



Deposited via The University of Sheffield.

White Rose Research Online URL for this paper:

<https://eprints.whiterose.ac.uk/id/eprint/192471/>

Version: Published Version

---

**Article:**

Isham, L., Sheng Loe, B., Hicks, A. et al. (2022) The meaning in grandiose delusions: measure development and cohort studies in clinical psychosis and non-clinical general population groups in the UK and Ireland. *The Lancet Psychiatry*, 9 (10). pp. 792-803. ISSN: 2215-0366

[https://doi.org/10.1016/s2215-0366\(22\)00236-x](https://doi.org/10.1016/s2215-0366(22)00236-x)

---

**Reuse**

This article is distributed under the terms of the Creative Commons Attribution (CC BY) licence. This licence allows you to distribute, remix, tweak, and build upon the work, even commercially, as long as you credit the authors for the original work. More information and the full terms of the licence here:

<https://creativecommons.org/licenses/>

**Takedown**

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing [eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk) including the URL of the record and the reason for the withdrawal request.



# The meaning in grandiose delusions: measure development and cohort studies in clinical psychosis and non-clinical general population groups in the UK and Ireland



Louise Isham, Bao Sheng Loe, Alice Hicks, Natalie Wilson, Jessica C Bird, Richard P Bentall, Daniel Freeman

*Lancet Psychiatry* 2022;  
9: 792–803

Published Online  
August 29, 2022  
[https://doi.org/10.1016/S2215-0366\(22\)00236-X](https://doi.org/10.1016/S2215-0366(22)00236-X)

Patient Advisory Group  
(A Hicks, N Wilson MSc),  
Oxford Cognitive Approaches  
to Psychosis, Department of  
Psychiatry (L Isham DCLinPsy,  
Prof D Freeman DCLinPsy),  
University of Oxford, Oxford,  
UK; Oxford Health NHS  
Foundation Trust, Oxford, UK  
(L Isham, Prof D Freeman);  
The Psychometrics Centre,  
Cambridge Judge Business  
School, University of  
Cambridge, Cambridge, UK  
(B Sheng Loe PhD); The McPin  
Foundation, London, UK  
(A Hicks, N Wilson); South  
London and Maudsley NHS  
Foundation Trust, London, UK  
(J C Bird DCLinPsy); Department  
of Psychology, University of  
Sheffield, Sheffield, UK  
(Prof R P Bentall PhD)

Correspondence to:  
Dr Louise Isham, Oxford  
Cognitive Approaches to  
Psychosis, Department of  
Psychiatry, University of Oxford,  
Oxford, OX2 7JX  
[louise.isham@psych.ox.ac.uk](mailto:louise.isham@psych.ox.ac.uk)

## Summary

**Background** The content of grandiose delusions—inaccurate beliefs that one has special powers, wealth, mission, or identity—is likely to be highly meaningful. The meaning, for example providing a sense of purpose, could prove to be a key factor in the delusion taking hold. We aimed to empirically define and develop measures of the experience of meaning in grandiose delusions and the sources of this meaning, and to test whether severity of grandiosity in clinical and non-clinical populations is associated with level of meaning.

**Methods** We did a cross-sectional self-report questionnaire study in two cohorts: non-clinical participants aged 18 years and older, with UK or Irish nationality or residence; and patients with affective or non-affective psychosis diagnoses, aged 16 years and older, and accessing secondary care mental health services in 39 National Health Service providers in England and Wales. Participants with high grandiosity completed two large item pools: one assessing the experience of meaning in grandiose delusions (Grandiosity Meaning Measure [termed gram]) and one assessing the sources of meaning (Grandiosity Meaning Measure–Sources [termed grams]). The Grandiosity Meaning Measure and Grandiosity Meaning Measure–Sources were developed using exploratory factor analysis and confirmatory factor analysis. Structural equation modelling was used to test the associations of meaning with the severity of grandiosity. The primary outcome measure for grandiosity was the Specific Psychotic Experiences Questionnaire (grandiosity subscale) and associations were tested with the Grandiosity Meaning Measure and the Grandiosity Meaning Measure–Sources.

**Findings** From Aug 30, 2019, to Nov 21, 2020, 13 323 non-clinical participants were enrolled. 2821 (21%) were men and 10 134 (76%) were women, 11 974 (90%) were White, and the mean age was 39.5 years (SD 18.6 [range 18–93]). From March 22, 2021, to March 3, 2022, 798 patients with psychosis were enrolled. 475 (60%) were men and 313 (39%) were women, 614 (77%) were White, and the mean age was 43.4 years (SD 13.8 [range 16–81]). The experience of meaning in relation to grandiose delusions had three components: coherence, purpose, and significance. The sources of meaning had seven components: positive social perceptions, spirituality, overcoming adversity, confidence in self among others, greater good, supporting loved ones, and happiness. The measurement of meaning was invariant across clinical and non-clinical populations. In the clinical population, each person typically endorsed multiple meanings and sources of meaning for the grandiose delusion. Meaning in grandiose delusions was strongly associated with severity of grandiosity, explaining 53.5% of variance, and with grandiose delusion conviction explaining 27.4% of variance. Grandiosity was especially associated with sense of purpose, and grandiose delusion conviction with coherence. Similar findings were found for the non-clinical population.

**Interpretation** Meaning is inherently tied to grandiose delusions. This study provides a framework for research and clinical practice to understand the different types of meaning of grandiosity. The framework is likely to have clinical use in psychological therapy to help guide patients to find sources of equivalent meaning from other areas of their lives and thereby reduce the extent to which the grandiose delusion is needed.

**Funding** Health Education England and National Institute for Health and Care Research.

**Copyright** © 2022 The Author(s). Published by Elsevier Ltd. This is an Open Access article under the CC BY 4.0 license.

## Introduction

Grandiose delusions are unfounded or inaccurate beliefs that one has special powers, wealth, mission, or identity.<sup>1</sup> These beliefs are relatively common—representing approximately a third of delusions experienced by patients diagnosed with non-affective psychosis<sup>2</sup> and up to 60% of those in bipolar mania.<sup>3</sup> Grandiose delusions can potentially cause harm across multiple life domains,

including physical, sexual, social, occupational, and emotional.<sup>4</sup> However, such beliefs can hold significant positive meaning for the individual. In an earlier study,<sup>4</sup> we conducted in-depth interviews with UK National Health Service (NHS) patients in England who had current or past experiences of grandiose delusions. Their reflections indicated that grandiosity can provide a sense of purpose, belonging, or self-identity, or make

## Research in context

### Evidence before this study

For over a century it has been hypothesised that grandiose delusions are highly meaningful experiences that can provide a sense of self-worth and happiness and compensate for feelings of loneliness, subjugation, or powerlessness. Qualitative accounts are broadly consistent with these ideas. We searched PubMed on April 4, 2022, with no date or language restrictions, using the terms (“grandios\*” OR “grandeur” OR “expansiv\*” OR “exceptional\*”) AND (delu\* OR belie\* OR idea\*) AND (meaning\* OR “content\*” OR “eudaimoni\*” OR “hedoni\*” OR “wellbeing”). 196 papers were identified. Several qualitative studies highlighted the importance of meaning in grandiose beliefs, but there were no quantitative studies directly investigating this construct and no assessments of meaning in grandiose beliefs.

### Added value of this study

To our knowledge, this is the first empirical test of meaning in grandiose delusions. We found that within participants from the UK and Ireland, grandiose delusions provide three types of meaning. Grandiose beliefs help to make life make sense

(coherence), provide a focus for the future (purpose), and make life feel worthwhile (significance). The meaning was derived from seven sources, which went beyond simply feeling happy, and included doing things for the greater good, supporting loved ones, overcoming adversity, gaining confidence in oneself when among others, having a positive social perception, and gaining spirituality. In a clinical sample, meaning had substantial associations with grandiosity, whether measured as severity of grandiose ideas or conviction in grandiose delusions. We provide the first empirically established framework to understand meaning in grandiose delusions.

### Implications of all the available evidence

Grandiose delusions are closely tied to a wide variety of personal meanings that people seek in their lives. Causal tests are now required to establish whether the meaning derived maintains the beliefs. If meaning is determined to be a causal factor, then a potential therapeutic strategy is for clinicians to support patients to develop sources of equivalent meaning from other areas of their lives.

sense of unusual or difficult events.<sup>4</sup> Examples cited by individuals who had beliefs such as “I work undercover for the security services” and “I am a Goddess” were being useful to society, helping others, and feeling strong, powerful, and able to achieve their potential.

Understanding the meaning in grandiose beliefs can be crucial. As one participant described: “I wanted the fantasy to persist...I wanted to be Messiah, I wanted to be important; I wasn’t looking for information against it because I didn’t want it to be false.”<sup>4</sup> Meaning inherent in the delusion could provide a compelling motivation for belief retention, despite the occurrence of harmful effects. Effective intervention therefore might depend on successfully developing alternative ways of achieving this function of the delusion. Indeed, attempting to alter the belief without compensating for the meaning it provides could prove both difficult and iatrogenic.<sup>4</sup> The meaning in grandiosity therefore requires understanding.

There has been little focused empirical research on grandiose delusions, and even less on their meaning, and there are no measures of the meaning of grandiose delusions to enable such work to be conducted. A sensible assumption is that the types of meaning sought from grandiose delusions are those people seek in general. Supportive of this assumption is that the descriptions of meaning reported in our qualitative study were similar to the concepts from the literature on meaning in life.

Martela and Steger<sup>5</sup> distinguish between the experience or sense of meaning in one’s life and the sources of it. They argue for three constituent components of meaning: coherence (life experiences

and the surrounding world making sense), purpose (having future-oriented goals and aspirations), and significance (the sense that one’s life is worthwhile and matters). This theory is consistent with proposals by several other authors.<sup>6,7</sup> Other dimensions of meaning have also been suggested, but Martela and Steger argue that these are better viewed as sources used to make the evaluation that one has meaning in life.<sup>5,8</sup> For example, a person might deduce that their life is significant because they have close relationships, or that they have a future-oriented purpose because they have a vocational career. In contrast to the experience of meaning, there is far less consensus surrounding potential sources, but common themes include: positive interpersonal relationships, environmental mastery, autonomy, altruism, religion, spirituality, positive affect, personal growth, personal achievement, and being treated fairly.<sup>9–17</sup> The concept of meaning in life has been applied to delusions more broadly<sup>18,19</sup> but not examined specifically for grandiose delusions.

The present study had three key aims: to understand the meaning in grandiosity, to identify the sources of meaning in grandiosity, and to test the potential connection of meaning with grandiosity. We view delusions as representing one end of a spectrum of severity in the general population, and we therefore initially developed measures of meaning and its sources in a large general population group scoring highly on grandiosity. We then tested the concepts in a clinical psychosis group. Finally, we tested the hypothesis that greater levels of meaning would be associated with higher levels of grandiosity.

See Online for appendix

## Methods

### Study design and participants

We conducted three sequential, cross-sectional, self-report questionnaire studies. Studies 1 and 2 recruited general population participants scoring highly on grandiosity. In study 1, two initial item pools were used to generate potential categories of i) the experience and ii) the sources of meaning in grandiosity. Study 2 built on the learning from study 1 by generating larger item pools, allowing the hypothesised factor structure for each measure to be tested. The measures were then administered to a clinical population in study 3. Measurement invariance between the general population and clinical groups was assessed, and the measures were then validated in the clinical sample. The measures were readministered to a subgroup of participants in studies 2 and 3 a week after baseline to assess test–retest reliability. The extent to which the meaning in grandiose beliefs was associated with grandiose belief conviction and grandiosity in clinical and general population groups was assessed using data from studies 2 and 3.

Ethical approval was given by the University of Oxford Research Ethics Committee (reference numbers R45936/RE001 and R69315/RE001) and NHS Health Research Authority, South Central Oxford C Research Ethics Committee (reference number 20/SC/0430).

Recruitment for studies 1 and 2 was via Facebook adverts and participant email contact lists from previous studies conducted by our research group where consent to contact was given. Inclusion criteria were broad: 18 years and older, access to the internet, and UK or Irish nationality or residence. There were no exclusion criteria. Data were collected using the online survey software, Qualtrics. In study 3, participants were recruited from 39 NHS mental health providers in England and Wales. Inclusion criteria were: 16 years and older, accessing adult secondary care NHS mental health services, and diagnosed with non-affective or affective psychosis. Exclusion criteria were insufficient English language to participate or primary diagnosis of alcohol or drug use disorder, personality disorder, or organic syndrome. Data were collected on paper or online via Qualtrics.

### Procedures

We developed two item pools to measure the meaning in grandiose beliefs: the Grandiosity Meaning Measure (termed gram), measuring the experience of meaning, and the Grandiosity Meaning Measure–Sources (termed grams), measuring the sources of such meaning.

Preliminary item pools were developed at the beginning of study 1. Deductive and inductive methods were used to generate items, via revisiting the analysis of the meaning from our earlier qualitative study<sup>4</sup> and reviewing the wider literature on meaning in life and adapting items from associated scales. The initial item pools had 26 (Grandiosity Meaning Measure) and 71 (Grandiosity

Meaning Measure–Sources) items (appendix pp 11–13). Items were rated on a 5-point Likert scale (0=do not agree, 4=agree totally).

The Specific Psychotic Experiences Questionnaire–Grandiosity Subscale (SPEQ-G; appendix p 3) is a self-report measure of grandiosity with good psychometric properties.<sup>20</sup> Respondents indicate how much they agree with eight statements in relation to the past month, answering on a 4-point Likert scale yielding a total score of 0 to 24. Higher scores indicate higher levels of grandiosity. The internal reliability of the scale in the non-clinical population (study 2) was Cronbach's  $\alpha$  of 0.72 and in the clinical population (study 3) was  $\alpha$  of 0.82. We used the SPEQ-G to identify participants scoring highly enough on the grandiosity continuum for administration of our item pools. The test–retest subgroup was taken from these participants.

### Outcomes

The primary outcomes were: the Grandiosity Meaning Measure for the measurement of meaning in grandiose beliefs; the Grandiosity Meaning Measure–Sources for the measurement of the sources of meaning in grandiose beliefs; and the SPEQ-G to test the association with grandiosity.

### Statistical analysis

Analyses were conducted in R (version 4.0.3–4.2.1) with packages psych (version 2.0.9–2.2.5) and lavaan (version 0.6–11). Before factor analysis, Bartlett's Test of Sphericity and the Kaiser-Meyer Olkin Measure of Sampling Adequacy (KMO) were used to check the feasibility of factor recovery based on the observed dataset. Parallel analysis was used to identify the number of factors to retain.

In study 1, exploratory factor analysis was conducted on both the Grandiosity Meaning Measure and the Grandiosity Meaning Measure–Sources to assess the structure of items and refine the item pools by discarding poorly fitting items.

In study 2, the sample for each measure was randomly split into two subsamples. This enabled item pool refinement using exploratory factor analysis in the first subsample and a test of the factor structure using confirmatory factor analysis in the second subsample. The factor structure was validated in the clinical sample (study 3) using confirmatory factor analysis.

The psychometric properties of the scale were assessed using ordinal  $\alpha$  to determine internal consistency and intraclass correlations for 1-week test–retest reliability.

To evaluate the validity of the measurement model in a clinical population, we conducted measurement invariance analysis, using data from general (study 2) and clinical (study 3) populations.

Finally, using data from studies 2 and 3, we assessed the extent to which the sources of meaning were associated with the experience of meaning in relation to

For more on Qualtrics see <https://www.qualtrics.com>

	Study 1 (n=1851)	Study 2 (n=1577)	Study 2 (test-retest; n=235)	Study 3 (n=357)	Study 3 (test-retest; n=107)
Age, years	32.9 (16.2 [18–90])*	39.7 (18.5 [18–89])*	44.2 (19.2 [18–82])*	41.5 (13.0 [16–78])	41.4 (12.8 [16–72])
Gender					
Women	1416 (76.5%)	909 (57.6%)	63 (26.8%)	135 (37.8%)	39 (36.4%)
Men	379 (20.5%)	607 (38.5%)	164 (69.8%)	215 (60.2%)	66 (61.7%)
Non-binary	34 (1.8%)	49 (3.1%)	6 (2.6%)	3 (0.8%)	1 (0.9%)
Other or prefer not to say	22 (1.2%)	12 (0.8%)	2 (0.9%)	4 (1.1%)	1 (0.9%)
Ethnicity					
White (any)	1576 (85.1%)	1342 (85.1%)	211 (89.8%)	257 (72.0%)	75 (70.1%)
Black (any)	22 (1.2%)	15 (1.0%)	1 (0.4%)	40 (11.2%)	14 (13.1%)
Asian (any)	91 (4.9%)	68 (4.3%)	4 (1.7%)	25 (7.0%)	8 (7.5%)
Multiple ethnic group or other	132 (7.1%)	131 (8.3%)	16 (6.8%)	34 (9.5%)	10 (9.3%)
Prefer not to say	30 (1.6%)	21 (1.3%)	3 (1.3%)	1 (0.3%)	0
Marital status					
Single	1064 (57.5%)	729 (46.2%)	92 (39.1%)	253 (70.9%)	77 (72.0%)
Cohabiting	267 (14.4%)	194 (12.3%)	22 (9.4%)	18 (5.0%)	7 (6.5%)
Married or in civil partnership	376 (20.3%)	461 (29.2%)	87 (37.0%)	32 (9.0%)	6 (5.6%)
Separated or divorced	87 (4.7%)	126 (8.0%)	21 (8.9%)	43 (12.0%)	14 (13.1%)
Widowed	27 (1.5%)	31 (2.0%)	10 (4.3%)	11 (3.1%)	3 (2.8%)
Prefer not to say	30 (1.6%)	36 (2.3%)	3 (1.3%)	0	0
Employment					
Employed full-time	457 (24.7%)	409 (25.9%)	58 (24.7%)	31 (8.7%)	11 (10.3%)
Employed part-time	252 (13.6%)	178 (11.3%)	31 (13.2%)	25 (7.0%)	4 (3.7%)
Housewife or househusband	32 (1.7%)	20 (1.3%)	6 (2.6%)	5 (1.4%)	2 (1.9%)
Retired	128 (6.9%)	186 (11.8%)	36 (15.3%)	21 (5.9%)	6 (5.6%)
Student	637 (34.4%)	416 (26.4%)	55 (23.4%)	20 (5.6%)	2 (1.9%)
Self-employed	170 (9.2%)	183 (11.6%)	26 (11.1%)	9 (2.5%)	0
Unemployed	147 (7.9%)	151 (9.6%)	18 (7.7%)	229 (64.1%)	78 (72.9%)
Voluntary work (option in study 3 only)	..	..	..	17 (4.8%)	4 (3.7%)
Prefer not to say	28 (1.5%)	34 (2.2%)	5 (2.1%)	0	0
SPEQ-G total	10.6 (3.4 [7–24])	9.0 (3.9 [5–24])	8.6 (3.7 [5–22])	11.6 (5.3 [5–24])	12.1 (5.5 [5–24])
History of mental health difficulties?					
Yes	1177 (63.6%)	856 (54.3%)	137 (58.3%)	..	..
No	653 (35.3%)	690 (43.8%)	95 (40.4%)	..	..
Prefer not to say	21 (1.1%)	31 (2.0%)	3 (1.3%)	..	..
If yes, are these ongoing?					
Yes	809 (68.7%)	586 (68.5%)	92 (67.2%)	..	..
No	333 (28.3%)	248 (29.0%)	42 (30.7%)	..	..
Prefer not to say	35 (3.0%)	22 (2.6%)	3 (2.2%)	..	..
Diagnosis†					
Schizophrenia	..	..	..	123 (34.5%)	39 (36.4%)
Schizoaffective disorder	..	..	..	70 (19.6%)	24 (22.4%)
Delusional disorder	..	..	..	6 (1.7%)	2 (1.9%)
Brief psychotic disorder	..	..	..	4 (1.1%)	3 (2.8%)
Psychotic disorder not otherwise specified	..	..	..	66 (18.5%)	16 (15.0%)
Bipolar affective disorder	..	..	..	83 (23.2%)	23 (21.5%)
Psychotic depression	..	..	..	2 (0.6%)	0
Other	..	..	..	3 (0.8%)	0

(Table 1 continues on next page)

	Study 1 (n=1851)	Study 2 (n=1577)	Study 2 (test-retest; n=235)	Study 3 (n=357)	Study 3 (test-retest; n=107)
(Continued from previous page)					
Mental health service recruited from					
Inpatient unit	..	..	..	92 (25.8%)	21 (19.6%)
Forensic inpatient	..	..	..	16 (4.5%)	8 (7.5%)
Early intervention in psychosis service	..	..	..	56 (15.7%)	19 (17.8%)
Adult CMHT	..	..	..	178 (49.9%)	54 (50.5%)
Forensic adult CMHT	..	..	..	1 (0.3%)	1 (0.9%)
Other	..	..	..	14 (3.9%)	4 (3.7%)
Data are n (%) or mean (SD [range]). Gram=Grandiosity Meaning Measure. Grams=Grandiosity Meaning Measure-Sources. SPEQ-G=Specific Psychotic Experiences Questionnaire-Grandiosity Subscale. CMHT=community mental health team. Demographics data presented here for each study are for the total sample used in factor analyses (ie, those included in gram or grams analyses). In study 1, 458 participants provided gram data only; 1386 participants provided gram and grams data, and seven gave grams data only. In study 2, 189 provided gram data only; 1388 provided gram and grams data. There were no participants who provided only grams data. In the test-retest for study 2, 223 provided both gram and grams test-retest data, and an additional 12 provided test-retest data for the gram only. In study 3, 24 provided gram data only, 324 provided both gram and grams data, and nine gave grams data only. In test-retest for study 3, 96 provided both gram and grams test-retest data, an additional seven provided gram data only, and four provided grams data only. *Study 1 (n=1847), study 2 (n=1507), and study 2 (test-retest; n=227). †ICD-10 diagnoses were recorded from participants' clinical notes.					
<b>Table 1: Sociodemographic data and descriptive statistics for participants included in the analyses</b>					

the grandiose belief, and the extent to which the meaning of the grandiose belief was associated with the degree of grandiosity and grandiose belief conviction. Pairwise associations were explored using Pearson's correlations, and structural equation modelling delivered final prediction models incorporating multiple predictors. For the key test of the association of meaning with grandiosity, 324 participants would provide 95% power to detect a Pearson's correlation coefficient of 0.2 at 5% significance level.

Full details of the statistical analyses are provided in the appendix (pp 6–7).

#### Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

#### Results

Recruitment windows were: Aug 30 to Nov 10, 2019, for study 1; Aug 28 to Nov 21, 2020, for study 2; and March 22, 2021, to March 3, 2022, for study 3. The studies recruited 8805, 4518, and 798 participants, respectively. The sociodemographic information for the participants who completed the item pools for measure development are shown in table 1 and for the full sample in the appendix (p 14).

Full information on the analyses and results is provided in the appendix (pp 6–10). We first looked at the meaning of grandiosity in the general population. For the Grandiosity Meaning Measure, in study 1 Bartlett's test of sphericity and the KMO test indicated that factor analysis was appropriate ( $\chi^2$  [325 df] 36346.11,  $p < 0.0001$ , KMO 0.95). Parallel analysis showed that two-factor and three-factor solutions appeared viable, but the three-factor solution (mapping onto constructs

of coherence, significance, and purpose) was identified as the most appropriate model from a theoretical and empirical perspective. Following the criteria for item removal, exploratory factor analysis led to retention of 22 of the 26 items (appendix p 15 provides factor loadings). These 22 items and three additional items constituted the revised item pool for study 2 (appendix pp 8–9 provides details of how and why items were amended, p 16 the revised item pool).

In study 2, Bartlett's test of sphericity and the KMO test indicated factor analysis to be appropriate for the first subsample (n=788,  $\chi^2$  [300 df] 18919.24,  $p < 0.0001$ , KMO 0.95). Commensurate with results from study 1, parallel analysis indicated the three-factor structure as the best solution. An exploratory factor analysis led to five items being discarded, and the resulting 20-item, three-factor model explained 65% of the variance (appendix p 17 provides factor loadings).

A confirmatory factor analysis in the second subsample (n=789) showed that the 20-item, three-factor model was within the acceptable fit range ( $\chi^2$  [167 df] 938.08, comparative fit index [CFI] 0.97, Tucker Lewis Index [TLI] 0.97, root mean square error of approximation [RMSEA] 0.077, standardised root mean square residual [sRMR] 0.049). To shorten the item bank and improve the model fit, we conducted post-hoc analysis, evaluating the model adequacy based on the modification index.<sup>21</sup> This produced the final 17-item, three-factor model, which fitted the data well ( $\chi^2$  [116 df] 401.86, CFI 0.99, TLI 0.99, RMSEA 0.056, sRMR 0.035).

The pattern of factor correlations supported a meaningful higher-order factor. Results from the higher-order confirmatory factor analysis model showed that the three primary factors loaded significantly onto the higher-order factor (coherence  $r=0.44$ , significance  $r=0.92$ , purpose  $r=0.84$ ; see appendix p 18 for factor loadings). Figure 1

shows the final model. The correlations between factor scores and corresponding raw scores were very strong (appendix pp 24–25).

The Grandiosity Meaning Measure had good psychometric properties with strong internal consistency<sup>22</sup> (ordinal  $\alpha$  0.89–0.94; appendix p 26). 235 participants provided follow-up data within 7–10 days (mean 7.56 [SD 0.81]) and the intraclass correlation coefficient (intraclass correlations of 0.82) indicated that the Grandiosity Meaning Measure had excellent test–retest reliability.

For the Grandiosity Meaning Measure–Sources, Bartlett’s test of sphericity and the KMO test for study 1 data indicated that factor analysis was appropriate ( $\chi^2$  [2485 df] 85027.34,  $p < 0.0001$ , KMO 0.97). Scree plot and parallel analysis indicated between six and 13 factors, each of which were considered via model comparison to generate hypotheses regarding potential factor structures. The high number of factor solutions indicated additional potential dimensions of interest. However, these potential factors had insufficient items to be able to determine whether they were true factors. We therefore revised the item pool (appendix pp 19–20) to include sufficient items to represent eight potential factors to be tested in study 2.

In study 2, before an exploratory factor analysis, inspection of the correlation matrix in the first subsample ( $n=830$ ) led to the removal of six items. Bartlett’s test of sphericity and KMO tests indicated factor analysis to be appropriate ( $\chi^2$  [2701 df] 57471.34,  $p < 0.0001$ , KMO 0.96). Parallel analysis suggested a seven-factor, eight-factor, or nine-factor solution, with a seven-factor solution emerging as most appropriate. The factors were: greater good, supporting loved ones, positive social perceptions, overcoming adversity, spirituality, confidence in self among others, and happiness. A further 28 items were removed during an exploratory factor analysis resulting in a 46-item, seven-factor model explaining 60% of the variance (appendix pp 21–22 provides factor loadings).

A confirmatory factor analysis in the second subsample of study 2 ( $n=558$ ) showed that the 46-item, seven-factor measure had acceptable fit to the data ( $\chi^2$  [968 df] 2903.18, CFI 0.92, TLI 0.92, sRMR 0.069, RMSEA 0.060). Modification indices were evaluated to identify items that could be deleted to shorten the measure while improving model fit, resulting in nine further items being removed. The final 37-item, seven-factor model had a good fit to the data ( $\chi^2$  [608 df] 1582.24, CFI 0.95, TLI 0.95, RMSEA 0.054, sRMR 0.057). Figure 2 and the appendix (p 23) show the final model. The correlations between factor scores and corresponding raw scores were very strong (appendix pp 24–25).

The Grandiosity Meaning Measure–Sources had good psychometric properties (appendix p 26) with strong internal consistency for each factor (ordinal  $\alpha$  0.81–0.93). 223 participants provided follow-up data within 7–10 days

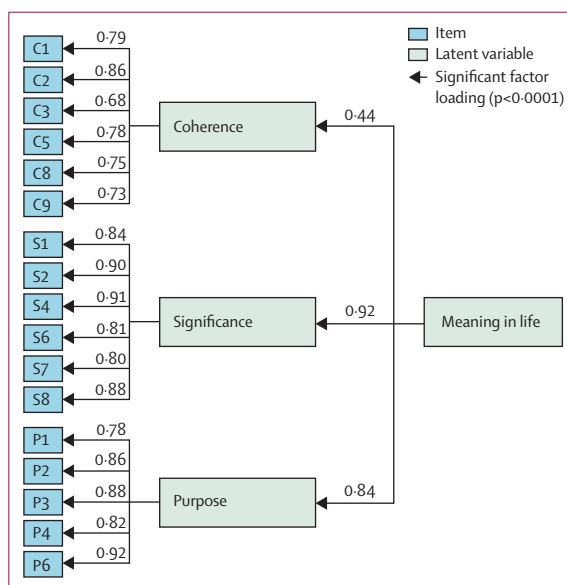


Figure 1: The Grandiosity Meaning Measure final 17-item higher-order factor model

(mean 7.56 [SD 0.81]). Test–retest reliability coefficients were excellent with intraclass correlations ranging from 0.77 to 0.89.

We then investigated the measures in the clinical population. To summarise frequency of endorsement we dichotomised item responses as not endorsed or endorsed (table 2; appendix pp 27–28 shows non-dichotomised responses). Participants endorsed on average 12 out of the 17 items of the Grandiosity Meaning Measure (mean 12.36 [SD 4.58]), and all items were more commonly endorsed than not. The most endorsed items were: “...makes my life meaningful”, “...gives me something I can be really committed to in the future”, and “...helps me to understand why events happen”. 241 (69.3%) of 348 participants endorsed “...gives me a reason to live.”

In the clinical validation sample ( $n=348$ ), the confirmatory factor analysis model indicated that the 17-item final higher-order model from study 2 had good fit ( $\chi^2$  [116 df] 445.26, CFI 0.96, TLI 0.96, RMSEA 0.090, sRMR 0.055; appendix p 23).<sup>23,24</sup> Associations between factor scores and corresponding raw scores were strong (appendix pp 24–25). The Grandiosity Meaning Measure had good psychometric properties (appendix p 26). Internal consistencies for each factor were strong (ordinal  $\alpha$  0.88–0.95). 103 clinical participants provided follow-up data within 3–10 days (mean 7.30 [SD 1.41]) and test–retest reliability was excellent (intraclass correlation of 0.82).

We tested for levels of measurement invariance between the clinical ( $n=324$ ) and general population ( $n=1386$ ) groups using participants who provided both complete Grandiosity Meaning Measure and complete Grandiosity Meaning Measure–Sources data. Measurement invariance for the Grandiosity Meaning Measure was achieved at the

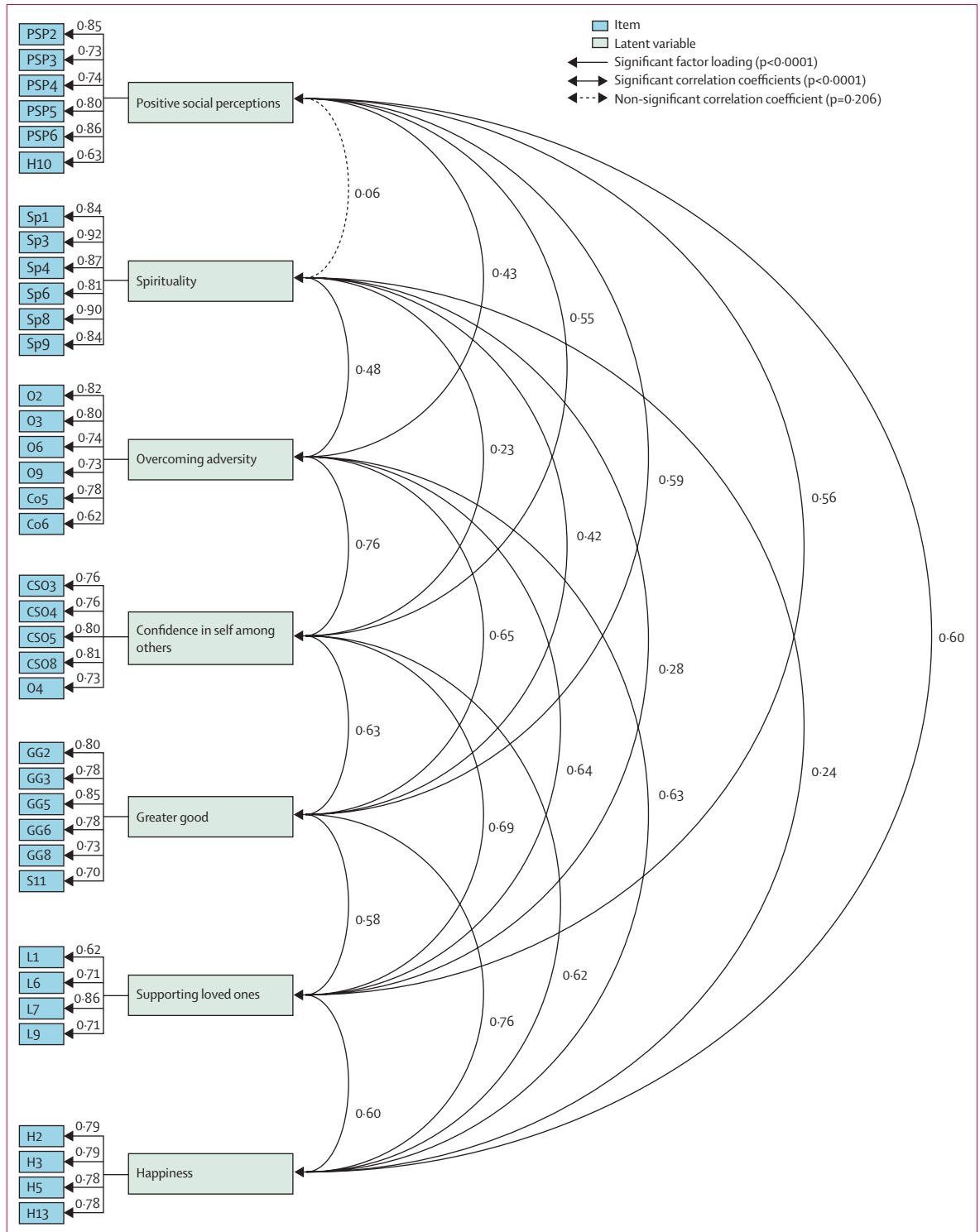


Figure 2: The Grandiosity Meaning Measure–Sources final 37-item correlated-factor model

strongest scalar level (appendix p 29), meaning that although the Grandiosity Meaning Measure was initially developed in a general population group, it can be used within a clinical population, and latent factor scores can

be meaningfully compared between these populations. For all three experience-of-meaning factors, the clinical group had significantly higher factor means than the general population group (appendix p 30).

Item content*	Endorsement level†	
	0	1
<b>Grandiosity Meaning Measure (n=348)</b>		
Coherence		
C1 "...helps me to make sense of what is going on in the world."	92 (26.4%)	256 (73.6%)
C2 "...helps me understand why particular events have happened in my life."	78 (22.4%)	270 (77.6%)
C3 "...helps me to predict what will happen in certain circumstances."	103 (29.6%)	245 (70.4%)
C5 "...makes sense of odd, strange or unusual experiences that I have had."	79 (22.7%)	269 (77.3%)
C8 "...helps me to understand why people behave towards me as they do."	104 (29.9%)	244 (70.1%)
C9 "...helps me to understand why upsetting things have happened."	106 (30.5%)	242 (69.5%)
Significance		
S1 "...means that my life is important."	82 (23.6%)	266 (76.4%)
S2 "...makes my life meaningful."	75 (21.6%)	273 (78.4%)
S4 "...makes my life worthwhile."	90 (25.9%)	258 (74.1%)
S6 "...makes living deeply fulfilling."	125 (35.9%)	223 (64.1%)
S7 "...means that I really value my life."	85 (24.4%)	263 (75.6%)
S8 "...gives me a reason to live."	107 (30.7%)	241 (69.3%)
Purpose		
P1 "...means that I have future plans that I am looking forward to."	86 (24.7%)	262 (75.3%)
P2 "...means that I know where my life is going in the future."	121 (34.8%)	227 (65.2%)
P3 "...gives me something I can be really committed to in the future."	75 (21.6%)	273 (78.4%)
P4 "...means that I have a much better idea of what I want to do in my life than others do."	108 (31.0%)	240 (69.0%)
P6 "...gives me a clear direction to follow in life."	100 (28.7%)	248 (71.3%)
<b>Grandiosity Meaning Measure-Sources (n=333)</b>		
Positive social perceptions		
PSP2 "...means that others respect me."	140 (42.0%)	193 (58.0%)
PSP3 "...means that others see me as powerful."	147 (44.1%)	186 (55.9%)
PSP4 "...means that others see me as talented."	110 (33.0%)	223 (67.0%)
PSP5 "...means that others find me interesting."	84 (25.2%)	249 (74.8%)
PSP6 "...means that others see me as successful."	147 (44.1%)	186 (55.9%)
H10 "...makes me attractive."	169 (50.8%)	164 (49.2%)
Spirituality		
Sp1 "...has made me sure that there is an afterlife."	131 (39.3%)	202 (60.7%)

(Table 2 continues in next column)

Item content*	Endorsement level†	
	0	1
(Continued from previous column)		
Sp3 "...has given me a personal relationship with God."	163 (48.9%)	170 (51.1%)
Sp4 "...means that I have a special religious mission to carry out."	193 (58.0%)	140 (42.0%)
Sp6 "...has made me a more spiritual person."	103 (30.9%)	230 (69.1%)
Sp8 "...has prevented the Devil's work."	188 (56.5%)	145 (43.5%)
Sp9 "...has helped me to stop evil forces."	158 (47.4%)	175 (52.6%)
Overcoming adversity		
O2 "...has enabled me to cope with my problems."	103 (30.9%)	230 (69.1%)
O3 "...has allowed me to be at peace with my past."	129 (38.7%)	204 (61.3%)
O6 "...has made it easier to bear much sadness."	108 (32.4%)	225 (67.6%)
O9 "...has helped me cope with the anxiety and fear that I have experienced in my life."	97 (29.1%)	236 (70.9%)
Co5 "...helps me feel better about the things that I don't have in life."	98 (29.4%)	235 (70.6%)
Co6 "...makes it easier to cope with the fact that my relationships with others are not as I would like them to be."	108 (32.4%)	225 (67.6%)
Confidence in self among others		
CSO3 "...gives me confidence to make my own decisions without being influenced by what everyone else is doing."	70 (21.0%)	263 (79.0%)
CSO4 "...gives me confidence in my opinions even if they are different to the opinions of other people."	55 (16.5%)	278 (83.5%)
CSO5 "...gives me the confidence to stand up for myself."	87 (26.1%)	246 (73.9%)
CSO8 "...makes me feel confident to do what I think is right, even if others don't agree."	60 (18.0%)	273 (82.0%)
O4 "...has meant that I can find solutions to my problems."	81 (24.3%)	252 (75.7%)
Greater good		
GG2 "...gives me a mission in life"	87 (26.1%)	246 (73.9%)
GG3 "...means that I am dedicating my life to a worthwhile cause."	100 (30.0%)	233 (70.0%)
GG5 "...means that I have something valuable to give to the world."	67 (20.1%)	266 (79.9%)
GG6 "...means that I can leave behind something good when I'm gone."	96 (28.8%)	237 (71.2%)
GG8 "...means that I am destined to accomplish something important."	76 (22.8%)	257 (77.2%)
Sp11 "... has meant that I can help to keep the world balanced towards good."	112 (33.6%)	221 (66.4%)

(Table 2 continues in next column)

	Item content*	Endorsement level†	
		0	1
(Continued from previous column)			
Supporting loved ones			
L1	"... has led to me finding someone who loves me."	180 (54.1%)	153 (45.9%)
L6	"...means that I can protect my loved ones from harm."	112 (33.6%)	221 (66.4%)
L7	"...means that I can support those I care about."	100 (30.0%)	233 (70.0%)
L9	"...means that I can make the people I love happy."	105 (31.5%)	228 (68.5%)
Happiness			
H2	"...makes me feel happy."	97 (29.1%)	236 (70.9%)
H3	"...makes me feel excited."	95 (28.5%)	238 (71.5%)
H5	"...makes me feel energised."	91 (27.3%)	242 (72.7%)
H13	"...has helped me to feel confident about myself."	73 (21.9%)	260 (78.1%)
*Items are preceded with either "Knowing that I have these exceptional abilities, identity, job, mission, or wealth" or "Having these exceptional abilities, identity, job, mission, or wealth". †Items were answered on a 0 to 4 scale from 0 (do not agree) to 4 (agree totally). Responses were recoded to a dichotomous scale where items originally rated 0 (do not agree) and 1 (agree a little) were coded as endorsement level 0, and those rated from 2 (agree moderately) to 4 (agree totally) were rated 1.			
<b>Table 2: Frequencies of endorsement for Grandiosity Meaning Measure and Grandiosity Meaning Measure–Sources items within the clinical sample (study 3, n=348)</b>			

For the Grandiosity Meaning Measure–Sources, on average, 25 out of 37 items were endorsed (mean 24.63 [SD 9.80]; table 2). The most commonly endorsed item was "...gives me confidence in my opinions even if they are different to the opinions of other people". The majority of items were endorsed by more than 60% of participants (appendix p 28 shows non-dichotomised responses).

In the clinical validation sample (n=333) the confirmatory factor analysis model indicated that the 37-item, seven-factor model had good fit ( $\chi^2$  [608 df] 1212.32, CFI 0.96, TLI 0.96, RMSEA 0.055, sRMR 0.052; appendix p 23 provides factor loadings). Associations between factor scores and corresponding raw scores were strong (appendix pp 24–25). The Grandiosity Meaning Measure–Sources had good psychometric properties (appendix p 26) with strong internal consistency (ordinal  $\alpha$  0.86–0.92). 100 clinical participants provided follow-up data within 3–10 days (mean 7.35 [SD 1.34]), and the Grandiosity Meaning Measure–Sources factors were shown to have good to excellent test–retest reliability coefficients (intraclass correlations 0.71–0.85).

The Grandiosity Meaning Measure–Sources achieved measurement invariance across all four levels (appendix p 29) and all source-of-meaning factor means were significantly higher in the clinical group than in the general population group (appendix p 30). The final measures are in the appendix (pp 1–2).

We investigated the degree to which the source-of-meaning factors from the Grandiosity Meaning Measure were associated with the experience-of-meaning factors from the Grandiosity Meaning Measure–Sources. Pairwise correlations were all significant. Associations were in the moderate to strong range in the clinical group ( $r=0.65$  to  $0.97$ ) and were present, but weaker, in the general population group (table 3).

The results of structural equation modelling, regressing each of the Grandiosity Meaning Measure–Sources source factors, are in the appendix (p 31). In the clinical population, coherence was predicted by spirituality, confidence in self among others, and supporting loved ones; and purpose and significance were each predicted by the greater good and happiness. A similar pattern of results was found in the general population group, although overcoming adversity remained in the final model as a predictor of coherence and significance. Fit statistics were good in the clinical group ( $\chi^2$  [1346 df] 2276.47, CFI 0.96, TLI 0.96, RMSEA 0.046, sRMR 0.052) and acceptable in the general population group ( $\chi^2$  [1344 df] 6655.85, CFI 0.94, TLI 0.94, RMSEA 0.053, sRMR 0.055).

Finally, we investigated the degree to which grandiose beliefs were associated with meaning. Pairwise correlations between the grandiose belief measures and each meaning factor were all significant (table 3). In the clinical group, grandiosity was most strongly associated with purpose ( $r=0.61$ ) and grandiose belief conviction with coherence ( $r=0.46$ ). This association was similar in the general population although the higher-order meaning-in-life factor was most strongly associated with grandiosity.

Structural equation modelling, which regressed each of the grandiose belief measures on the experience of meaning factors, while also specifying the final structural equation model from the previous stage of analysis (accounting for the association between source and experience of meaning factors) produced the final models shown in table 4. Fit indices were good in the clinical group ( $\chi^2$  [1856 df] 2969.99, CFI 0.96, TL 0.95, RMSEA 0.043, sRMR 0.057) and acceptable in the general population group ( $\chi^2$  [1851 df] 9496.60, CFI 0.92, TLI 0.92, RMSEA 0.055, sRMR 0.062).

In the clinical group, coherence and purpose remained in the model as predictors of both grandiosity and grandiose belief conviction. The model explained 53.5% of the variance in grandiosity and 27.4% of the variance in grandiose belief conviction.

In the general population group, all three experience factors (coherence, significance, and purpose) remained in the final models predicting grandiosity and grandiose belief conviction. The model explained 46.2% of the variance in grandiosity and 16.0% of the variance in grandiose belief conviction.

	Measures of grandiosity		Experience of meaning factors				Source of meaning factors						
	Grandiosity	Grandiose belief conviction	Coherence	Significance	Purpose	Meaning in life*	Positive social perception	Spirituality	Overcoming adversity	Confidence in self among others	Greater good	Supporting loved ones	Happiness
<b>Clinical population (study 3, n=324)</b>													
Grandiosity	1.00	0.43	0.53	0.53	0.61	0.60	0.57	0.51	0.52	0.53	0.61	0.59	0.54
Grandiose belief conviction	0.43	1.00	0.46	0.39	0.42	0.43	0.35	0.38	0.39	0.40	0.44	0.39	0.38
Experience of meaning													
Coherence	0.53	0.46	1.00	0.75	0.79	0.85	0.72	0.69	0.83	0.80	0.81	0.82	0.78
Significance	0.53	0.39	0.75	1.00	0.92	0.95	0.80	0.65	0.88	0.82	0.90	0.87	0.89
Purpose	0.61	0.42	0.79	0.92	1.00	0.96	0.80	0.69	0.89	0.84	0.93	0.89	0.89
Meaning in life*	0.60	0.43	0.85	0.95	0.96	1.00	0.86	0.74	0.95	0.90	0.97	0.94	0.94
Source of meaning													
Positive social perception	0.57	0.35	0.72	0.80	0.80	0.86	1.00	0.61	0.80	0.84	0.82	0.90	0.88
Spirituality	0.51	0.38	0.69	0.65	0.69	0.74	0.61	1.00	0.72	0.63	0.82	0.72	0.60
Overcoming adversity	0.52	0.39	0.83	0.88	0.89	0.95	0.80	0.72	1.00	0.94	0.89	0.90	0.94
Confidence in self among others	0.53	0.40	0.80	0.82	0.84	0.90	0.84	0.63	0.94	1.00	0.84	0.87	0.94
Greater good	0.61	0.44	0.81	0.90	0.93	0.97	0.82	0.82	0.89	0.84	1.00	0.88	0.86
Supporting loved ones	0.59	0.39	0.82	0.87	0.89	0.94	0.90	0.72	0.90	0.87	0.88	1.00	0.88
Happiness	0.54	0.38	0.78	0.89	0.89	0.94	0.88	0.60	0.94	0.94	0.86	0.88	1.00
<b>General population (study 2, n=1386)</b>													
Grandiosity	1.00	0.37	0.30	0.38	0.40	0.44	0.38	0.25	0.31	0.38	0.47	0.29	0.40
Grandiose belief conviction	0.37	1.00	0.32	0.27	0.26	0.32	0.24	0.19	0.28	0.32	0.29	0.26	0.31
Experience of meaning													
Coherence	0.30	0.32	1.00	0.43	0.39	0.53	0.37	0.36	0.62	0.59	0.44	0.56	0.43
Significance	0.38	0.27	0.43	1.00	0.79	0.91	0.50	0.42	0.69	0.59	0.80	0.60	0.85
Purpose	0.40	0.26	0.39	0.79	1.00	0.87	0.51	0.34	0.60	0.57	0.81	0.55	0.81
Meaning in life*	0.44	0.32	0.53	0.91	0.87	1.00	0.62	0.49	0.81	0.74	0.93	0.73	0.94
Source of meaning													
Positive social perception	0.38	0.24	0.37	0.50	0.51	0.62	1.00	0.12	0.51	0.64	0.66	0.60	0.67
Spirituality	0.25	0.19	0.36	0.42	0.34	0.49	0.12	1.00	0.55	0.29	0.52	0.38	0.31
Overcoming adversity	0.31	0.28	0.62	0.69	0.60	0.81	0.51	0.55	1.00	0.81	0.69	0.73	0.70
Confidence in self among others	0.38	0.32	0.59	0.59	0.57	0.74	0.64	0.29	0.81	1.00	0.67	0.76	0.69
Greater good	0.47	0.29	0.44	0.80	0.81	0.93	0.66	0.52	0.69	0.67	1.00	0.65	0.83
Supporting loved ones	0.29	0.26	0.56	0.60	0.55	0.73	0.60	0.38	0.73	0.76	0.65	1.00	0.67
Happiness	0.40	0.31	0.43	0.85	0.81	0.94	0.67	0.31	0.70	0.69	0.83	0.67	1.00

Pearson correlation coefficients between factor scores (latent variables) and raw scores (for grandiosity and grandiose belief conviction). All p-values were significant (p<0.0001). \*Higher-order factor.

**Table 3: Associations between experience of meaning, sources of meaning, grandiose belief conviction, and grandiosity**

## Discussion

In this study from the UK and Ireland, we show the potential categories of meaning inherent in grandiosity and the different sources of these meanings. By providing a sense that one's life makes sense (coherence), has a future focus (purpose), and is worthwhile (significance), grandiosity provides the

experience of having meaning in life. This understanding is entirely consistent with the general literature on meaning in life. Grandiose delusions might be a means to acquire the types of meaning that everyone seeks. The sources of the meaning derived from grandiosity were shown to be numerous. Grandiose delusions can provide a sense of being able

	Estimate	SE	p value	Standardised estimate
<b>Clinical population (n=324)</b>				
Grandiosity				
Coherence	0.14	0.06	0.027	0.15
Purpose	0.56	0.06	<0.0001	0.62
Grandiose belief conviction				
Coherence	0.44	0.07	<0.0001	0.37
Purpose	0.22	0.07	0.0022	0.20
Coherence				
Spirituality	0.35	0.07	<0.0001	0.31
Confidence in self among others	0.43	0.07	<0.0001	0.41
Supporting loved ones	0.26	0.11	0.013	0.21
Purpose				
Greater good	0.76	0.07	<0.0001	0.69
Happiness	0.31	0.07	<0.0001	0.28
Significance				
Greater good	0.55	0.07	<0.0001	0.52
Happiness	0.47	0.07	<0.0001	0.44
<b>General population (n=1386)</b>				
Grandiosity				
Coherence	0.09	0.03	<0.0001	0.13
Significance	0.11	0.03	<0.0001	0.16
Purpose	0.37	0.04	<0.0001	0.50
Grandiose belief conviction				
Coherence	0.36	0.03	<0.0001	0.29
Significance	0.13	0.04	0.0015	0.11
Purpose	0.11	0.05	0.019	0.08
Coherence				
Spirituality	0.13	0.03	<0.0001	0.14
Overcoming adversity	0.15	0.05	0.0034	0.16
Confidence in self among others	0.38	0.05	<0.0001	0.37
Supporting loved ones	0.12	0.05	0.023	0.09
Purpose				
Greater good	0.47	0.03	<0.0001	0.51
Happiness	0.37	0.03	<0.0001	0.39
Significance				
Overcoming adversity	0.11	0.02	<0.0001	0.11
Greater good	0.32	0.03	<0.0001	0.32
Happiness	0.55	0.03	<0.0001	0.52

**Table 4: Predicting grandiosity and grandiose belief conviction by grandiose delusion meaning—structural equation model outcomes**

to overcome adversity, support loved ones, feel confident in oneself among others, and contribute to the greater good, as well as providing a sense of happiness, of spiritual meaning, and that one is perceived positively by others. Patients endorsed multiple experience items and multiple source items. Clearly, the meaning of grandiose delusions goes beyond simply making the person feel happy or powerful.

The meaning in grandiose delusions was strongly associated with grandiosity, measured as either degree

of endorsement of items or conviction in the grandiose belief. Substantial variance in grandiosity was explained by perceived meaning. When considering the three experiences of meaning, purpose was most strongly associated with endorsing grandiosity items, and coherence with belief conviction. These findings are in line with the hypothesis that meaning is a key maintenance factor for grandiose delusions. If this hypothesis is true, there are important clinical implications, as meaning could then be a central focus of psychological intervention. Grandiose delusions can be harmful—a person believing that they are Jesus could try to walk on water, be rejected by others, or feel suicidal due to the pressure. Such harm, when present, provides a rationale for intervention. However, the clear importance of grandiose beliefs in providing meaning to life indicates that simply trying to alter the belief directly could be both difficult and harmful. In our clinical group, 69% of participants indicated that the grandiose delusion gave them a reason to live, and so attempts to change the belief without building up a sense that one's life is meaningful from other sources could be iatrogenic. Supporting patients to develop equivalent meaning from other areas of life could be a helpful alternative approach in intervention. This approach fits with recommendations by those with lived experience of grandiose beliefs.<sup>4</sup>

The study has limitations, primarily that the cross-sectional design means causal relationships cannot be determined. The participant groups were large but predominantly White women in the general population groups and White men in the clinical group, limiting the generalisability. Although we assessed multiple different types of meaning, it is plausible that an exhaustive list was not examined. Causation in delusions is also likely to be multifactorial. The meaning of grandiosity could be a central causal factor, but it will not be the only one: for instance, there may be contributions from fantasy elaboration, reasoning biases, and immersion behaviours.<sup>24</sup> As the understanding of grandiose delusions improves, we would expect studies to assess the contributions of multiple different factors. It would also be valuable to establish whether the measures perform similarly in diverse populations and across different countries. A clear next step is to assess the associations in longitudinal studies. Future research should carry out causal tests of increasing meaning from other areas of life to establish whether grandiosity then reduces.

**Contributors**

LI led the research design, data collection, data management, statistical analysis, and manuscript preparation. DF and RPB supervised the work and contributed to the design, theoretical interpretation, and writing of the manuscript. BSL supervised the statistical analyses and conducted aspects of the analyses. AH and NW contributed to the design and refinement of the Grandiosity Meaning Measure and Grandiosity Meaning Measure—Sources and theoretical interpretation of the findings. JCB supported aspects of the analyses. The data were verified by LI and BSL. LI, BSL, and DF had full access to all the data in the study; LI and DF had final responsibility for the decision to submit for publication.

**Declaration of Interests**

LI reports grant funding from the National Institute for Health and Care Research. All other authors declare no competing interests.

**Data sharing**

De-identified participant data will be available in anonymised form from the corresponding author on reasonable request (including study outline), subject to review and contract with the University of Oxford.

**Acknowledgments**

We thank the participants of the three studies and the Clinical Research Networks in each of the Trusts participating in study 3, for generously giving their time to this research. This paper presents independent research funded by the National Institute for Health and Care Research (NIHR) and Health Education England (HEE). LI is supported by an HEE–NIHR clinical doctoral research fellowship (ICA-CDRF-2016–02–069), which funded all three studies. DF is an NIHR Senior Investigator. The views expressed are those of the authors and not necessarily those of HEE, the National Health Service, the NIHR, or the Department of Health and Social Care.

**References**

- 1 Leff JP, Fischer M, Bertelsen A. A cross-national epidemiological study of mania. *Br J Psychiatry* 1976; **129**: 428–42.
- 2 Garety PA, Gittins M, Jolley S, et al. Differences in cognitive and emotional processes between persecutory and grandiose delusions. *Schizophr Bull* 2012; **39**: 629–39.
- 3 Goodwin FK, Jamison KR. Manic-depressive illness: bipolar disorders and recurrent depression. New York: Oxford University Press, 1990.
- 4 Isham L, Griffith L, Boylan AM, et al. Understanding, treating, and renaming grandiose delusions: a qualitative study. *Psychol Psychother* 2021; **94**: 119–40.
- 5 Martela F, Steger MF. The three meanings of meaning in life: distinguishing coherence, purpose, and significance. *J Posit Psychol* 2016; **11**: 531–45.
- 6 Park CL, George LS. Assessing meaning and meaning making in the context of stressful life events: measurement tools and approaches. *J Posit Psychol* 2013; **8**: 483–504.
- 7 Heintzelman SJ, King LA. Life is pretty meaningful. *Am Psychol* 2014; **69**: 561–74.
- 8 Steger MF, Shin JY, Shim Y, Fitch-Martin A. Is meaning in life a flagship indicator of well-being? In: Waterman A, ed. The best within us: positive psychology perspectives on eudaimonia. Washington, DC: American Psychological Association, 2013: 159–82.
- 9 Morgan J, Farsides T. Measuring meaning in life. *J Happiness Stud* 2009; **10**: 197–214.
- 10 Wong P. Implicit theories of meaningful life and the development of the personal meaning profile. In: Wong PTP, Fry PS, eds. The human quest for meaning: a handbook of psychological research and clinical applications. Abingdon: Lawrence Erlbaum Associates Publishers, 1998: 111–40.
- 11 Macdonald MJ, Wong PTP, Gingras DT. Meaning-in-life measures and development of a brief version of the personal meaning profile. In: Wong P, ed. The human quest for meaning: theories, research, and applications. New York: Routledge, 2012: 357–82.
- 12 Hicks JA, Schlegel RJ, King LA. Social threats, happiness, and the dynamics of meaning in life judgments. *Pers Soc Psychol Bull* 2010; **36**: 1305–17.
- 13 Ryff C, Keyes CLM. The structure of psychological well-being revisited. *J Pers Soc Psychol* 1995; **69**: 719–27.
- 14 Ryff CD. Psychological well-being revisited: advances in the science and practice of eudaimonia. *Psychother Psychosom* 2014; **83**: 10–28.
- 15 Schnell T. Individual differences in meaning-making: considering the variety of sources of meaning, their density and diversity. *Pers Individ Dif* 2011; **51**: 667–73.
- 16 Reker G. Theoretical perspective, dimensions, and measurement of existential meaning. In: Reker G, Chamberlain K, eds. Exploring existential meaning: optimizing human development across the life span. Thousand Oaks, CA: Sage, 1999: 39–55.
- 17 Reker GT, Wong PTP. Personal meaning in life and psychosocial adaptation in the later years. In: Wong P, ed. The human quest for meaning: theories, research, and applications. Abingdon-on-Thames: Routledge, 2012: 433–56.
- 18 Ritunnano R, Kleinman J, Whyte Oshodi D, et al. Subjective experience and meaning of delusions in psychosis: a systematic review and qualitative evidence synthesis. *Lancet Psychiatry* 2022; **9**: 458–76.
- 19 Ritunnano R, Bortolotti L. Do delusions have and give meaning? *Phenomenol Cogn Sci* 2021; **23**: 1–20.
- 20 Ronald A, Sieradzka D, Cardno AG, Haworth CMA, McGuire P, Freeman D. Characterization of psychotic experiences in adolescence using the Specific Psychotic Experiences Questionnaire: findings from a study of 5000 16-year-old twins. *Schizophrenia Bull* 2014; **40**: 868–77.
- 21 Freeman D, Lambe S, Yu LM, et al. Injection fears and COVID-19 vaccine hesitancy. *Psychol Med* 2021; published online June 11. <https://doi.org/10.1017/S0033291721002609>.
- 22 Taber KS. The use of Cronbach's alpha when developing and reporting research instruments in science education. *Res Sci Educ* 2018; **48**: 1273–96.
- 23 Shi D, Maydeu-Olivares A, Rosseel Y. Structural equation modeling: a multidisciplinary journal assessing fit in ordinal factor analysis models: SRMR vs. RMSEA. *Multidisciplinary Journal* 2019; **27**: 1–15.
- 24 Xia Y, Yang Y. RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: the story they tell depends on the estimation methods. *Behav Res Methods* 2019; **51**: 409–28.