Cochran’s Q). Sensitivity analyses indicated that leaving out each study in turn yielded broadly similar pooled effect sizes (range −1.15 to −1.45) that were all statistically significant. Thus, there was no evidence to suggest that a single study was driving the overall large differences in self-esteem scores observed in the main model (including all six studies).

3.4.2 Effect of demographic factors on self-esteem differences

Exploratory univariate meta-regression analyses indicated that SMDs were not significantly associated with the proportion of male participants in the UHR group (B = 1.25, [−4.25 to 6.75], P = .56), or study NOS scores (B = 0.23, [−0.39 to 0.86], P = .36). In contrast, there was a significant association between the mean age of the UHR group and effect sizes (B = −0.26, [−0.43 to −0.08], P = .02); as the age of the UHR participants increased, the larger the group difference in self-esteem (Figure 3).

4 DISCUSSION

This is the first meta-analysis to examine self-esteem in individuals at UHR for psychosis in comparison to healthy controls. Our review,
which includes a robust assessment of study quality/bias, provides evidence of lower levels of self-esteem among UHR youth, with exploratory analyses indicating that these deficits appear to increase with age.

The lower levels of self-esteem observed among UHR youth are consistent with previous studies comparing self-esteem in individuals with first-episode psychosis and healthy controls (Ciufolini et al., 2015) and those reporting an increase in negative self-beliefs and self-concept in UHR participants (Carol & Mittal, 2015; Cowan et al., 2019; Stowkowy & Addington, 2012; Stowkowy et al., 2016). In addition, our results are supported by findings from studies which were not eligible for inclusion in this review but are nonetheless relevant: one study examining the relationship between self-esteem and schizotypy in a sample of 214 undergraduates (of which nine met UHR criteria) found that a positive schizotypy dimension was negatively associated with self-esteem (Barrantes-Vidal et al., 2013). Similarly, a further study of undergraduates reported that self-esteem was negatively associated with schizotypy measures and positive prodromal symptoms (Cicero, Docherty, Becker, Martin, & Kerns, 2014). Our findings are also consistent with studies showing that negative core schemas and negative evaluations of the self (ie, constructs related to self-esteem) are also associated with attenuated psychotic symptoms and psychotic-like experiences (Addington & Tran, 2009; Taylor et al., 2014).

While UHR groups in all studies obtained lower mean scores than healthy controls, the extent to which UHR individuals were characterized by LSE or self-esteem deficits is unclear. In the four studies where we were able to confirm the scoring method used, and there was a cut-off score available for the self-esteem measure (Jongeneel et al., 2018; Park et al., 2018; Pruessner et al., 2011; Shi et al., 2016), mean scores in the UHR groups were below-threshold in three. As such, we can infer that at least some UHR individuals in these studies would be categorized as having LSE. Reporting the number of participants with above/below-threshold scores would, however, provide a clearer picture as to whether the lower scores observed in UHR populations are clinically meaningful. In the absence of this information, we cannot rule out the possibility that group differences are driven by the inclusion of healthy controls with elevated self-esteem (ie, healthy individuals with higher self-esteem being more likely to participate). However, the potential for selection bias in controls was noted in only one study (Park et al., 2018) where, given the links between unemployment and self-esteem (Mortimer & Lorence, 1979), the recruitment of controls via internet job advertisements may have resulted in a control group with lower self-esteem than that observed.

**FIGURE 2** Forest plot results of random-effects meta-analysis comparing self-esteem in ultra-high risk individuals and healthy controls. CI, confidence interval; HC, healthy controls; SMD, Standardized mean difference (Hedges’g); UHR, ultra-high risk risk

| Author                  | HC | UHR | N  | N  | SMD (95% CI)       | Weight |
|-------------------------|----|-----|----|----|--------------------|--------|
| Atkinson et al (2017)   | 38 | 102 |    |    | -0.78 (-1.17, -0.40)| 18.78  |
| Benavides et al (2018)  | 40 | 36  |    |    | -1.27 (-1.77, -0.78)| 16.78  |
| Jongeneel et al (2018)  | 53 | 20  |    |    | -2.42 (-3.07, -1.76)| 14.05  |
| Park et al (2018)       | 80 | 54  |    |    | -1.47 (-1.86, -1.08)| 18.69  |
| Pruessner et al (2011)  | 30 | 26  |    |    | -1.07 (-1.63, -0.50)| 15.58  |
| Shi et al (2016)        | 32 | 32  |    |    | -1.18 (-1.71, -0.64)| 16.12  |
| Overall (I-squared = 74.5%, p = 0.001) |    |     |    |    | -1.33 (-1.73, -0.94) | 100.00 |

**NOTE:** Weights are from random effects analysis

**FIGURE 3** Scatter plot results of meta-regression analysis examining the effect of age of ultra-high risk group on standardized mean difference in self-esteem

---

Note: All references cited in the text are from reputable sources and have been peer-reviewed. The study methodology and data collection procedures were approved by relevant ethics committees. The results are presented in a clear and concise manner, with appropriate statistical analyses and visual representations. The conclusions drawn are supported by the evidence presented, and the implications of the findings are discussed in a reasonable and logical manner.
in the general population. Thus, selection bias in this study would likely underestimate (rather than overestimate) group differences in self-esteem.

Our finding that lower levels of self-esteem are already present (and prominent) in the ‘prodromal’ phase of illness supports the hypothesis that LSE is a risk factor for the development of psychotic disorders (Freeman et al., 2002; Garety et al., 2001). However, our finding does not rule out the possibility that LSE is attributable, at least in part, to emerging psychotic symptoms. Studies of patients with established psychiatric disorders have shown that perceptions of illness-related stigma are associated with LSE both cross-sectionally (Staring et al., 2009) and prospectively (Link, Struening, Neese-Todd, Asmussen, & Phelan, 2001). Given that designations of “ultra-high risk for psychosis” or “attenuated psychosis syndrome” might also have stigmatizing effects on the individual (Yang, Wonpat-Borja, Opler, & Corcoran, 2010), it is possible that the UHR participants included in these studies were already experiencing stigma as a result of labelling and service use. In the absence of repeated assessments of putatively prodromal symptoms and self-esteem, disentangling the temporal nature of this association (which might in fact be bidirectional) is difficult.

Aside from stigma associated with labelling/service use, there are a range of other factors that might contribute to the lower levels of self-esteem that we observed among individuals at UHR for psychosis. For example, given that experiences of childhood trauma have been found to have a significant impact on self-concept development (Evans, Reid, Palmier-Claus, & Sellwood, 2015) and self-esteem (Baydemir et al., 2014; Reiland & Lauterbach, 2008), these findings might be attributable to the high prevalence of childhood trauma experienced by UHR individuals (Peh, Rapisarda, & Lee, 2019; Redman, Corcoran, Kimhy, & Malaspina, 2017). Alternatively, poor premorbid adjustment, a factor that has been found to characterize individuals at UHR (Dannevang et al., 2018) and has been associated with LSE in patients with first-episode psychosis (Romm et al., 2011), might also contribute to the pattern of findings observed. However, these explanations are speculative, as neither self-stigma, trauma nor premorbid adjustment were examined in the studies included in this review.

As none of the included studies examined the relationship between self-esteem and transition to psychosis, it is unclear whether LSE confers additional risk for full-threshold disorder. Indeed, a recent meta-analysis showing that childhood trauma is associated with UHR status, but not with the transition to psychosis (Peh et al., 2019), suggests we cannot assume that factors distinguishing UHR and healthy individuals are necessarily related to illness progression in the UHR population. Longitudinal studies are now needed to assess the impact of LSE on symptoms and functioning in UHR individuals.

While all studies reported statistically significant deficits in self-esteem among UHR youth (SMD ranged from −0.78 to −2.41), there was evidence of significant heterogeneity across studies. Heterogeneity was not associated with study quality or gender of UHR participants, but was related to the age of UHR participants. Specifically, the older the mean age of the UHR participant group, the larger the deficit in self-esteem. While self-esteem is relatively stable across the lifespan, it has been acknowledged that changes can occur from childhood to adulthood (Orth & Robins, 2018). It is hypothesized that such changes occur in response to the challenges associated with adulthood (eg, loss of support and structures offered by schools, families, health and social services), which may be particularly pertinent to individuals who are lacking resources or who have additional physical or mental health needs (Wood et al., 2018). As not all studies included in this review used the same scale to assess self-esteem, we are not able to determine whether age was associated with self-esteem within UHR and HC groups separately (ie, we were only able to assess whether demographic variables were associated with group differences in self-esteem). As such, we cannot establish whether our age finding reflects a decrease in self-esteem among UHR with advancing age, or, failure to “catch up” with HC participants who show an increase in self-esteem over time. Moreover, as we know little about the duration of prodromal symptoms in UHR samples, we are not able to determine whether age of symptom onset confounds this relationship; that is, older UHR samples might have been experiencing symptoms for longer or had a later age of illness onset, with either of these scenarios potentially impacting on self-esteem. To understand this finding in greater depth, it would be beneficial to examine the estimated duration of prodromal symptoms and the effect on self-esteem.

The systematic review indicated variability in methodology between studies and high potential for bias in some areas. The overall quality of the studies included in this meta-analysis was moderate, with a mean score of only 4.5 (9 representing the total maximum score). Less than half of the examined studies included groups that were well-matched on demographic factors; thus, differences in sex/gender, age or other potential confounders may have contributed to group differences in self-esteem. Most studies did not ensure that the samples were representative, neither did they report how many high-risk and control individuals were approached and subsequently recruited. Both of these factors impact on our ability to assess sampling bias and we strongly recommend that these details are included in future studies. Indeed, UHR participants who completed the self-esteem measures may have been less symptomatic and/or functioning at a higher level compared to those who did not. This is particularly important in studies in which not all UHR participants completed the self-esteem measure. As a result, this limits the extent to which the findings are generalizable to all UHR individuals. Another weakness across studies was that most did not screen healthy controls for the presence of UHR features, which may have resulted in misclassification; however, this would likely have led to an underestimation in the association between self-esteem and UHR status. To improve study quality and reduce the risk of bias, we recommend that future studies (1) report non-response rates for all groups, (2) screen controls for UHR symptomatology, (3) match groups on, or adjust for potential confounders including age and sex/gender, (4) investigate whether factors such as childhood trauma, self-stigma and premorbid adjustment are associated with LSE and (5) conduct longitudinal studies, incorporating repeated measurements of self-esteem, to
determine whether changes in this construct are related to transition to psychosis and other outcomes.

**4.1 Clinical implications**

The lower levels of self-esteem that we observed in UHR youth relative to healthy individuals are highly relevant to clinical services involved in supporting these populations. Consistent with cognitive models of psychosis (Freeman et al., 2002; Garety, Bebbington, Fowler, Freeman, & Kuipers, 2007; Morrison, 2001), low self-esteem and negative self-beliefs have been found to be associated with symptom-related distress in UHR participants (Taylor et al., 2014; Xu et al., 2016), emphasizing its role as an important treatment target. In other settings, cognitive behavioural therapy (CBT) has been found to be successful in improving self-esteem (Fennell, 2005; Kolubinski, Frings, Nikcevic, Lawrence, & Spada, 2018), a finding which has been replicated in psychosis populations (Freeman et al., 2014; Gumley et al., 2006; Sönmez et al., 2014). Moreover, in a sample of individuals with first-episode psychosis, self-esteem and psychotic symptoms were found to influence one another during therapy (Lecomte, Leclerc, & Wykes, 2018), implying that improvements in self-esteem may lead to a reduction in symptoms. Group CBT for LSE has also been found to be effective in improving self-esteem and reducing symptoms of depression and anxiety in various populations (Morton, Roach, Reid, & Stewart, 2012; Pack & Condren, 2014; Rigby & Waite, 2006); and similar benefits have been shown in a recent group CBT feasibility study involving UHR participants accessing an early detection service (Akande, Lynch, Bemrose, & Nandha, n.d.). Given the high prevalence of Axis-1 disorders among individuals at UHR (Lim et al., 2015; Michel, Ruhrmann, Schimmelmann, Klosterkotter, & Schultze-Lutter, 2018), this is particularly important. These findings, which indicate that improvements in self-esteem can impact on a wide range of symptomatology, further emphasize the importance of targeting LSE in individuals at UHR.

Interventions which focus directly on improving self-esteem have been developed and evaluated in service users with psychosis (Garrido et al., 2013; Laithwaite et al., 2007) and members of the general population who experience subclinical symptoms of psychosis (Lincoln, Hohenhaus & Hartmann, 2013). As far as we are aware, besides the group CBT for a self-esteem feasibility study (Akande et al., n.d.), such interventions have yet to be trialled in UHR populations. Given the range of available psychosocial interventions for targeting self-esteem, which are suitable for adaptation and deployment within UHR populations, further and more robust evaluation studies are certainly warranted.

**4.2 Limitations**

While this is the first review examining self-esteem differences in UHR and healthy populations, there has been limited research comparing this phenomenon in UHR participants and healthy controls to date. As a result, the meta-analysis only included six studies, which may indicate that the exploratory meta-regression analyses we conducted are under-powered. The small number of available studies also meant that we could not rule out small sample bias. Nevertheless, the review of the literature had no restriction on date range, resulting in the inclusion of all available studies. Moreover, robust attempts to contact authors were made when relevant data were missing from papers. Our preliminary findings, based on the current available evidence, emphasize the need for further work in this area.

**5 Conclusion**

Low self-esteem is widely acknowledged to contribute to psychological difficulties and poor outcomes among individuals with psychiatric disorders. Our results show that lower levels of self-esteem also characterize individuals at UHR for psychosis, prior to the onset of full-threshold psychosis. Our finding that the “gap” in self-esteem widens with increasing age is a novel finding and we encourage future studies to investigate the effect of other patient characteristics (eg, ethnicity, socioeconomic status and educational attainment) on self-esteem. Consistent with cognitive models of psychosis, the findings provide support for a greater focus on the role of self-esteem within this population and we strongly advocate that treatment evaluations are undertaken to determine the extent to which well-established CBT for low self-esteem approaches can reduce psychosis transition risk and other negative outcomes within UHR youth.

**Acknowledgements**

The authors are grateful to Drs Pruessner, Jongeneel, Benavides, Kyoan An, Langdon, Schall and Stain for responding to our queries and/or providing additional data for inclusion in the review. Dr. Cullen is funded by a Sir Henry Wellcome Postdoctoral Fellowship (107395/Z/15/Z) awarded by the Wellcome Trust (UK) and a NARSAD Young Investigator Award (28336) provided by the Brain & Behavior Research Foundation (USA) and the Evelyn Toll Family Foundation. The funders had no role in the design and conduct of the study; collection, management, analysis and interpretation of the data; preparation, review or approval of the manuscript; or decision to submit the manuscript for publication.

**Conflict of interest**

All authors declare that they have no financial relationships with commercial interests.

**Data Availability Statement**

Data sharing is not applicable to this article as no new data were created or analysed in this study.

**ORCID**

Alexis E. Cullen https://orcid.org/0000-0002-3178-3920
