Harmful Grandiose Delusions: Developing a Cognitive Model

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Declaration

The work described in this thesis was carried out between May 2017 and March 2023 under the supervision of Professor Daniel Freeman and Professor Richard Bentall. The work in this thesis is my own with the only exceptions listed below:

- The qualitative analysis of the data in Chapter 2 was conducted in collaboration with Dr Anne-Marie Boylan (Nuffield Department of Primary Care Health Sciences, University of Oxford) and Dr Laura Griffith (School of Social Policy, University of Birmingham).

- The statistical analyses in Chapters 3, 4, and 5 were carried out in collaboration with Dr Bao Sheng Loe (The Psychometrics Centre, University of Cambridge).

- All stages of the research process were conducted in collaboration with Alice Hicks and Natalie Wilson, members of the Oxford Cognitive Approaches to Psychosis (OCAP) Patient Advisory Group (Department of Psychiatry, University of Oxford).

I declare that the work presented in this thesis has not been submitted for any other degree in this or in any other university or institute of learning.

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Thesis Abstract

Background

Grandiose delusions are inaccurate beliefs about having special powers, wealth, mission, or identity. They are a common psychotic experience, but neglected as a specific focus of research. There is no evidence-based theoretically driven psychological intervention for harmful grandiose delusions.

Aims

The thesis aimed i) to determine the extent to which patients identify harmful consequences occurring as a result of grandiose delusions and whether they want help with these harms, and ii) to develop a theoretical causal model of grandiose delusions and conduct preliminary tests of the model.

Method

A qualitative study is reported in which fifteen patients with experiences of grandiose delusions were interviewed. Thematic analysis and grounded theory were used to analyse the data (Chapter 2). Analyses are also reported from cross-sectional questionnaire data collected from two non-clinical cohorts (n=13,323) and a clinical cohort of 798 patients with a psychosis diagnosis, 375 of whom had grandiose delusions (Chapters 3-5).

Results

More than three-quarters of patients with grandiose delusions identified grandiose-related harms occurring in the past six months. Over half of patients wanted help with these difficulties. Six putative maintenance factors for grandiose delusions were identified. Tests of association found that in the clinical group, the meaning of grandiose delusions, repetitive thinking about the grandiose belief, immersion behaviours, and daydreaming accounted for 53.5%, 20.4%, 39.5%, and 19.1% of the variance in grandiosity severity respectively.

Conclusions

Most patients with grandiose delusions identify difficulties arising from their grandiose delusions, which may provide a route for engagement in treatment. Potential maintenance mechanisms that may be suitable targets for intervention include the meaning of the grandiose delusions, immersion behaviours, perseverative thinking, and pleasant daydreams. If these findings are

verified by further longitudinal and experimental research, this would enable the development of a specific cognitive-behavioural intervention for people with harmful grandiose beliefs.

Thesis Abstract – Long Version

Background

Grandiose delusions are inaccurate beliefs about the possession of special powers, wealth, mission, or identity. Despite being a relatively common type of delusion in clinical presentations of both affective and non-affective psychosis, grandiose delusions are remarkably neglected as a specific focus of research. There is no evidence-based theoretically driven psychological intervention for harmful grandiose delusions.

Aims

In this programme of work the aims were: i) to determine the extent to which patients identify harmful consequences occurring as a result of grandiose delusions and whether they want help with these harms, and ii) to learn from patients whether there may be psychological mechanisms that maintain grandiose delusions in order to outline a theoretical model, and to conduct preliminary tests of the model by testing associations between hypothesised maintenance factors and grandiosity. This work was conducted to inform the future development of an evidence-based targeted psychological treatment for harmful grandiose delusions.

Method

This thesis comprises four empirical studies. In Chapter 2, a qualitative study is reported in which fifteen patients with past or present experiences of grandiose delusions were interviewed. Thematic analysis and grounded theory were used to analyse the data, and the results used to inform the subsequent studies. In Chapters 3, 4, and 5 analyses are reported from cross-sectional questionnaire data collected from two non-clinical cohorts (n=8805 and n=4518) and a clinical cohort of 798 patients with a psychosis diagnosis which included 375 patients with grandiose delusions. In Chapter 3 data are reported on the experience of meaning in grandiose delusions and the sources of that meaning. Chapter 4 presents data based on reports by patients of subjective harm from grandiose delusions, and on acting within the delusional system ('immersion behaviours') and repetitive thinking about the grandiose belief. In Chapter 5 data are reported on the relationship between daydreaming and grandiosity. In each chapter, the development of new measures of the key constructs is described and associations tested between grandiosity and the hypothesised maintenance mechanisms. Throughout the work a patient advisory group was consulted about the design, analysis, and interpretation of the studies.

Results

In the initial qualitative study, participants who had experienced grandiose delusions reported harms across multiple life domains (physical, sexual, social, emotional, and occupational) occurring due to grandiose delusions (Chapter 2). Six putative maintenance factors were identified: the meaning of the grandiose delusions, anomalous experiences such as hearing voices and felt sense of salience, mania, fantasy elaboration (including repetitively thinking about the grandiose belief and daydreaming), reasoning biases such as jumping to conclusions and positive misinterpretation of negative social information, and immersion behaviours. Participants reported having had insufficient opportunities to talk about their grandiose beliefs. They were positive about the possibility of a psychological therapy for their delusions.

In Chapter 3, two new measures were developed to assess the experience of meaning in grandiose delusions, the Grandiosity Meaning Measure (gram), and the sources of meaning, the Grandiosity Meaning Measure – Sources (grams). Meaning in grandiose delusions was strongly associated with the severity of grandiosity and grandiose delusion conviction, explaining 53.5% and 27.4% of variance in the clinical group respectively.

Four further measures were developed and associations with grandiosity tested (Chapters 4 and 5). The Subjective Harm from Exceptional Experiences Questionnaire (SHEEQ) was designed to assess the types of harm that patients identify as occurring due to grandiose delusions. The Immersion Behaviours Questionnaire – Exceptional Experiences (IBQ-EE) was developed to assess the actions and behaviours occurring in response to the grandiose delusion. The Thinking about Exceptional Experiences Questionnaire (TEEQ) was developed to assess repetitive thinking about the grandiose delusion. The Qualities of Daydreaming Scale (QuOD) was developed to assess the extent to which pleasant, frequent, and vivid daydreams are experienced. All measures developed had good psychometric properties.

More than three-quarters of patients with grandiose delusions identified grandiose-related harms occurring in the past six months and over half of patients wanted help with these difficulties. Immersion behaviours and perseverative thinking were highly prevalent and, in the clinical group, explained 39.5% and 20.4% of variance in grandiosity severity respectively. Immersion behaviours and perseverative thinking were significantly associated with subjective harm, even after controlling for grandiosity severity. Patient reports of wanting help for the difficulties occurring due to their grandiose delusions was not associated with grandiosity severity, but was associated with higher levels of subjective harm, use of immersion behaviours, and higher levels of perseverative thinking. Levels of daydreaming were higher in patients with grandiose

delusions than in those without grandiose delusions or in the non-clinical group. Daydreaming was significantly associated with grandiosity, explaining 19.1% of the variance in the clinical group data. Daydreaming was also associated with time spent thinking about grandiose delusions and grandiose delusion conviction explaining 7.7% and 5.2% of the variance in the data respectively.

Conclusions

Most patients with grandiose delusions identify harm or difficulties arising from their grandiose delusions, which may provide a route for engagement in treatment. Potential maintenance mechanisms that may be suitable targets for intervention include the meaning of the grandiose delusions, immersion behaviours, repetitive thinking about the grandiose belief, and pleasant daydreams. Although this is, to the author's knowledge, the first systematic attempt to develop a clinically informed psychological model of grandiose delusions, a limitation of the research is that it was cross-sectional, so that inferences about the causal relationships between predictors and grandiose beliefs must be considered tentative. Hence, future research should test key hypotheses using both longitudinal and experimental designs. One way of doing this would be to combine the two approaches in a manipulation-causal intervention study in which putative mechanisms are targeted and symptomatic change is then evaluated. The research findings indicate some mechanistic targets which, if verified by this kind of research, would enable the development of a specific cognitive-behavioural intervention for people with harmful grandiose beliefs. The research reported in this thesis demonstrates the importance of enlisting the support of patients when developing future interventions and the benefits of learning from their experience.

Table of Contents

1. Grandiose delusions - developing an experience specific psychological model for treatment innovation.

1.1 Introduction

Grandiose delusions are inaccurate beliefs about the possession of special powers, wealth, mission, or identity (Leff et al., 1976). They are relatively common (Junginger et al., 1992; Paolini et al., 2016), accounting for approximately a third of delusions experienced by patients diagnosed with non-affective psychosis (Garety et al., 2012) and experienced by up to 60% of people diagnosed with bipolar disorder (Goodwin & Jamison, 1990). Despite their prevalence, they are arguably the psychotic experience that has been most neglected by researchers. Indeed, although theoretical discussions about grandiose beliefs date back more than one hundred years (Bleuler, 1950; Freud, 1911) very little in the way of empirical research focusing specifically on grandiose delusions has been conducted (Knowles et al., 2011). This lack of research is particularly stark when compared to other psychotic experiences such as persecutory delusions and auditory hallucinations.

This thesis describes a systematic programme of research which aims to examine the harms that may arise from grandiose delusions, whether patients want help with these difficulties, and the mechanisms that may maintain these kinds of beliefs. This work will inform the future development of an evidence-based targeted psychological treatment for harmful grandiose delusions. There is no such treatment currently.

After providing a definition for grandiose delusions, this chapter outlines the case for developing a targeted psychological intervention for harmful grandiose delusions. First, the potential for harm to occur due to grandiose delusions is considered as this provides the justification for developing an intervention. Next, the rationale for adopting an experience-specific rather than broader diagnostic approach to research is discussed. To inform consideration of what the appropriate targets for a psychological intervention may be, the existing empirical evidence regarding potential psychological maintenance mechanisms is then summarised. The chapter concludes by outlining directions for future research and the aims of this thesis.

1.2 Defining grandiose delusions

1.2.1 Conceptualising delusions

Formal psychiatric classification systems, such as the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5; APA, 2013) and the International Statistical Classification of Diseases and Related Health Problems (ICD-11; WHO, 2019), typically define delusions as fixed or firmly held false beliefs that are not (or are only briefly) amenable to change in the light of conflicting evidence.

Such definitions, whilst seemingly plausible at first glance, are problematic as they cannot always reliably differentiate between delusional and non-delusional beliefs (Bentall, 2018, 2023; Garety & Freeman, 1999). People can hold false beliefs that would not typically be considered delusional (Bentall, 2023, gives the example of the conspiracy theory that the 2020 US presidential election was rigged), and beliefs that would typically be considered delusional (e.g., "I am being followed by intelligence services") may be hard to falsify. Furthermore, delusions have been shown to accommodate new information (Brett-Jones et al., 1987; Buchanan et al., 1993), and non-delusional beliefs (such as political or religious beliefs) may be held with as strong conviction and as rigidly as delusional beliefs (Lodge & Taber, 2013; Peters et al., 1999).

An important consideration is that of the individual's cultural context. This is highlighted by Morrison (2001) who conceptualises delusions as "culturally unacceptable interpretations of intrusions into awareness" (where the intrusions may be anomalous experiences, cognitions, physiological or emotional states, or external information). Consistent with this definition, Bentall (2018) proposed that delusional beliefs may differ from other strongly held beliefs by occurring "in isolation" and not being "tested against the beliefs of other people". The importance of culture is also recognised in ICD-11, where it states that delusional beliefs are "not ordinarily accepted by other members of the person's culture or subculture".

Within the current thesis delusions are defined as false, culturally unacceptable beliefs, held with more certainty than not (i.e., at least 50% conviction). Whilst there are still some inherent difficulties with this definition (judgement of what is 'false' and 'culturally unacceptable' will inevitably be biased by the particular 'lens' through which the assessor views the world) it was deemed a pragmatic solution for the purposes of this body of work.

1.2.2 Conceptualising grandiose delusions

To define grandiose delusions the descriptions of 'delusions of grandiose abilities' and 'delusions of grandiose identity' provided in the Schedules for Clinical Assessment in Neuropsychiatry (SCAN; World Health Organisation, 1992) were used. These are outlined below:

> "**19.34 Delusions of grandiose abilities**
>
> Respondents think they have unusual talents. They believe they are able to read people's thoughts, or that they are particularly good at helping others, that they are much cleverer than anyone else, that they have invented machines, composed music, solved mathematical problems, and so on, beyond most people's comprehension.
>
> **19.35 Delusions of grandiose identity**
>
> Respondents believe they are famous, rich, chosen for a special mission, titled or related to prominent people. They may believe that they are changelings and that their real parents are royalty.
>
> **Differentiation from other symptoms:**
>
> A delusional identification with God or a saint or an angel should be counted as a religious delusion (19.21)".

For clarity, religious beliefs can be identified as grandiose delusions if they incorporate the required element of specialness or uniqueness. For example, a belief such as "God has chosen to talk to me. He talks to lots of people to help them" would not be considered grandiose, but "God has chosen to talk to me. I am the only one chosen because I am special and have a unique mission to help him save the world" would be considered grandiose.

1.3 Harm from grandiose delusions

At first glance grandiose delusions may appear relatively benign in comparison to other psychotic experiences. Indeed, descriptions from those with lived experience of grandiose delusions emphasise that these beliefs can provide important benefits such as boosting self-confidence and positive affect (Strand et al., 2015). However, alongside such benefits, significant harm can occur:

> *"I was Alice Christ – the second coming of the Messiah[..]. So it was like, 'okay – you're Alice Christ. What does this mean you've got to do?' Well, presumably save the world. How was I to do that? Well part of me.., it was just to be good. But what it led to eventually was [..] 'Alice you are going to have to die'. As a Christian I know the story of Jesus, he died and then on the third day he rose from the dead. So my thinking was 'Oh… well you will rise from the dead'. This was my mission really. To prove the resurrection in a modern age. I guess this was really very dangerous for me, but all these thoughts in my head, all these delusions if you like, I wasn't telling anybody."*
>
> - *Alice* (Freeman, 2019)

Alice's experience demonstrates a not untypical potential extreme form of harm as she believed she had to die by suicide to save the world. However, clinical experience indicates that harm can also manifest in other less overt forms, such as self-neglect, social isolation, and distress. For example, a patient who believed that they could control world affairs with their mind spent all day watching the news to try to prevent bad events from happening. This resulted in feeling immense pressure and anxiety due to the perceived responsibility, withdrawing from others (causing distress to themselves as well as family and friends), and dropping out of college. Another patient believed he was a special advisor to MI5 and talked extensively about this. This caused social isolation as friends and family withdrew, self-neglect due to preoccupation with the belief, and unemployment and dependency on benefits (he believed he had meaningful employment). He was also exploited by local criminals who identified him as vulnerable. As these illustrative case examples show there can be a breadth, in terms of severity and focus, of harmful outcomes that occur. Harm may be to the self or others and can impact across different life domains.

The empirical literature investigating harm in the context of grandiose delusions is very limited. What literature does exist focuses almost exclusively on violence or offending rather than a full range of potential harms. In forensic populations there is evidence suggesting that grandiose delusions increase the risk of offending. In their retrospective case note study of 223 offenders and 129 non-offenders with psychosis diagnoses, van Dongen and colleagues (2015) found that offenders had approximately four times greater odds of having grandiose delusions than non-offenders. However, in a longitudinal study with 409 patients recently discharged from forensic inpatient units, although a preliminary association between grandiosity and violent action was found, this was no longer significant when controlling for other positive psychotic symptoms (Ullrich et al., 2018). In non-forensic groups the findings are equally few in number and

inconsistent. In a study with 83 recently admitted patients with delusional beliefs, no association was found between grandiose delusions and categories of self-reported delusional action (categories were no or single action, aggressive action to self or others, and defensive action; Wessely et al., 1993). Initial analysis from the MacArthur Violence Risk Assessment study found that in a cohort of 852 patients recently discharged from psychiatric inpatient services there was also no significant difference in the rates of violent action in the subsequent ten weeks between those with and without grandiose delusions (Appelbaum et al., 2000). However, a re-analysis of this data using a different statistical approach that considered the temporal proximity between the delusional belief and violence found that delusions of having special gifts increased the odds of violent action (AOR=1.95, p=0.001) and that this represented both direct and indirect effects as the relationship was partially mediated by elation and anger (Ullrich et al., 2014). The analysis was not adjusted for the effects of other positive psychotic symptoms.

Clearly further empirical research on harm in relation to grandiose delusions is needed to understand the range and severity of harmful outcomes that can occur. It is also important to determine the extent to which people with grandiose beliefs themselves identify harmful consequences. Grandiosity has been found to be associated with lower patient motivation to engage in standard mental health treatment (Mulder et al., 2005), and this likely results from interactions with services that do not provide patients with a suitable rationale for engagement. Understanding what patients identify as the difficulties associated with their experiences and whether they want help with these difficulties may be one route to better engagement. There are currently no studies which examine this.

1.4 The case for an experience-specific targeted approach to grandiose delusions

Researchers investigating treatments for psychosis have traditionally adopted a diagnostic approach, the assumption being that different psychotic experiences (such as grandiosity, paranoia, hearing voices, thought disorder and anhedonia) are each symptoms of an underlying psychotic disorder such as schizophrenia (Freeman, 2016). This approach has yielded modest results. Antipsychotic medications predominantly have small to moderate impact (effects sizes range from 0.33 to 0.88, median 0.44; Leucht et al., 2013), but they can also have severe and sometimes life-threatening side-effects. First-generation psychological therapies have effects in the range of 0.3 to 0.44 (Turner et al., 2020; Wykes et al., 2008). These findings are not trivial, particularly given that talking about delusions was once discouraged altogether. However, the

effects are small and this is particularly apparent when contrasted to other targeted CBT interventions such as CBT for social anxiety (Cohen's d=1.56; Mayo-Wilson et al., 2014). Ultimately, whilst offering some benefits, current treatments for psychosis frequently leave patients still with significant difficulties and therefore require substantial improvement.

Factor analytic symptom studies in both clinical and non-clinical groups have shown that different psychotic experiences, including grandiosity, are distinct albeit correlated constructs (Bedford & Deary, 2006; Peralta et al., 2013; Ronald et al., 2014; Stefanis et al., 2004; Verdoux et al., 1998; Wigman et al., 2011). Additionally, grandiosity loads onto a single (rather than multiple) dimension in non-clinical groups (Ronald et al., 2014; Stefanis et al., 2004; Verdoux et al., 1998; Wigman et al., 2011) and this has also been demonstrated with a clinical group cutting across diagnostic categories (Peralta et al., 2013). Characteristics of grandiose delusions (conviction, pervasiveness, preoccupation, action, inaction, and negative affect) have also been found to load onto the same factor structure across bipolar and schizophrenia diagnostic categories (Appelbaum et al., 1999), indicating that there is likely a single dimension of grandiosity across diagnostic categories.

Different psychotic experiences also appear to have some distinct aetiological influences. In their large study of 5059 adolescent twin pairs, Zavos and colleagues (2014) used the Specific Psychotic Experiences Questionnaire (SPEQ) to investigate the degree of genetic and environmental influences on six types of psychotic experiences: self-reported paranoia, hallucinations, cognitive disorganisation, grandiosity, anhedonia, and parent-reported negative symptoms. They found that heritability varied by type of psychotic experience (heritability estimates were: 44% for grandiosity, 15% for hallucinations in males, 32% for hallucinations in females, 50% for paranoia, 43% for cognitive disorganization, 47% for anhedonia, and 59% for negative symptoms). Some covariation was found between psychotic experiences, and this was explained by shared genetic influences across domains. The authors highlighted that, as not all domains were correlated with one another however and the genetic correlations did not reach unity, there may be distinct aetiological influences for different psychotic experiences. In the same study, Zavos and colleagues also conducted extremes analysis which compared genetic and environmental influences across the distribution of psychotic experiences. They found that for each psychotic experience, including grandiosity, the heritability did not differ between individuals who reported the most severe and frequent psychotic experience and the full sample, and that there were genetic links between the extreme group and the rest of the distribution in each case. Taken together these factor analytic symptom studies and twin design genetic study indicate that grandiose delusions likely lie at one end of a single spectrum of grandiosity that is

distinct from other psychotic experiences and exists within the general population and across diagnostic categories.

Such findings have resulted in a call to move away from the traditional diagnostic approach and to conduct targeted research to develop experience-specific models and treatments (Bentall, 2006, 2014; Ben-Zeev et al., 2011; Garety, 2015; Knowles et al., 2011). This approach has so far been most applied to persecutory delusions (Freeman et al., 2021) and command hallucinations (Birchwood et al., 2014) with promising results. Indeed, in a recent randomised controlled trial which compared a new theoretically driven cognitive therapy for persecutory delusions - The Feeling Safe Programme - to befriending, the Feeling Safe Programme produced the largest treatment effects seen for patients with persecutory delusions to date. Half of patients had recovery in their persecutory delusion and there were significant end of treatment reductions in delusional conviction (Cohen's d=-0.86, p=0.021) and delusional severity (Cohen's d=-1.20, p<0.0001), demonstrating clinical benefits closer to those found in targeted cognitive behaviour therapy for anxiety disorders (Freeman, Emsley, et al., 2021). Given the evidence that grandiosity is distinct to other psychotic experiences and with different aetiological influences, there is a clear rationale for adopting an experience-specific approach to grandiose delusions also.

It should be acknowledged that experience-specific approaches are not without limitations. There is a risk that adopting this type of targeted approach might lead to the disregard of previous findings that relate to causal or maintenance mechanisms of broader constructs such as 'psychosis', 'positive symptoms' or 'delusions'. Given that there will still be some shared mechanisms across different psychotic experiences and, indeed, different mental health problems (Freeman, 2016) these common mechanisms may still be important targets for intervention and should not be overlooked. As illustrated however, experience specific models have the potential to significantly improve treatment effects and thus have a central role in the development of effective interventions for psychosis.

1.5 Potential maintenance mechanisms of grandiose delusions

Whilst there has been some discussion in the literature considering theoretical factors that may underpin grandiose delusions (e.g., Knowles et al., 2011), very few studies have empirically tested potential associations. A summary of the key findings that do exist is presented below. Given that grandiose delusions likely lie at one end of a spectrum of severity of grandiosity in the

general population, both clinical and non-clinical studies have been included in the research described.

1.5.1 Repetitive thinking

In a study with 109 non-clinical participants, Bortolon & Raffard, (2021) used an experimental paradigm to compare the impact of positive rumination versus distraction on grandiose ideation. Participants in this study were asked to recall a past experience in which they felt special, important, or superior to most people (a grandiosity induction). Half the participants were then instructed to dwell on how they were feeling and the extent to which they had felt special or superior to others at the time of the experience being recalled, and the other half participated in a distraction task. Current grandiosity was assessed before and after the experimental task. Compared to distraction, the rumination condition was associated with the maintenance of current grandiose ideation (Cohen's d=1.15; Bortolon & Raffard, 2021). The authors suggested that "a ruminative style of thinking might narrow attention toward positive experiences and prevent individuals from attending to disconfirmatory evidence" and that this "might lead to positively biased interpretations of life events, higher expectations that something positive will happen, and memory biases toward positive events." This finding requires replication in a clinical group and other forms of repetitive thinking may also warrant investigation. Bortolon et al., (2019) found that optimism was associated with grandiosity in a clinical group of 115 participants with non-affective psychosis, suggesting a potential role for future oriented positive thinking. Metacognition in the form of cognitive self-consciousness (preoccupation with one's own thoughts) was also associated with grandiosity in a non-clinical study (n=331; Larøi & Van Der Linden, 2005). The potential role of repetitive thinking requires further research scrutiny.

1.5.2 Reasoning biases

There is well documented evidence that reasoning biases maintain delusions (Dudley et al., 2016; So et al., 2016; Ward & Garety, 2019; Zhu et al., 2018). Targeting reasoning biases with psychological interventions can lead to improvements on observer-rated measures of persecutory delusions (e.g., Garety et al., 2021). There has also been some discussion as to whether they may play a particularly strong role in grandiose delusions. Garety et al., (2012) found that in a cross-sectional study with 301 patients with non-affective psychosis, a group with grandiose delusions had a higher likelihood of showing two psychosis-specific reasoning biases – jumping to conclusions and poor belief flexibility – than a group with persecutory delusions. They tentatively suggested that "in the absence of depressed affect and a negative self-concept, the aberrant experiences of psychosis are more likely to be appraised as personally significant and to

acquire grandiose (positive) content when a person's style of reasoning shows a tendency to adopt an explanation of events and experiences on the basis of limited data and with limited generation of alternative explanations or review of the evidence". In contrast, Ben-Zeev et al., (2011) failed to find an association between a jumping to conclusions bias and grandiose delusions. Theirs was a longitudinal study but had some limitations as it was relatively small (only one-third of the 130 patients participating had grandiose delusions) and, as it adopted an experience sampling methodology, only a single question was used to assess key constructs including the grandiose beliefs.

Impaired theory of mind has also been suggested to be a potential maintenance factor for grandiose delusions. Knowles and colleagues (2011) hypothesised that in the context of an anomalous perception of unexpected, unsolicited, or undue attention from others, theory of mind difficulties might lead to an individual inferring that this attention was because they are special and worthy of additional attention. Boyden et al., (2015) found that participants with grandiose delusions in the context of psychosis performed significantly worse on theory of mind tasks compared to a control group with depression, however this was a very small study with only 32 participants in total. A recent meta-analysis has indicated that theory of mind difficulties may be more strongly associated with cognitive-disorganisation and negative dimensions of psychosis than with 'positive' symptoms (Thibaudeau et al., 2023).

1.5.3 Anomalous Experiences

It seems plausible that anomalous experiences might, in some circumstances, provoke grandiose explanations. For example, hearing a voice saying *"you are Jesus"* might be appraised as *"it's the voice of God confirming my true identity",* or experiencing a sense of depersonalisation might be interpreted as a sign of one's special powers or identity. Several studies have looked at this potential association in relation to hallucinations specifically. In a network analysis study with 6941 non-clinical participants, Černis et al., (2021) found evidence of positive associations between hallucinations and grandiosity. Similarly, in a cross-sectional study with 392 school children, Galbraith et al., (2014) found an association between grandiosity and hallucinations, which was partially mediated by anxiety. In a cross-sectional study with 115 patients with schizophrenia, Bortolon et al., (2019) found a moderate association between grandiose delusions and hallucinations ($r=0.36$, $p=0.0001$) which remained when controlling for other clinical variables ('suspiciousness/persecution' and 'general psychopathology'). However, Ben-Zeev et al., (2011) did not find any association between hallucinations and grandiose delusions in their experience sampling longitudinal study with 130 patients. These studies used different measures

to assess hallucinations, but all combined distinct hallucination modalities (e.g., visual, auditory) into a single score. The importance of distinguishing between unimodal hallucinations (those occurring in a single modality only), multisensory hallucinations (those occurring in more than one modality but not simultaneously), and multimodal hallucinations (those occurring in multiple modalities simultaneously) has recently been highlighted (Dudley et al., 2023; Toh et al., 2021), but to the author's knowledge there are no studies that consider this in relation to grandiose beliefs as yet. Similarly, with the exception Cěrnis and colleagues (who also found evidence of a positive association between dissociation and grandiosity), none of the studies above considered anomalous experiences beyond hallucinations. Further research is evidently required.

1.5.4 Emotion and self-esteem

Theorists have suggested that delusions may serve a function of protecting against underlying low self-esteem and depression (Beck & Rector, 2005; Bentall et al., 1994, 2001; Neale, 1988). One model arising from this perspective proposed that delusions may act as an unconscious defence, preventing discrepancies between how individuals perceive themselves to be and how they would like to be from entering awareness (Bentall et al., 1994). A key prediction from this model is that there would be a discrepancy between overt and covert self-esteem such that covert self-esteem would be lower than overt self-esteem.

This was tested directly in relation to grandiose delusions by N. Smith and colleagues (2005). They conducted an experimental task with 21 participants who had grandiose delusions and 20 non-clinical controls. They found no difference between the two groups in relation to either overt measures of self-esteem, anxiety, and depression, or covert measures of self-esteem. They acknowledged that one possible interpretation is that the covert self-esteem measures may not have penetrated defensive processes (given that no method exists to enable certainty that an experimental task has broken through the hypothesized defences). However, as they had used two distinct and well-regarded measures of covert self-esteem (the Emotional Stroop Task and the Self Referent Incidental Recall Task) they concluded that the most likely explanation was that within this group the grandiose delusions was not an unconscious defence against low self-esteem.

Smith and colleagues suggested that an alternative explanation may be that grandiose delusions are "direct exaggerations of the emotional state of individuals" (the so called 'emotion-consistent account'). This position argues that positive beliefs about the self may become exaggerated in the context of heightened emotional states and hasty decision making. Several other studies are consistent with an emotion-consistent account. Garety et al., (2012) found that in a cross-

sectional study with 301 patients with non-affective psychosis, grandiose delusions (in comparison to persecutory delusions) were predicted by less negative self-evaluation, lower levels of anxiety and depression, and by higher self-esteem and more positive self- and other- beliefs. Galbraith et al., (2014) found that positive self-beliefs and grandiosity were associated in a non-clinical group of 293 school children. In a longitudinal non-clinical study with 2873 adolescents, Zavos et al., (2016) reported no significant association between depressive symptoms and grandiosity either within a single time point (baseline or 9 months follow-up) or across timepoints. Finally, Raune et al., (2006) found that grandiose delusion theme and grandiose hallucination content were not associated with the report of self-esteem impairing or humiliating life events in the preceding 12 months in a group of 41 people with first episode psychosis. Indeed, they found that experiencing a negative loss event in the preceding 12 months reduced the likelihood of grandiose delusions subsequently.

However, not all findings indicate that grandiose beliefs evolve from pre-existing positive affect or self-belief. For example, in a group of 4830 adolescent twin pairs, Shakoor and colleagues (2016) found that grandiosity was significantly associated with reports of stressful life events occurring in the preceding 12 months (an association that they determined was explained by both genetic and environmental influences). Paolini et al., (2016) also found that reports of childhood environmental violence were associated with grandiose or religious delusions in a group of 245 patients with first episode psychosis. Of course, there are many ways in which traumatic events may contribute to psychotic experiences (Hardy, 2017) and an association between life events and grandiosity does not automatically imply a mediating route via low self-esteem and depression. However, Gin et al., (2021) found that negative self- and other- beliefs significantly contributed to a model of grandiosity in a cross-sectional study with 122 adolescents with distressing unusual experiences, and Ben-Zeev et al., (2011) found that lower self-esteem at baseline was associated with a higher chance of experiencing a grandiose delusion in the subsequent week in a group of 130 patients with psychosis.

How might one explain these findings? An emotion consistent account certainly seems plausible as a potential causal and maintenance mechanism for grandiose delusions for some people. This is not incompatible, however, with the possibility that grandiose delusions may have a beneficial or protective function as well. Such a function does not necessarily need to be in the form of an unconscious defence and, as such, this perspective does not conflict with the findings from N. Smith and colleagues (2005). Raune et al., (2006) suggested that "grandiose delusions may be a way of improving and maintaining self-esteem, regardless of whether it was initially low" and N. Smith and colleagues suggested that there may be secondary gains from grandiose delusions such

as "providing pleasurable distraction from inactivity, withdrawal from others, and failed hopes and expectations". Clearly this is an area that warrants further research.

1.6 The next steps

So far in this chapter three key points have been highlighted. First, harm can arise from grandiose delusions but this may occur in many forms and has been insufficiently documented. Second, there is likely a single dimension across the population of grandiosity, with grandiose delusions the extreme end seen in patient populations, that is distinct from other psychotic experiences. This indicates that adopting an experience specific approach to the development of a psychological model and intervention is warranted. Third, the limited empirical literature suggests potential roles for repetitive thinking, reasoning biases, anomalous experiences, affect, and self-esteem in the occurrence of grandiose delusions. Grandiose delusions require specific research scrutiny.

This thesis represents the first stage of a systematic programme of research which has the ultimate goal of improving outcomes for patients experiencing harmful grandiose delusions via a targeted psychological therapy. This has not been done before for grandiose delusions. The first steps towards achieving this goal are to consider how patients with harmful grandiose delusions may be engaged in a psychological therapy (understanding what patients perceive as the problems associated with grandiose delusions will be critical here), and to develop the theoretical understanding of psychological mechanisms underpinning grandiose delusions to inform treatment development.

Accordingly, the first study described (Chapter 2) uses qualitative methodology to learn from patients about their experience of grandiose delusions. The key priorities within this study were to learn: what harms patients identify in relation to grandiose delusions, why grandiose delusions may persist, and what help patients may want from clinical services. The next three chapters (Chapter 3, 4, and 5) describe studies that develop measurements of four potential maintenance mechanisms for grandiose delusions identified in Chapter 2, and test their associations with grandiosity across the spectrum of severity. Chapter 4 also presents a self-report measure of subjective harm from grandiose delusions and provides quantitative data regarding the extent to which patients report harms occurring due to grandiose delusions and want help with these difficulties. The thesis should set up a future programme of treatment testing.

The specific aims of the thesis therefore are to: i) determine the extent to which patients identify harmful consequences occurring as a result of grandiose delusions and whether they want help with these harms, and ii) learn from patients whether there may be psychological mechanisms that maintain grandiose delusions in order to outline a theoretical model, and conduct preliminary tests of the model by testing associations between hypothesised maintenance factors and grandiosity.

2. Understanding grandiose delusions: a qualitative study[1]

2.1 Chapter abstract

Rationale

Chapter 1 outlined the case for developing a targeted psychological intervention for harmful grandiose delusions. Chapter 2 takes the first steps towards this goal by learning from patients whether grandiose delusions have harmful consequences, the psychological mechanisms that maintain them, and what help patients want from clinical services.

Methods

Qualitative interviews were conducted with fifteen patients with past or present experiences of grandiose delusions who were attending NHS mental health services. Thematic analysis and grounded theory were used to analyse the data.

Results

Participants reported physical, sexual, social, occupational, and emotional harms from grandiose delusions. All patients described the grandiose belief as highly meaningful: providing a sense of purpose, belonging, or self-identity, or making sense of unusual or difficult events. The meaning obtained appeared to be a key driver of the persistence of the beliefs. Other possible maintenance factors were anomalous experiences (e.g., voices), symptoms of mania, fantasy elaboration, reasoning biases, and immersive behaviours. Participants described insufficient opportunities to talk about their grandiose beliefs and related experiences and were generally positive about the possibility of a psychological therapy.

Conclusions

Patients identify a broad range of harms occurring in relation to their grandiose beliefs and want help with these experiences. There are a number of potential maintenance factors that may be amenable to a targeted psychological intervention. These will be explored further in subsequent chapters.

[1] *This chapter is adapted from the paper: Isham, L., Griffith, L., Boylan, A., Hicks, A., Wilson, N., Byrne, R., Sheaves, B., Bentall, R.P., & Freeman, D. (2021). Understanding, treating, and renaming grandiose delusions: a qualitative study. Psychology and Psychotherapy: Theory, Research, and Practice, 94, 119-140. This is provided in Appendix 6.*

2.2 Introduction

As highlighted in Chapter 1, grandiose delusions – despite being a relatively common psychotic experience – have been severely neglected as a specific focus of research and clinical practice, particularly in contrast to experiences such as persecutory delusions and auditory hallucinations. This apparent disparity may have arisen for several reasons. There may be a perception that grandiose delusions represent a more benign presentation in non-affective psychosis and that they will not be distressing or harmful given the focus of the belief. Alternatively, they may be viewed simply as a symptom of mania in affective psychosis, and therefore it is presumed that research and clinical focus should be on the manic episode rather than the belief per se. These assumptions, however, are likely erroneous. Both harm and distress can occur with grandiose delusions (e.g., believing one is invincible and stepping into traffic, or believing one is Jesus and will therefore be crucified). Furthermore, potential maintenance mechanisms beyond mania (e.g., reasoning biases, hallucinations) have been indicated, and factor analytic symptoms studies and twin design genetic studies suggest that there are distinct aetiological influences for different psychotic experiences, including grandiosity (e.g., Ronald et al., 2014; Zavos et al., 2016) . Grandiose delusions require specific scrutiny and a systematic approach is required.

The current study aimed to further understanding by learning directly from patients using qualitative methodology. Three key areas were examined: the consequences of grandiose delusions, why the beliefs persist, and what patients may want from services. The rationale to intervene is inextricably linked to the degree to which grandiose delusions cause harm and therefore details regarding the types of harmful consequences that may occur were sought. If intervention is indicated, then the mechanisms to target to effect change must be known. Preliminary evidence suggests possible roles for reasoning biases, hallucinations, and self-esteem (Ben-Zeev et al., 2011; Bortolon et al., 2019; Garety et al., 2012). The current understanding of the factors maintaining grandiose delusions is very limited however, and hence patient perspectives were sought to enable the generation of hypotheses regarding potential maintenance factors. Finally, grandiose delusions increase the risk of a patient being unmotivated to engage in standard treatment (Mulder et al., 2005) but little is known about why this is. Patients may feel that treatments are irrelevant or unhelpful, and such perspectives must be understood in order for an acceptable intervention to be developed. It was therefore important to learn from patients what they would, and would not, want from clinical services.

2.3 Method

The study was approved by the NHS Health Research Authority (REC reference:17/SC/0515).

2.3.1 Research team

The study was designed and conducted by a team with a range of expertise. This was led by the author (LI) and included those with personal experience of grandiose delusions (AH, NW), as well as experts in the development and delivery of psychological models and treatments for psychotic experiences (DF, BS), and in qualitative methodology (LG, AMB). This team approach ensured that multiple perspectives were obtained at all stages of the research process, which was invaluable in maximising the credibility and dependability (or validity and reliability) of the study (Guest et al., 2012).

2.3.2 Participants

Participants were sought from mental health teams in Oxford Health NHS Foundation Trust. Inclusion criteria were: aged 16+ years; current/past experience of grandiose delusions held for at least one month with at least 50% conviction; and a primary diagnosis of schizophrenia-spectrum psychosis or bipolar-affective disorder. Individuals without capacity to consent, with insufficient comprehension of English, or with primary diagnoses of drug/alcohol/personality disorder, learning disability, or organic syndrome were excluded. Potential participants were identified by their clinical teams and, if consent was given to do so, approached by the author who provided information about the study and screened for suitability. The Schedules for Clinical Assessment in Neuropsychiatry (SCAN; World Health Organisation, 1992) items 19.34 delusions of grandiose abilities and 19.35 delusions of grandiose identity were used to guide the assessment of grandiose delusions. All participants gave written informed consent.

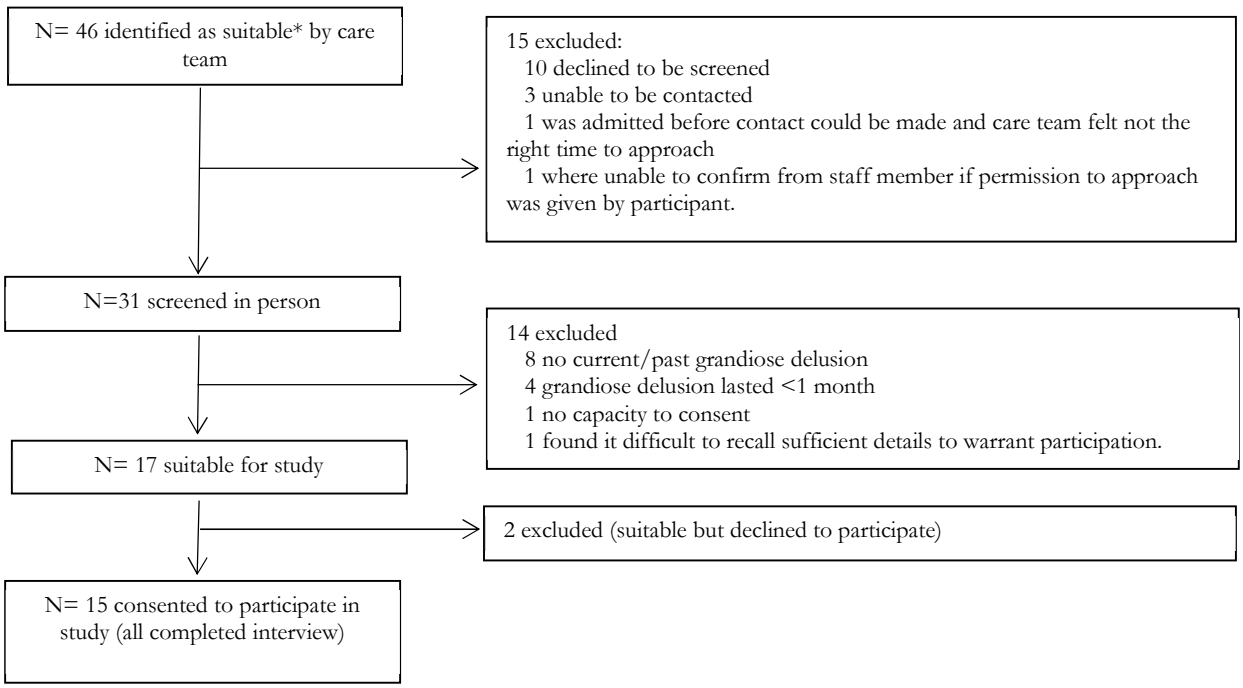
Purposive Sampling

Representation across those with (i) current and past grandiose delusions and (ii) affective and non-affective diagnoses was prioritised. This was due to anticipated differences in views on harm, treatment, and maintenance factors. Some harms (such as social embarrassment) were anticipated as being potentially more apparent to those with past beliefs, whereas some maintenance factors might be more readily identified in those currently holding a grandiose delusion. Including participants with affective and non-affective diagnoses ensured that grandiose delusions both within and outside of the context of mania could be considered. Variation across gender, age, and service experience was also sought where possible.

Data saturation

Data saturation was considered to have been achieved when no new themes emerged from additional interviews (Fusch & Ness, 2015). In practice it was felt that this had occurred by the thirteenth participant but a further two participants were recruited to test and confirm this. This resulted in a final sample of 15 participants. Sample extraction details (Figure 2.1) and participant characteristics (Tables 2.1 & 2.2) are provided.

Figure 2.1. Sample extraction



* NB: A heterogeneous sample was pursued by purposive sampling to include those with current and past grandiose delusions, and affective and non-affective diagnoses.

Table 2.1. Socio-demographic information for study participants (n=15)

Demographic characteristic	Frequency
Age (years)	
16-25	2
26-35	3
36-45	5
46-55	1
56-65	4
Gender	
Male	7
Female	8
Ethnicity	
White-British	13
Indian	1
Mixed White- & Black- British	1
Marital Status	
Single	8
Engaged	1
Married	3
Divorced	3
Employment	
Employed full time	1
Employed part time	2
Student and part time employment	1
Unemployed	11
Diagnoses	
Schizophrenia	4
Schizoaffective Disorder	4
Bipolar Affective Disorder	6
Non-organic psychotic disorder (working diagnosis due to first presentation)	1
Current/Past Grandiose Belief	
Current belief about current abilities/identity	8
Current belief about past abilities (doesn't believe currently has abilities)	2
Past belief not currently subscribed to	5
Service context at time of interview	
Community mental health team (CMHT)	11*
Early intervention in psychosis (EIP) team	2
Acute psychiatric inpatient setting	2
Experience of psychiatric admission	
At least one psychiatric admission	13
No	2
Self-reported experience of any talking therapy (not necessarily for grandiose belief)	
No	4
Yes (incl. GP counselling, individual psychotherapy or counselling (private), individual CBT (NHS), mindfulness group therapy (NHS), ward-based psychosis group (NHS)).	11

Demographic details were provided by participants except for diagnosis and service context (identified at point of referral).
* one participant was open to CMHT at time of interview but had been discharged from hospital the previous day.

Table 2.2. Content of grandiose beliefs discussed during interview.

Pseudonym**	Marital Status	Employment	Diagnosis	Current Service	Past or current belief	Belief(s)
Bob	Single	Student & Employed-PT	BD	EIP	Past	I have the capacity to become the next Messiah and am on a special pathway towards achieving this.
Mark	Divorced	Unemployed	SzA	AMHT*	Current	I am working undercover for the security services.
Mandy	Married	Unemployed	SzA	AMHT	Current	I am a Goddess and the daughter of God with whom I have a special relationship. In the next world I will be married to Jesus, will have special powers to help people and bring peace to the world.
Kit	Single	Employed-PT	BD	Inpatient	Current	I am Jesus. I am the one son of God. I have special spiritual and mystical abilities which allow me to get very close to God and to make the world more peaceful. (At times I also wonder if I can walk on water or float but am less certain about this).
Annabelle	Single	Unemployed	SzA	AMHT	Past	I have been chosen by God to be the only one he speaks to because I am special, his favourite and his daughter. People will build temples dedicated to me.
Sophie	Engaged	Employed-PT	BD	EIP	Past	I am God. I have the power to walk on water and bless people. I will save the world.
Stephen	Single	Unemployed	S	AMHT	Current (re past abilities)	I have special powers (to read minds, levitate objects, travel through time). I am God. I have slept with billions of women and fathered children by them. I created and starred in the Avengers (who are real).
Max	Single	Unemployed	SzA	AMHT	Past	I am on an MI7 training programme; I am in the SAS; I am 007.
Sonja	Married	Unemployed	BD	AMHT	Current	I have special abilities to access and transfer information via telepathy (including with the spiritual realm). I can read others' minds extremely quickly (much more quickly than others).
Jessica	Divorced	Unemployed	BD	AMHT	Current (re past abilities)	I am able to do telepathy. I have special knowledge (the ability to predict the future) and abilities (knowing codes to enter and exit locked buildings). I am on a special mission of great importance.
Fred	Single	Unemployed	S	AMHT	Current	I am a messiah, God-like figure for the world. I have superior consciousness compared to other people.
Sarah	Divorced	Unemployed	S	Inpatient	Current	I receive visions from God which allow me to predict the future. God has given me this ability because I am the Holy Spirit and his representative on earth. God kills those who harm me because I am special.
Brian	Single	Unemployed	Non-organic psychotic disorder	EIP	Current	I am the reincarnation of Albert Einstein and have advanced mathematical abilities
Polly	Single	Unemployed	S	AMHT	Current	I have been chosen by God to have a special role in saving the world. I will do this by marrying a person identified to me by God (either a current friend, or Jesus himself).
Mildred	Married	Employed-FT	BD	AMHT	Past	I have special powers to predict the future; I have been chosen by God to save the world from evil forces because I am special.

*one participant was open to AMHT at the time of interview but had been recruited during his admission to hospital, and the interview took place one day after discharge.; PT=part-time; FT=full-time; S=Schizophrenia; SzA=Schizoaffective disorder; BD=Bipolar Affective Disorder; EIP=Early Intervention for Psychosis Service; AMHT=Adult Mental Health Team. ** Participants were given the option to choose their own pseudonym to be used in the write up of the study.

2.3.3 Procedure

Interview guide evolution

Consensus meetings between the research team and pilot interviews conducted with those who had personal experience of grandiose delusions facilitated the development of a preliminary interview guide (provided in Appendix 2.1). This 'team' approach was adopted to ensure multiple perspectives were included in the generation of interview questions (hence reducing potential bias). Decisions made at this stage included starting the interview with an open unstructured question inviting participants to tell their story about their experience of the identified belief. This ensured that the participant could talk about the issues most important to them. It was also decided to have two versions of the interview questions to ensure that experiences related to both past and current beliefs could be discussed sensitively (e.g., asking *"How did you come to* ***believe*** *you were God?"* or *"How did you come to* ***realise*** *that you were God?"*). This is in line with good practice in cognitive behavioural therapy for psychosis where it is recognised that it may be appropriate to work 'within' the delusional belief system (Johns et al., 2014). Emergent themes were incorporated into the interview guide as they arose. For example, after the first five interviews it became apparent that the experience of grandiose beliefs was not synonymous with feelings of superiority or arrogance and therefore an additional question was added to elicit additional information about this (Question: *"I'm interested in how this experience impacts on your view of yourself in relation to others. Do you see yourself as different or the same as others?"* Optional further probes if difference is suggested: *"How are you different? Is this in a good way or a negative way? Do you see yourself as better or worse than others? Or superior or inferior to others?").*

Interview Process

Semi-structured, in-depth, audio-recorded interviews were conducted by the author in accordance with relevant guidelines (Byrne, 2011; Yeo et al., 2014). They were open-ended (59-187 minutes). After the initial open question, subsequent focused questions facilitated discussion about belief onset, possible maintenance factors, impact on the individual, and experiences of mental health services. Follow-up questions and probes were used as appropriate. Following guidelines for good practice in qualitative methodology, interviews were transcribed, anonymised, checked for accuracy, and offered to participants for review (Bazeley, 2013; Poland, 1995).

Where possible steps were taken to minimise potential power imbalances between the interviewer (a clinical psychologist in the Trust) and the participants (Gilburt et al., 2008;

Hoffmann, 2007). These included the interviewer emphasising their viewpoint that the participant's perspective was paramount and that the intention was to learn from them. Care was taken to schedule the interview at a time and location of the participant's choosing and to remind participants that they could choose not to answer questions. It was also emphasised that information given by the participant in the interview would only be shared with care teams in the presence of significant risk.

Given that poor quality audio recordings can be a primary source of transcription error (Poland, 1995), concerted efforts were made to secure a quiet and uninterrupted space for the interview, and steps taken to reduce background noise where possible (e.g., requesting that participants turn off radios, and rescheduling an interview that had been due to take place on a ward but where there was significant disruption on the planned interview date).

2.3.4 Method of Analysis

Data were transcribed by a third party (either a departmental secretary with experience of transcription or professional transcriber). Given that transcription may be considered to be an interpretive process in itself (as the transcriber "chooses what speech to write down and how to present it"; Green et al., 1997), and factors such as human error or fatigue can also influence the quality of transcription, all transcriptions were checked systematically by the author in accordance with a pre-specified set of guidelines (see Appendix 2.2).

Transcribed data were read and re-read to ensure familiarity with the data. A preliminary coding framework (developed by LI and DF) largely corresponded to overarching topics on the interview guide but evolved in line with emerging ideas. Details regarding each code (including its origin, and whether it was an *a priori* or 'in vivo' code) were recorded. The coding framework was regularly reviewed by the research team. All data were coded by the author (LI) but if uncertainty arose this was discussed with other team members and consensus agreed. Furthermore, coding of an early interview was reviewed in its entirety by an additional coder (BS) to increase reliability. As the coding framework evolved, earlier interviews were reviewed again to ensure information relevant to emerging codes was captured. For example, the code 'behavioural enaction' (to capture behaviours resulting from the grandiose belief – later renamed as 'immersion behaviours') was added after the first five interviews had been coded and therefore these interviews were reviewed again to ensure that pertinent data from these transcripts were captured. After all interviews were completed, 'coding checks' of each transcript were conducted to check for consistency.

Interviews were explored using inductive and deductive thematic analysis (Braun & Clarke, 2006), and drawing on grounded theory whereby the detailed investigation of initially unstructured narratives was compared to the research question under investigation. This offered a high degree of flexibility and fidelity to the data. This approach generated initial codes which were constantly compared and modified as new interviews were added and analysed. This allowed for the initial formation of conceptual themes which were constantly re-examined by the addition of new data in a dialectical process (Hutchison et al., 2010). NVivo version 12 was used to support the coding, organization, and analysis of data.

The research team took a critical realist approach to the analysis. As highlighted by Lambe et al., (in prep.) critical realism theory proposes that there exists an objectively knowable reality, but that perception and cognition influence the way in which that reality is observed. As such, it is acknowledged that the beliefs and experiences of the research team will have influenced the way in which the data were perceived, interpreted, and represented. For example, LI, DF, and BS are clinical psychologists specialising in cognitive behaviour therapy for psychosis (CBTp) and their experience of understanding peoples' experiences within a cognitive behavioural framework was identified as being likely to impact on the way in which they viewed the data (and in particular when seeking to understand the mechanisms that may drive grandiose beliefs). Furthermore, both members of the research team who had lived experience of grandiose beliefs (AH and NW), as well as the psychologists (LI, DF, BS), had personal or clinical experience of grandiose beliefs being both harmful and meaningful, which likely influenced the analysis of the data, as it was an expectation of the team that these constructs would be embedded in the narratives of participants. To encourage reflexivity and awareness of the way in which the team's beliefs and experiences might influence the research process, a detailed research diary was kept from the initial discussions about the research proposal to the final write-up and publication of the analyses. This included explicit recognition and consideration of the research team's *a priori* positioning. A codebook also formed part of the research diary, and this included details for each code of how it originated (for example did it arise from a specific piece of data or was it theory-driven), how the code was defined, how this definition was refined over time, and on what basis. Excerpts from the research diary illustrate the reflexive process and are included in Appendix 2.3.

2.4 Results

2.4.1 Harm

Interviewer: *"I wondered whether you'd be able to tell your story [..] of your experience of being Jesus?"*

Kit: *"Well, first off, it's ten years of being sad."*

Harmful or potentially harmful situations were identified by all participants and had arisen in multiple life domains as a direct consequence of their grandiose beliefs. Trying to fly or walk on water (physical harm), going home with strangers they believed to be God (sexual harm), being rejected or ridiculed by others for their beliefs or associated behaviours (social harm), dropping out of university because of preoccupation with experiences (occupational harm), and feeling depressed, frightened, angry, under pressure, and suicidal (emotional harm) were all described (Box 2.1 provides additional illustrative quotes).

Harm was sometimes the direct consequence of the participant's behaviour (Jessica: *"I drove faster than I normally would")* but frequently the risk came from others. Some, especially the male participants, knowingly entered dangerous situations feeling themselves to be invulnerable (Max described confidence during an altercation at a nightclub because *"I felt that people were looking out for me"*). Others demonstrated a lack of awareness of the risks posed by others:

> Polly: *"This elderly gentleman came up to me [...]. I thought 'you're God'. I went to his house [..]. We had some kisses and cuddles and I said 'can we be married?'. He said 'no'. [..] 'we can be partners' and from that I thought he meant not literally romantic partners but business partners; partners in the process of saving people."*

Often the participant was adversely affected but there were examples of significant harm to others, with evidence of family, friends, and strangers experiencing distress, neglect, embarrassment, or fear:

> Max: *"I saw two guys [..] and said 'stop, I want to speak to you'. [..]* [They] *started walking away. I don't know if they were doing something dodg-, but then I opened my jacket and went like* [motions reaching inside inner jacket pocket]. *They started running [..]. I said 'stop armed police!' or something and they just ran off."*

> Sarah: "*I was going to heaven, [..] spending time with God [..]. Always in visions* [dreams]. *My days would be perfectly normal, but my nights would be just magical. And this is where we get to my daughter because.., I just wanted to go to bed. She was a teenager and wanted to be out with her friends and I would*

Box 2.1. Further examples of harm across domains

Physical harm:

Sophie: *"In some cases I wouldn't think through where I tried* [walking on water]. *So maybe it will incidentally be shallow [..] but also in deeper places, and [..] places where getting out might have been challenging"; "It could've gone very very wrong if things had been slightly different [..]. I could've got seriously hurt."*

Sophie: *"Trying to fly off various heighted objects"*; *"[I] stepped off things and expected to fly."* Interviewer: *"What's the highest thing you've stepped off?"* Sophie: [deep exhale, 10s pause] *"I can't entirely remember. And I don't want to remember if that makes sense."*

Max (describing an altercation at a nightclub whilst believing he had secret services training and protection from 'other officers'): "*Normally I would've just left it but [..] because I felt that I was in some sort of training scheme, some organisation I felt a lot more confident so that added to the conflict. [..] I felt that people were looking out for me."*

Jessica: *"I was on a mission [..] I walked across fields, I took my shoes off and put them as markers [..]. I ended up walking, I've never seen it before but there was a caravan and I knocked on the caravan and this man was startled, as you would be at 11, 10 at night. But he wouldn't let me in. And it was absolutely chucking it down, and maybe I wouldn't, but bearing in mind I've got no shoes and socks."*

Brian (talking about being Einstein): "*I needed to get to the highest point, so I could see, like, the horizon line. [..] And that's when they sectioned me because they thought I was going to commit suicide because I was over like loads of electric wires [..] I was on the lamp post on the bridge, sitting on top of it. [..] I just wanted to see the horizon line. I was literally just obsessed with space and that."*

Sexual harm:

Kit: *"I have met with my Father* [God] *twice in human form. [..] first one was Arthur* and Arthur* was a bit confusing, [..] What he does he tries to give me like life lessons […] but then he also wanked off to gay porn when I was in the room and I felt a bit violated."*

Polly's description of sexual harm is presented in the text. The example given however was not an isolated incident and Polly described several similar occurrences including one when she ended up spending the night on the streets with a homeless man who she described as being on narcotics.

Social harm:

Stephen: *"I was talking to her, I was gonna offer her a drink, and this other girl pulled her away and said 'I just thought I would pull you away from that situation' [..]"* Interviewer: "*Why do you think she did that?"* Stephen: "*I don't know. It's just what people think I am isn't it [..]. People think I'm a weirdo. Some people think I'm not right in the head."*

Mildred (describing a previous boyfriend ending their relationship when she believed she was in a battle of good versus evil with one of his relatives): *"He was just like, 'I can't... I just can't do this anymore.'"* Interviewer: "*And what impact did that have on you at them time?"* Mildred*: "Erm.., my world fell to pieces."*

Emotional harm:

Fred (describing feeling different to others as a Messiah): *"In my 30s I wanted to die; I wanted to commit suicide [..] For anyone in that position I thought it would be ordinary to commit suicide, it was just hopeless"; "I was certainly depressed for a long time, and I came to this momentous decision, 'oh, to hell with it all, I'm not playing this game of being a human being anymore'."*

Jessica: "*There were fireworks going off but to me they weren't fireworks, they were gunshot rings and I remember, although I was scared and that, I was on a mission, I had to do it."*

Bob: "T*he messiah is completely devoid off all sin [..]. So I would not allow myself [..] to feel any greed, [..], any sort of desire, without feeling guilt for it, without feeling self-hatred."*

*pseudonym

> *just ignore her. Go to sleep and leave her. I didn't even know what time she was coming in. [..] It did impact our relationship. [..] I would go to bed early [..]. say seven o'clock, [..] because that was more exciting than my daily life and I didn't realise that I neglected her."*

Harms were evident both when the belief was present but also afterwards. Participants recalled embarrassment, loss (Max: *"you go from really important to really unimportant"*), and practical difficulties (Sophie: *"Suddenly it's been that long, you go back [to work] but not all the same staff are there [..]. I was no longer so regular and valued"*).

Harm was not solely caused by the belief per se, but sometimes due to the degree of preoccupation with it (Mandy described accidentally scalding herself whilst caught up thinking about the belief) or by others' responses:

> Mandy: "*My brother's partner said 'can Mandy come up?' and-, I was very upset once because my cousin said 'No. I can't cope with what she's saying* [about being the Goddess], *it's stressful for me [..].' So I couldn't sometimes go up."*

Disbelief by others was prominent and experienced negatively by most participants, especially those currently hospitalised:

> *Kit: "I was going to kill myself on New Year's Eve [..] It was linked to breaking up with my girlfriend and 10 years of just people ignoring me* [Jesus] *[..], I even went to the Evensong, you know, in a church, stood next to everyone, they were all singing to Jesus, and no one fucking talked to me. No one really does want me* [Jesus] *because, you know, it lasts a lot longer if I'm just dead and people just don't know."*

2.4.2 Maintenance Mechanisms

Six potential psychological maintenance factors were identified. Box 2.2 provides further illustrative quotes.

Meaning making

All narratives emphasised that grandiose beliefs were 'meaning making' experiences. Participants reported the beliefs as highly significant and they appeared to provide a sense of purpose, belonging, or self-identity, or make sense of unusual or difficult events.

The types of meaning inherent in the belief differed between participants. Power and self-efficacy, helping others, and making a valuable contribution to society were common themes. Social meanings were also prevalent and participants described that they were (or would be) "*part*

of a team", respected by others, or involved in intimate relationships with the promise of comfort, protection, marriage, sex, or children.

Frequently, grandiose beliefs occurred in the face of negative circumstances and, as such, appeared to be protective. Accounts of the belief providing respite from paranoia, low mood, self-loathing, and rejection, and as a means to make sense of suffering, achieve retribution for past wrongs, and retain hope for a better future were all described.

> Bob: *"I hated who I was."; "I tried to seek some sort of route to escape this depression, which was to again fall into this fantasy world in which I would try to elevate myself, and you can elevate yourself as far as you want in your own fantasy, you can be the next messiah [..]."*

Such a 'meaning making' function could lead to belief persistence:

> Bob: "*[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".*

The inherent meaning was not typically synonymous with feeling highly superior, arrogant, or overly entitled. When superiority was evident it was often not totally unwarranted (e.g., the participant had above average intelligence), or it was accompanied by humility or uncertainty:

> Fred: *"I feel superior to other people, definitely, yes. I don't go around saying that, [..] but that's how I feel inside."*
>
> Interviewer: *"Having these abilities, do you see yourself as different to others in some way, or the same, or...?"* Jessica: "*No, no. No, not at all.";* Interviewer: *"So when you felt you were on a mission,[..] in that moment have you felt better or worse than others, or superior or inferior to others? [..]"* Jessica: *"No. Probably the same."*
>
> Interviewer: *"Does [*being the Goddess] *make you feel better than other people?"* Mandy: *"No no. 'Cause we all come from-. In fact, they-, everybody comes from me in the first place, flesh was took away from me, but umm…no no. I would be over [*them*] in a way, but no, all people are people. They should all be treated the same."*
>
> Polly: "*I* ***know*** *I'm not better than anybody else…, but it does make me feel special."* [..]. Interviewer: *"Do you feel superior to others?"* Polly: "*I do but that's rubbish, I shouldn't feel like that."*

Box 2.2. Illustrations of possible maintenance mechanisms and service-related experiences.

Meaning-making experiences:
Helping others and hope for the future*:* Mandy: *"I was telling me parents I could help 'em [..]. They're suffering now but it will come out alright.*"; *"[*God*] says 'hang on in there' [..] I know you suffer sometimes but suffering's for a reason, and you will come out of it."'*

Power and achieving potential: Max: "*[*It made*] me feel strong and powerful and sort of able to do anything. The sort of feeling you get, it makes you feel like you become the person you've always wanted to be or better."*

Being useful and helping society: Mark: "*I feel I am useful to society."*

Social meaning: Stephen: *"I just feel part of a team";* Mandy: "*I'm gonna have children in the new life."*

Anomalous experiences:
AEs powerful and intense, increasing sense of their significance: Kit: *"The actual powerful voice of God spoke to me and said 'Do it right this time.' I fell into a bush [..] like it came out of kind of sunlight clouds which was on the righthand side of me. And it was so powerful I fell over."*

Mania:
Mania preceding development of grandiose belief: Mildred: "*For that particular episode [..] I know exactly where the trigger came from. My mood had started to go up and I was reading these books[..] I think I managed to get through all 10 within about two weeks. [..] I was sleeping less than I normally do, but [..] I wasn't worried about it. [..] I think my mood went up before the sleep reduced."*

The grandiose belief changing when the mania recedes: Mildred: "*I think I just came out of my episode, basically. I think natural... I go up and down. I literally naturally came out of the other side and my focus just ever so slightly shifted."*

Fantasy elaboration:
Thinking about the belief (in imagery form) feels good: Mandy: "*Well it can feel good, yeah, looking like that* [giggles]. *I could see err-, see myself, err the eyes they are not just err... they're like that!* [gesturing large eyes]."

Reasoning biases:
Confirmation bias: Bob: *"I had the ideas…. It became a reciprocating system in that I would then feel this reinforcement with this information stream. [..] As my perception would change, the information stream would change. In much the same way, if you are ice skating and you start looking one way you will start drifting that way."*

"There was a pathway which I followed of my own logic, which was potentially fallible [..]. But I didn't take the time to try to fail myself [..] because failing myself would mean the past few months I had done had gone to waste and I'd destroyed myself and the whole post negative implications which I did not want to face."

Negative social information being misinterpreted positively: Polly: "*An elderly gentleman [..] walked past me [..]. I thought 'he looks like God'. [..] I said, 'Hello, Daddy', and he said something like 'What do you want?'* [hostile tone]. *I said, 'What can I do to please you?' [..] He said, 'Nothing.' I said, "What can I do for you?" And he said, 'Nothing!'"* Interviewer: *"What was that like?"* Polly: "*Well, it was nice to meet him.*" Interviewer: "*When he said, 'there's nothing', what did you take from that?"* Polly: "*That Jesus has done it all, we don't have to."*

Advice/feedback from others rejected: Bob: *"Anyone who tried to come and sort of say 'No, sorry your reality's false, you are completely psychotic' had no effect on me, except just to sort of aggravate..., umm.., and to push me further away."*

Immersion behaviours:
Sophie: *"I was completely convinced I was God. I needed to go out and bless via libraries. Why libraries I don't know, but I was convinced that libraries were an effective way to bless and was just going around… yeah."*

Service-experience:
Positive techniques used to help manage the grandiose delusion: Participant*: "my CPN was amazing [..] thinking about thinking patterns and cycles of behaviour [..] ways to challenge it, looking a bit at the evidence and like noticing reinforcing patterns."*

Anomalous experiences

Anomalous experiences were described by all but one participant. Most common were auditory hallucinations (reported by eight participants) and a felt sense of salience (reported by six participants) but other hallucinations (somatic, olfactory, and visual), dissociative experiences (out of body experiences and déjà vu) and vivid dreams were also evident.

> Mandy: *"I think it was my Lord the father [..] but not letting me know till, good, till he came out of my body. […] He was..., made my body, ah like that, come out* [gesticulates with hands something coming down through her body from her neck and out through her stomach]. *He definitely came out like that, I see him. [..] He zoomed out. [..] He, err, like white, white but so fast, an image of a man, but white, he come out fast like that."* Interviewer: "*Did you feel it as well physically?"* Mandy: *"Err yes, zoom. Yeah, the zoom. The zoom came out."*

Anomalous experiences were implicated in belief maintenance in several ways. First, the content of the anomalous experience could cause or confirm the belief. Mandy described realising she was the Goddess when *"He* [God] *was in my head and telling me."; "A voice was telling me"*. Similarly, Sophie described a referential belief (*"The sunset told me stuff, it had meaning"*), underpinned by a felt sense of salience, which fed into her belief about having special abilities. The presence of an anomalous experience was often described as the defining moment at which the person 'knew' that their belief was true, and some indicated that the belief receded when the anomalous experiences did.

Anomalous experiences were described as powerful and intense (Fred: *"It's extremely powerful. It's all consuming if you like")*, making them potentially more likely to be appraised as significant. For some, the grandiose belief was the most plausible explanation for anomalous experiences that felt strange and profound:

> Fred: *"I had an immense shift of consciousness, rather like suddenly being able to see, whereas previously I couldn't see."; "I felt that something momentous had happened [..] I attributed it to being the second coming of Christ, because that was the only framework that I had to put it in. [..] In my mind, the change that happened was so profound it couldn't be anything else."*
>
> Mildred: *"It's like..., you know on your phone filter, when you put everything vivid? [..], It's like that, and* ***everything*** *is like that."* Interviewer: *"Colours you mean?"* Mildred: *"Yeah colours. It's like everything's got a kind of halo around it. [..] and very intense, [..] you can hear everything intensely."* [..] Interviewer: *"And what did you think about it at the time?"* Mildred: *"I felt it was..,* [laughing] *Monty Python the Holy Grail when it kind of goes "Laaaaa" kind of like it's that."* Interviewer: *"When you're*

having that experience, when colours are bright and noises are louder, how are you to make sense of that?" Mildred: *"[..] You can't can you? Or you just attach it to the nearest thing."* Interviewer: *"Did you think it was part of the spiritual…[..] your abilities?"* Mildred: "*Absolutely, absolutely. And that just kind of reinforced that I was right because obviously I could see it."*

A reciprocal relationship was also evident with some participants deliberately seeking out anomalous experiences because they were seen as important or pleasurable in the context of the grandiose belief:

Kit: "*God reveals himself to people in dreams. So my dreams have always been the most interesting thing that I spend a lot of time asleep dreaming and I force myself to sleep to dream because God shows himself in that way."*

Mania

Where grandiose beliefs co-occurred with mania, interactions were sometimes apparent. Max said "*[*The grandiose beliefs*] have always been after elevated mood"* and *"It's a really good feeling, feeling that you're in the SAS"* suggesting a bi-directional interaction with elevated mood. Brian described racing thoughts (*"the numbers started coming really fast")* contributing to his realisation that he was Einstein reincarnated, and several participants described sleep disturbance preceding or accompanying their grandiose beliefs.

Mania was not a necessary condition for the maintenance of grandiose delusions however, and several participants (including those with affective psychosis diagnoses) presented at interview with current grandiose beliefs in the absence of elevated mood or mania. Mildred noted that of two occasions when she believed she was chosen by God to battle evil, one was clearly preceded by "*mania"* (elevated mood, poor sleep, increased energy) and resolved when she "*came out of my episode"* but that mania was not present on the other occasion:

"I don't know what triggered that, only that my Dad had left, [..] my Mum had a nervous breakdown, so I was left in charge of my two younger sisters"; "I suppose it was obviously very heightened emotionally, so it must have... it can only have come from that, but I don't remember having a particularly high mood"; "[the other experience] *was different. There was a lot of energy behind that that there wasn't with this."*

Fantasy elaboration

Participants described thinking about their grandiose beliefs "*all the time*" (Mark; Polly), and that "*it took over my whole life*" (Brian). It was, however, sometimes possible to reduce or stop thinking about the grandiose beliefs when significantly distracted for example starting a drama company

(Mildred), helping someone in trouble (Bob), or going shopping or talking to her husband (Mandy).

> Interviewer: *"Were there times when you didn't think about it?"* Bob: *"I guess I stopped thinking about it when I was eating. [..]"* Interviewer: *"And the rest of time you were thinking about it?"* Bob: *"I mean if something else was happening in front of me which I could invest myself into, it would stop. I mean if there was someone outside in trouble in front of me and I could help them I would stop being like the messiah thing and would be like.. the whole sort of friend needs me and I have failed to help them. Erm.., I only recognise that as a messianic sort of failing or opportunity erm after the fact. [*Interviewer: "*okay"]. Erm during the time it was 'my friend needs help, I need to help them' or 'there's something happening here which I need to involve myself in.'"*

> Interviewer: "*How much time do you spend thinking of this [being a Goddess]?"* Mandy: *"Err.. well if I go out buying things that helps me to release it a bit because I'm thinking of something else or if I keep cleaning. But I do think I'm Godly and that helps me to clean. And my husband helps me, err you know, we have chats about other things and different things and it helps me you know."* Interviewer: *"So there are times where you focus on other things? Like when you are shopping or chatting to your husband?"* Mandy: *"Yeah, but it's still with me. It is still with me."*

Thoughts about the grandiose belief were not always verbal; compelling images were also present:

> Mandy (describing an image of being the Goddess): "*I'm blonde hair, big brown eyes, and they're massive [..]. I felt these huge eyes and long blonde hair, and then a figure."*

While it was anticipated that repetitive thinking would occur because it was pleasurable, the wider meaning, which typically went beyond simple hedonic pleasure, also drove repetitive thinking:

> Mark: "*It fills my time. I'm always busy [..]. In the past without doing that I'd be just feeling bored, sitting in my flat, listening to the radio, watching TV, sitting on my computer, bored, drinking alcohol. [..]. But with this situation I am busy thinking all the time."*

Some participants described a childhood pattern of daydreaming or 'escaping' into a fantasy world to cope with difficulties which had continued into adulthood and contributed to the grandiose delusion.

> Bob: *"I feel like a lot of these habits I had during the, erm, rooting of my psychosis, err, were formed during my childhood. I was never, I never went out much, I was never very popular, erm, I never understood people. So*

my childhood I spent most of my time in front of the TV or computer screen or in some sort of fantasy world playing with action figures and whatnot. Erm, so when I got to University and I decided to retreat from the world that is want I went back to [..]. It was entire-, entirely fantasy, entirely imaginatively driven."; " I would try to elevate myself, and you can elevate yourself as far as you want in your own fantasy, you can be the next Messiah, you can be king, you can be God, you can be the creator of everything, you could-, you could be the Devil, you could anything and everything all at once.., which leads to-, the sort of, th- the spiritual grandiosity, thinking that you are the next Messiah."

Reasoning biases

Participants' descriptions were consistent with a range of biases being present, most commonly confirmation bias:

> Interviewer: "*If someone had said 'we don't think that is happening' [..] how would you have reacted?"*
> Mildred: *"Well…. That* [would be] *just another sign than I'm on the right path. That's a test."*

Jumping to conclusions (an absence of data-gathering) also occurred:

> Max: "*I spent a lot of time thinking about it, not that much time like researching about it. Just thinking, thinking about it and feeling I would get the right answers myself without actually looking it up."*

Negative social information was misinterpreted as positive and there were descriptions of discrediting advice or feedback:

> Stephen: *"People just kept staring at me wherever I went [..]."* Interviewer: *"What did you conclude from that?"* Stephen: *"That I was something powerful."*

> Interviewer: "*When you're in that mode of being God, how do you respond to advice or feedback from others?*" Sophie: *"Completely dismiss and ignore it."*

Although reasoning biases were frequently evident there were counterexamples including altering belief conviction with disconfirmatory evidence:

> Max: *"I was convinced that I was in the SAS [..], I thought the police were gonna raid the place and get me out. And obviously that didn't happen, so I think when I came out I felt a bit less convinced."*

Immersion Behaviours

Participants described behaviours where they immersed themselves in a world consistent with the delusion. For some participants this included acting according to their perceived role or identity:

Sophie: *"I was God. I needed to go out blessing."*

Max: "*I remember just driving around sort of feeling like I was in the SAS and I remember I didn't put my seatbelt on and I saw police cars and, sort of waving at them and things, and I thought I was sort of part of like patrolling the town and looking for people, if there was anything dodgy going on."*

Other participants described withdrawing and becoming engrossed in information that fitted with their belief:

Bob: "*I shut myself off from the world [..] I was sort of in my brain with videos online, articles, and on the internet there's no filter, you can literally get anything. I was [..] trying to get in touch with what I thought reality was".*

Participants described engaging in these 'immersion behaviours' for several reasons. Some wanted information to understand how to achieve their 'mission' or evidence to prove to themselves or others that their belief was true. Others acted because it felt good or important. Sophie described trying to walk on water with differing rationales. When uncertain if she was a demi-God she "*did some experiments to test [it] out"*, but when she "*knew"* she could do it she acted because "*it could be fun".*

Some behaviours would be clearly noticeable to an observer but others were subtler. For example, Mildred described doing "*spiritual combat"* in her mind's eye with someone she perceived was evil:

Mildred: *"I would draw her up, we would be in this space..[..] I suppose you'd call it astral projection? Yeah she was there and we would be having a* [laughing] *spiritual combat, which probably looks a bit like Hogwarts, but err..."* Interviewer: *"And if someone was observing you doing this, what would they see you doing?"* Mildred: *"Just meditating."*

2.4.3 Experience of service-use and help-seeking

Participant: *"Nobody talked to me. I wanted to talk to them [..] I was alone and isolated."*

Participants unanimously reported difficulty talking to mental health services about their experience of grandiose delusions, despite the majority thinking that it might be helpful. Experiences were reported as hard to articulate (Fred: *"it's very hard to [...] know what to say to describe it")* or secrecy was inherent in the belief (Max: "*I won't speak to them about it, thinking it's something that needs to be kept secret"*). The lack of discussion was primarily attributed to staff- or

service-related factors. Staff not knowing how to talk about grandiose beliefs, speaking to family members rather than the participant, or simply not listening or understanding were described. Insufficient time in appointments or previous aversive experiences (e.g., compulsory admission, or feeling *"browbeaten", "ignored"* or *"dismissed"*) were further barriers to opening up:

> Participant: "*You tell care staff, the medical staff and then they say, 'right, you have to go into hospital' and 'we're taking your driving licence away.'"*

Talking about the grandiose belief was considered important to enable risk monitoring, facilitate belief change, or offer support:

> Sophie*: "Even if you can't change my beliefs I really appreciate being listened to and talked to 'cause it's really upsetting [..]. You can do that human support even if you can't change the situation."*

In terms of what would be helpful, taking time to develop trust was repeatedly reiterated. Participants particularly appreciated staff who had 'gone the extra mile' (e.g., buying the participant a coffee or taking extra time to talk when distressed). Other recommendations included asking specifically about the experiences (without being pushy) and listening carefully to the participant's perspective:

> Participant: *"If people don't take the time to get to know, and don't ask questions [..] it's a big problem. Because if I'm having these ideas I think it's obvious.* [..] *It's quite unhelpful when people assume you'll tell them stuff. [..] So actually try to talk about it and interact with it, rather than just assuming you'll tell people everything."*

Few participants had been offered therapy specifically for their grandiose beliefs although many felt this would be helpful.

> Participant: *"Years ago before the unusual experiences were a problem I had a session of CBT at* [location] *about mood but unfortunately I was quite well and wasn't in a position to make much use of it. Umm, my treatment team at the MHT have mentioned they would like me to do some but like that's never going to happen. So like, I'd like it, but it's just not going to happen."* Interviewer: "*Have they put you on a waiting list?"* Participant: *"I don't think so. I'm getting discharged."*

Unhelpful experiences of therapy more generally (i.e., for other difficulties) included too great a focus on the past or the participant feeling blamed ("[it's] *your thought processes that were wrong, [..] there's something wrong in you").* However, descriptions of helpful therapy experiences suggested that looking at evidence for and against the belief, considering alternative explanations, and looking at aspects identified as possible maintenance cycles may be beneficial:

> Bob: "[Good therapy would be] *something that makes them feel good, [..] makes them want to be in reality. Getting up every day, going for a morning run, having some good breakfast [..] having projects to work on, having skills you learn. [..] What's your love life like? [..] You need to look at all aspects of the person's life."; "You've also got to have a sense of belonging [..] a place within your society, a sense you have some worth."*

Participants suggested that it may not be the grandiose delusion per se that needed to be addressed in therapy but the harm or difficulties arising from it:

> Bob: *"I mean you may-, you may find that approaching this problem of grandiosity, you still have that grandiosity at the end of it, but it wouldn't be a problem. [..] The problem isn't the grandiosity, the problem is how they view themselves, how they interact with the world, how their aspirations sort of interfere."*

Several participants talked about the skills that would be needed by a therapist. Some felt that talking to a peer counsellor who had gone through similar experiences might be particularly helpful:

> Bob: *"If you get a psychological therapy for someone going through this sort of thing, they can't just be qualified in that they've read the literature. They need to be someone who's sort of gone through, who's got the approval of some sort of council, [..] someone who can relate to other people, not just a bookworm but somebody who can be empathetic, endearing."*

> Interviewer: *"If you were to have therapy, what would you like it to look like? What would you like it to involve?* Jessica: *"Mmm* [pause – 8 seconds] *I don't know. Maybe like a weekly session.* [pause – 13 seconds]. *And someone that understands rather than just someone that just has to do it because it's their job* [pause – 10 seconds]. *Or even maybe someone that's had a bit of personal..., like experiences themselves."*

2.5 Discussion

This is the first qualitative study focussed specifically upon the experience of grandiose delusions. The patient accounts were extraordinarily rich, with most participants never having spoken in depth before about these experiences. Harm from grandiose delusions – across multiple domains – was evident for all the participants, and occurred as a direct consequence of the belief, from preoccupation, and from the responses of others. The limited literature on harm associated with grandiose delusions focuses almost exclusively on offending (Ullrich et al., 2014; van Dongen et al., 2015) but clearly a wider perspective is needed.

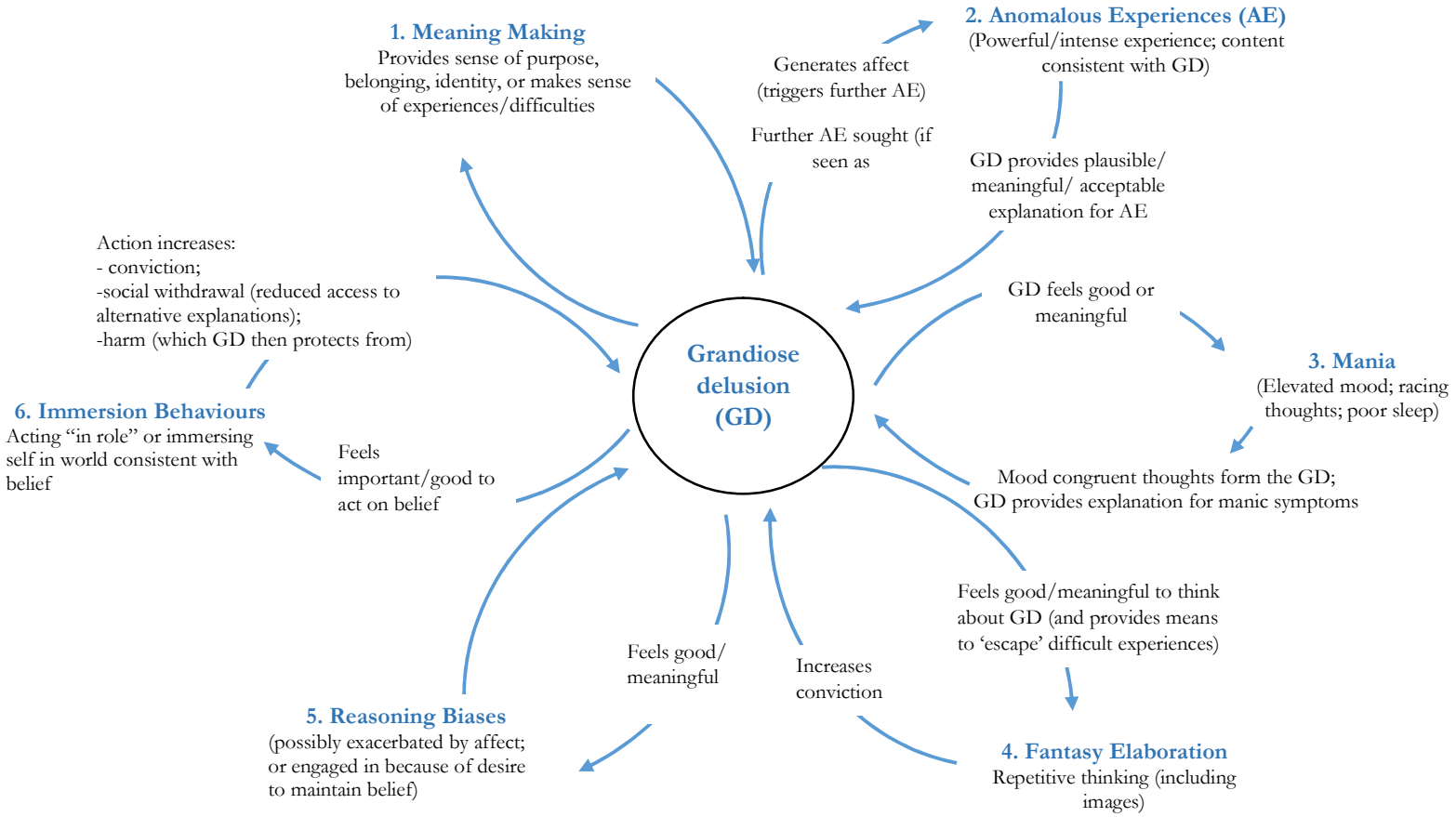
A number of potential maintenance factors were identified (see Figure 2.2). Foremost, the beliefs provide a sense of purpose, belonging, or positive identity, often in difficult circumstances, creating a motivation for belief retention. Second, grandiose beliefs offer a plausible explanation for anomalous experiences, which, in some cases, results in these experiences being actively sought. Third, a mood-elevating bi-directional relationship between symptoms of mania and grandiosity occurs for some patients. Fourth, 'fantasy elaboration' (which may incorporate positive rumination and daydreaming) appears to act in a way akin to that of worry in persecutory delusions (Freeman et al., 2015), whereby repetitively thinking about the belief (in verbal or imagery form) brings it to mind, elaborates details, and increases conviction. Fifth, reasoning biases are also prominent, consistent with evidence that they are heightened in grandiose delusions (Garety et al., 2012). Negative social feedback appears to be disregarded or interpreted in an overly positive manner, similar to findings in hypomania (Devlin et al., 2015; Mansell & Lam, 2006). Finally, immersive behaviour reinforces the belief. Memories for self-performed actions may be stronger compared to imagined actions (Engelkamp & Zimmer, 1989), so that 'being in role' may provide particularly accessible or compelling memories.

These findings from patient narratives are consistent with hypotheses considered by other researchers who have suggested that grandiose beliefs may compensate for negative self-beliefs (Beck & Rector, 2005; Ben-Zeev et al., 2011; Knowles et al., 2011; N. Smith et al., 2005), and be associated with anomalous experiences (Bortolon et al., 2019; Knowles et al., 2011), reasoning biases (Garety et al., 2012; Knowles et al., 2011), and repetitive, imagery-based thinking (Knowles et al., 2011). Further research empirically testing such hypotheses is clearly required.

The qualitative nature of the study enabled a hypothesised maintenance model for grandiose delusions to be generated, however there were some limitations. Obviously these findings are not representative and individuals with subclinical grandiosity or older adults were not included, nor were viewpoints elicited from other key groups (e.g., family members or mental health professionals). There are likely to be other maintenance factors that were not identified and the experiences of the research team (as clinical psychologists, qualitative methodologists, and those with personal experience of grandiose delusions) means that data were viewed through a particular lens. Further research investigating different populations and viewpoints would be of value.

Despite these limitations, such models have the potential to drive clinical interventions in the future, and there were several key implications from the participant narratives that should be considered. The level of harm evident highlights the need for a targeted treatment specifically for

Figure 2.2. Hypothesised maintenance model of grandiose delusions



NB: Not all maintenance factors were evident in all participants. As such it is suggested that no maintenance factor is either necessary or sufficient for the persistence of grandiose delusions, and idiosyncratic combinations of factors will be relevant to different individuals.

grandiose delusions. Patient recognition of some forms of harm indicates a possible route for engagement and participants were largely positive about the possibility of receiving psychological therapy. Any decision to intervene, however, should only be made after careful consideration of the meaning and associated benefits of the belief. Trying to alter the belief without first compensating for the benefit or function of the belief is likely to prove both difficult and potentially iatrogenic. Direct belief change may not always be the most advantageous option. If harm is limited to negative responses from others, addressing behavioural responses to the grandiose belief (e.g., discerning who can be talked to about the experiences) and taking steps to address stigma more broadly might be more appropriate.

Notably, grandiosity was not synonymous with high levels of superiority, arrogance, or entitlement. This is significant because 'grandiose' is often used as a derogatory term to indicate such traits. It may be that grandiose beliefs enhance self-esteem, but do not necessarily cause it to become excessively exaggerated. Alternatively, as suggested by one participant, such traits, when apparent, may be more closely connected to mania. Since actually having exceptional abilities or identity is not synonymous with viewing oneself as being inherently better than others, then superiority should not be assumed to occur in the context of grandiose delusions. Consequently, it is suggested that if this finding is replicated in future studies, grandiose delusions should be better termed: 'delusions of exceptionality'. This may be a more accurate reflection of the experience and, as such, a better way to think about administering care.

The findings from the current chapter are built upon in the next three chapters using cross-sectional data from two large non-clinical cohorts (n=8805, n=4518) and one clinical cohort (n=798). These chapters describe the development of measures of four potential drivers of grandiose delusions (the meaning in grandiose delusions, repetitive thinking about the grandiose belief, immersion behaviours, and daydreaming) as well as a measure of subjective harm from grandiose delusions. Key tests of association between grandiosity and each of these constructs are presented. Chapter 3 focuses on the first potential mechanisms to be examined – the meaning in grandiose delusions.

3. The meaning in grandiose delusions[2]

"Man's main concern is not to gain pleasure or to avoid pain but rather to see a meaning in his life. That is why man is even ready to suffer, on the condition, to be sure, that his suffering has meaning."

(Frankl, 2004)

3.1 Chapter abstract

Rationale

The qualitative study presented in Chapter 2 indicates that the content of grandiose delusions is likely to be highly meaningful. The meaning – for example, providing a sense of purpose – could prove a key factor in the belief taking hold. The current chapter builds on this finding. A series of three studies that aimed to empirically define and develop measures of the experience of meaning in grandiose beliefs and the sources of this meaning are presented. Data are reported on the relationship between meaning and grandiosity in clinical and non-clinical populations.

Methods

Three sequential cross-sectional self-report questionnaire studies were conducted with a total of 798 patients with psychosis (375 of whom had grandiose delusions) and 13,323 non-clinical adults. Factor analyses using data from participants scoring highly on grandiosity were used to form two scales: one assessing the experience of meaning in grandiose delusions (Grandiosity Meaning Measure; gram) and one assessing the sources of meaning (Grandiosity Meaning Measure – Sources; grams). Structural equation modelling was used to test the associations of meaning with the severity of grandiosity.

Results

The experience of meaning in relation to grandiose beliefs had three components: coherence, purpose, and significance. The sources of meaning had seven components: positive social perceptions, spirituality, overcoming adversity, confidence in self amongst others, greater good, supporting loved ones, and happiness. The measurement of meaning was invariant across clinical

[2] *This chapter is adapted from the paper: Isham, L., Loe, B.S., Hicks, A., Wilson, N., Bird, J.C., Bentall, R.P., & Freeman, D. (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. Lancet Psychiatry, 9, 792-803. This is provided in Appendix 6.*

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 conviction in the grandiose belief, explaining 27.4% of variance. Similar findings were found for the non-clinical population.

Conclusion

A framework is provided 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 belief is needed. Meaning is inherently tied to grandiose delusions, but there are likely other contributory mechanisms.

3.2 Introduction

The qualitative in-depth interviews with NHS patients with current or past experience of grandiose delusions summarised in Chapter 2 showed that whilst grandiose delusions can potentially cause harm across multiple life domains, such beliefs can also hold significant positive meaning for the individual. Participants' reflections indicated that grandiosity can provide a sense of purpose, belonging, or self-identity, or make sense of unusual or difficult events. 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."* 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. The meaning in grandiosity therefore requires understanding.

There has been little focused empirical research on grandiose delusions, and even less on their meaning. A literature search conducted using PubMed on April 4, 2022, with no date or language restrictions, and using the term ("grandios*" OR "grandeur" OR "expansiv*" OR "exceptional*") AND (delu* OR belief* OR idea*) AND (meaning* OR "content*" OR

"eudaimoni*" OR "hedoni*" OR "wellbeing") identified 196 papers. 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 to enable such work to be conducted.

A sensible assumption is that the types of meaning sought from grandiose delusions are those that people seek in general. Supportive of this assumption is that the descriptions of meaning reported in the qualitative study (Chapter 2) were similar to the concepts from the literature on meaning in life. Martela & Steger (2016) distinguish between the experience or sense of meaning in one's life and the sources of it. They argue for three constituent components of the experience 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 (Heintzelman & King, 2014; Park & George, 2013). 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 (Martela & Steger, 2016; Steger et al., 2013). 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 (Hicks et al., 2010; Macdonald et al., 2012; Morgan & Farsides, 2009; Reker, 1999; Reker & Wong, 2012; Ryff, 2014; Ryff & Keyes, 1995; Schnell, 2011; Wong, 1998). The concept of meaning in life has been applied to delusions more broadly (Ritunnano et al., 2022; Ritunnano & Bortolotti, 2021) but not examined specifically for grandiose delusions.

The aims of the studies presented in the current chapter were: to understand the meaning in grandiosity, to identify the sources of meaning in grandiosity, and to test the potential connection of meaning with grandiosity. As described in Chapter 1, delusions are viewed as representing one end of a spectrum of severity in the general population. The measures of meaning and its sources were therefore developed initially in two large non-clinical groups scoring highly on grandiosity and then tested in a clinical psychosis group. Finally, the hypothesis that greater levels of meaning are associated with higher levels of grandiosity was tested.

3.3 Method

3.3.1 Study design and participants

Three sequential cross-sectional self-report questionnaire studies were conducted. Studies 1 and 2 recruited non-clinical 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 using data from the first non-clinical cohort. 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 in the second non-clinical cohort. The measures were then administered to a clinical population in Study 3. Measurement invariance between the non-clinical and clinical groups was assessed, and the measures were then validated in the clinical sample. The measures were re-administered to a subgroup of participants from Studies 2 and 3 a week after baseline to assess test-retest reliability in the non-clinical and clinical groups. The extent to which the meaning in grandiose beliefs was associated with grandiose belief conviction and grandiosity in clinical and non-clinical groups was assessed using data from Studies 2 and 3.

Recruitment for Studies 1 and 2 was via Facebook advertisements and participant email contact lists from previous studies where consent to contact was given. Advertisements were titled 'Experience of Feeling Exceptional' and stated that the questionnaires were about 'experiences of feeling exceptional, special, or extraordinary' that could include 'special abilities, identity, power, or knowledge'. Advertisements and information sheets emphasised that participants did not need to have these experiences to participate.

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 (*Qualtrics*, 2019) which was accessible via desktop or mobile phone browsers. Study procedures were in line with professional guidelines for online studies (British Psychological Society, 2021). The landing pages showed the information sheet and consent form, and survey questionnaires were only displayed if all consent items were endorsed.

Study 3 was supported by the National Institute for Health and Care Research (NIHR) Clinical Research Network (CRN), and participants were recruited by the CRN clinical studies officers (CSOs) embedded in clinical teams of 39 NHS mental health providers across 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. CSOs approached potential participants meeting the

inclusion criteria, assessed capacity to consent, gained informed consent, and supported participants to complete the questionnaires. Support was provided either face-to-face or via video or telephone contact. Data were collected on paper or online via Qualtrics.

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).

3.3.2 Assessment measures

Grandiosity

The Specific Psychotic Experiences Questionnaire – Grandiosity Subscale (SPEQ-G) is a self-report measure of grandiosity with good psychometric properties (Ronald et al., 2014; see Appendix 3.1). Respondents indicate how much they agree with eight statements in relation to the past month, answering on a four-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 group (Study 2) was Cronbach's α of 0.72 and in the clinical group (Study 3) was α of 0.82. The SPEQ-G was used to identify participants scoring highly enough on the grandiosity continuum for administration of the meaning in grandiose delusions item pools. The test-retest subgroup was taken from these participants.

Meaning in Grandiose Delusions

Item Pool Development: Two item pools were developed to measure the meaning in grandiose beliefs: The Grandiosity Meaning Measure (gram), measuring the experience of meaning, and the Grandiosity Meaning Measure–Sources (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. First, data from the qualitative study (described in Chapter 2) were revisited to see whether the constructs of 'experience of meaning in life' (i.e., purpose, coherence, and significance) and 'sources of meaning' from the broader meaning in life literature were compatible with participants' descriptions of their experiences. There were descriptions indicating that the grandiose belief provided a sense of purpose (Fred: *"I thought… this strong feeling... there must be some purpose to it [..]. I am just waiting with curiosity for my existence to have meteoric purpose";* Bob: *"I would create my own reality where it's all playing towards a greater purpose"*). The belief also appeared to provide a sense of coherence, for example by making sense of experiences of suffering (Mandy: *"[God] says 'hang on in there […]. You suffer sometimes but suffering's for a reason'"*) or of anomalous experiences such as hearing voices (Kit: *"The actual powerful voice of God spoke to me and said 'Do it right this time'. I fell into a bush [..] like it came out of kind of sunlight clouds which was on the*

righthand side of me. And it was so powerful I fell over.") There were further indications that the belief provided a sense of significance, although this was often expressed in the context of a source of significance, rather than the feeling of significance itself. For example, people expressed a sense that they could contribute to the greater good (Mark: *"I am being useful to society"*), experience love and/or belonging (Mandy: *"I felt I was special. That's why* [God] *wanted to do that – to let me know he does care";* Stephen: *"I just feel part of a team"*); or lead an accomplished life (Max: *"It makes you feel like you become the person you've always wanted to be or better. [..] The teachers always said at school I'd got the potential to do really well, and the potential to be great, but that I don't push myself enough"*). This was further discussed with the patient advisory group. It was agreed that overall, there appeared to be a good fit between the participant narratives and the meaning in life constructs.

To develop items for the Grandiosity Meaning Measure (gram) and the Grandiosity Meaning Measure – Sources (grams), existing measures from the wider meaning in life literature were reviewed. These included: The Flourishing Scale (FS; Diener et al., 2010); Life Attitude Profile-Revised (LAP-R; Reker & Peacock, 1981); The Life Regard Index (LRI; Battista & Almond, 1973); The Mental Health Continuum long- and short-versions (MHC-LF, MHC-SF; Keyes, 1998; Ryff, 1989; Ryff & Keyes, 1995); The Meaningful Life Measure (MLM; Morgan & Farsides, 2009); Meaning in Life Questionnaire (MLQ; Steger et al., 2006); Orientation to Life Questionnaire (OLQ; Antonovsky, 1993); The Purpose in Life Test (PLT; Crumbaugh & Maholick, 1964); Personal Meaning Profile (PMP; Wong, 1998); The Psychological Wellbeing Scale long- and short-form versions (PW-LF, PW-SF; Ryff, 1989; Ryff & Keyes, 1995); Reasons for Living Scale (RLS; Linehan et al., 1983); and The Scale of Positive and Negative Experience (SPANE; Diener et al., 2010). In accordance with good practice guidelines (Boateng et al., 2018), a relatively inclusive approach was adopted in terms of adding items to the potential item list, and all items were initially included that could logically apply to grandiose delusions. This item list was then reviewed and refined. Where items were very similar in meaning, a single item was selected based on readability. Items were considered again in the context of the beliefs described by participants in the qualitative study (Chapter 2) as well as those reported elsewhere in the literature (e.g., N. Smith et al., 2005) to check that each item had face validity. Where specific aspects of the grandiose delusion meaning (as reported by participants in the qualitative study) had not been captured, additional items were generated. For example, an aspect of participant experience not explicitly captured in the broader meaning in life scales was the meaningfulness of the grandiose belief in relation to negative circumstances and so appropriate items were generated (e.g., *"I have experienced much sadness in my life, but my special abilities/identity/mission/wealth has made this easier to bear"*).

Items were generated by the author and reviewed by a panel of experts comprising two members of a patient advisory group with lived experience of grandiose delusions and five clinical research psychologists specialising in psychosis and familiar with clinical presentations of grandiose delusions and measure development. The feedback from this group was that the items captured well the experience of meaning in relation to grandiose delusions. Where some items were indicated as repetitive or where language could be simplified for readability, amendments were made. This resulted in the preliminary item pool used in Study 1 (see Appendices 3.2 and 3.3).

Items for the Grandiosity Meaning Measure (gram) were generated to assess coherence, significance, and purpose specifically. Given the lack of consensus in the meaning in life literature regarding sources however, a broader approach was adopted for the Grandiosity Meaning Measure – Sources (grams). Thus, at the start of Study 1 a diverse range of items were included in the grams that were potentially relevant to grandiose delusion meaning, but there was no specific *a priori* hypotheses regarding potential factor structure. The two-phase approach across Studies 1 and 2 meant possible solutions could be explored and hypotheses generated regarding potential dimensions in Study 1, and then the measure could be refined accordingly, ready to test these in Study 2. At the end of Study 1 therefore, revised item pools (25-item gram and 80-item grams, see Appendices 3.4 and 3.5) were developed in line with emerging hypotheses regarding potential factors and administered to Study 2 participants. Study 2 analyses yielded a final version of the measures (17-item gram and 37-item grams; see Appendix 1.1) which were administered to the clinical cohort in Study 3.

Grandiosity Meaning Measures – administration: Participants were given the SPEQ-G, and the gram and grams were only administered if the participant scored ≥7 on the SPEQ-G in Study 1, or ≥5 in Studies 2 or 3. These cut-offs indicated the top 10th and 15th percentile scores on the SPEQ-G in a non-clinical sample, n=6941 (Černis et al., 2021). Those scoring above threshold were then asked to write a brief description of their specific experience of having exceptional abilities/identity/mission/wealth (e.g., "*I have superior intelligence to others"*; *"I am on a special mission from God to save the world"*; "*I have abilities to predict the future"*). This elicited the specific grandiose belief. In Studies 2 and 3 participants also rated their current conviction in this belief on a 0-100% scale. Instructions specified that participants should answer the subsequent gram and grams items in relation to their recorded belief. Items were prefaced by a statement reminding participants to answer in relation to their grandiose belief rather than more broadly (e.g., "*Knowing that I have these exceptional abilities/identity/mission/wealth helps me…"* or "*Having these exceptional abilities/identity/mission/wealth…*").

Additional Measures: Participants in all three studies completed additional measures so that tests of association between grandiosity severity and other putative causal mechanisms predicted by the theoretical model outlined in Chapter 2 could be tested. Analyses relating to some of this data is reported in Chapters 3 to 5 of the thesis, however there is further planned analysis, beyond the scope of the DPhil, which will be completed at a later stage. For transparency, a list of all measures included within the non-clinical and clinical studies is provided in Appendix 3.2.

3.3.3 Statistical analysis

Analyses were conducted in R version 4.0.3–4.2.1 (R Core Team, 2021) with packages psych version 2.0.9–2.2.5 (Revelle, 2020) and lavaan version 0.6–11 (Rosseel, 2012).

Data cleaning

Before commencing analysis, data were checked and cleaned to improve the quality of the data used in the analysis phase. In the non-clinical studies, participants were removed at the cleaning stage if they: i) did not meet the inclusion criteria, ii) had not provided enough usable data, iii) completed the baseline questionnaires multiple times, and iv) completed the measures too quickly for the number of questions answered or took longer than 24 hours (indicating possible poor engagement in the process). In the clinical study, however, participants were not removed on the basis of completion time (all clinical participants were supported by a clinical studies officer both during the consent process and during the data collection, and thus there were fewer concerns regarding poor quality data).

Assessing the feasibility of factor recovery based on the observed dataset.

Before factor analysis, Bartlett's Test of Sphericity (Bartlett, 1954) and the Kaiser-Meyer Olkin Measure of Sampling Adequacy (KMO; Kaiser, 1974) were used to check the feasibility of factor recovery based on the observed dataset. Bartlett's test evaluates the null hypothesis that the correlation matrix is the identity matrix (i.e., variables are unrelated and hence unsuitable for factor analysis) and a significant value indicates that factor analysis may be suitable. KMO assesses the adequacy of the sample size for factor analysis, with values >0.8 indicating adequate sampling (Shrestha, 2021).

Parallel analysis

Parallel analysis based on polychoric correlations (assuming ordinal data) was used to identify the number of factors to retain. Retention of factors was based on comparisons between the eigenvalues of the observed data and random data (Ruscio & Roche, 2012).

Exploratory and confirmatory factor analysis

In Study 1, exploratory factor analysis (EFA) 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 (CFA) in the second subsample. The factor structure was validated in the clinical group (Study 3) using CFA.

In both Studies 1 and 2, items were removed prior to EFA if there was multicollinearity between items (correlation coefficient of >0.9). Poor-fit criteria used to determine which items to remove during EFA included weak factor loading (<0.3), low communalities (<0.3), cross-loading (<0.2) onto multiple factors, and poor theoretical fit with factors (Boateng et al., 2018). Items were also removed from the final item bank if there was consensus agreement between the research team that items were very similar in meaning.

To judge the fit of the measurement model during CFA, the comparative fit index (CFI), the Tucker-Lewis index (TLI), the standardised root mean square residual (SRMR) and the root mean square error of approximation (RMSEA) were used. Thresholds were: for acceptable fit - CFI and TLI >0.9 (Kline, 2005) and SRMR and RMSEA <0.08 (Hu & Bentler, 1999; MacCallum et al., 1996); for good fit - CFI and TLI >0.95, SRMR<0.08, and RMSEA <0.06 (Hu & Bentler, 1999).

In Studies 1 and 2 the exploratory factor analyses were conducted using polychoric correlations, oblique rotation, and the maximum likelihood estimator. In Studies 2 and 3 confirmatory factor analyses used the weighted least square mean and variance adjusted estimator (wlsmv). These specifications were selected as data were assumed to be ordinal in nature (T. Brown, 2006).

Assessing the psychometric properties of the gram and grams

The psychometric properties of the scales were assessed using ordinal alpha to determine internal consistency and intraclass correlations for one-week test-retest reliability (following recommendations by Gadermann et al., 2012 and Zumbo et al., 2007). To determine whether levels of internal consistency and test-retest reliability were acceptable, guidelines by Cicchetti (1994) were adopted. These state that for internal consistency, when the size of coefficient alpha is below 0.70 the internal consistency is unacceptable, when it is between 0.70 and 0.79 it is fair; when it is between 0.80 and 0.89 it is good; and when it is 0.90 and above it is excellent. For test-retest reliability (measured by intra-class correlation, ICC) the guidelines state that when the ICC

coefficient is below 0.40 the reliability is poor, between 0.40 and 0.59 it is fair, between 0.60 and 0.74 it is good, and between 0.75 and 1.00 it is excellent.

Assessing measurement invariance

To evaluate the validity of the measurement model in a clinical population, measurement invariance analysis was conducted using data from non-clinical (Study 2) and clinical (Study 3) groups. Measurement invariance was assessed using the following consecutive steps recommended for categorical data (Svetina & Rutkowski, 2020; Wu & Estabrook, 2016): i) configural invariance test (equivalent specification of factor invariance); ii) threshold invariance tests (invariant thresholds); iii) metric invariance tests (invariant thresholds and factor loadings); and iv) strong/scalar invariance test (invariant thresholds, factor loadings, and intercepts). At the scalar invariance level, the item factor loadings, item thresholds, and item intercepts are constrained in tandem, but the factor means are allowed to vary. Measurement invariance achieved at the scalar level indicates that the factor scores are not influenced by group differences on the items and that latent mean differences capture all observed mean differences in the shared variance of the items (Putnick et al., 2016). Thus, factor scores between groups are comparable only if the scalar invariant condition is met. To determine whether measurement invariance has been achieved at a specific level, changes in CFI (ΔCFI), RMSEA (ΔRMSEA), and SRMR (ΔSRMR) between model fit at that level and the preceding one are considered. Thresholds recommended by Svetina and Rutkowksi (2017) (ΔRMSEA=0.05 at metric level, and ΔRMSEA=0.01 and ΔCFI=-0.002 at scalar level) were adopted as these were developed for categorical data, with more than one factor, and for uneven sample sizes between groups. It is noted however that these criteria were developed specifically for when making a large number of group comparisons (10 to 20 groups) whereas in the present study there were only two groups (non-clinical and clinical cohorts). As such the thresholds are likely to be overly conservative and will be considered with some flexibility.

Tests of association

Finally, using data from Studies 2 and 3, the extent to which the sources of meaning were associated with the experience of meaning in relation to 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 were assessed. Pairwise associations were explored with Pearson's correlations using factor scores for the latent variables and raw scores for grandiosity and grandiose belief conviction. Structural equation modelling delivered final prediction models incorporating multiple predictors. Stepwise backward elimination was used to remove non-significant predictors. Predictors with negative coefficients (against the expected direction of

effect and direction demonstrated in the correlation) were further removed to address possible suppressor effects (R. L. Smith et al., 1992). 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.

3.4 Results

The recruitment windows for each study were: 30th August to 10th November 2019 for Study 1; 28th August to 21st November 2020 for Study 2; and 22nd March 2021 to 3rd March 2022 for Study 3. After data cleaning, the studies recruited 8805, 4518, and 798 participants respectively. Table 3.1 shows a summary of the reasons for participant removal during data cleaning for each study. The socio-demographic information for the participants with high grandiosity who provided complete item pool data and whose data were therefore used in the measure development analyses are shown in Table 3.2. Socio-demographic information for the full sample is provided in Appendix 3.7.

Table 3.1 Summary of participant removal during data cleaning

	Study 1	**Study 2**	**Study 3**
Number of initial responses recorded	12207	6935	805
Number removed for:			
- Not meeting inclusion criteria	50	0	0
- Incomplete consent items	764	548	0
- Not providing enough usable data	2458	1764	1
- Taking >24 hours to complete the survey *	50	35	NAP
- Responding too quickly (high likelihood of 'false' data)*	2	0	NAP
- Completing the baseline measures on multiple occasions	78	69	0
- Answers indicating the likelihood of false data (long strings of repeat responses).	0	1	0
- Withdrawal of consent	0	0	6
Remaining sample size after cleaning data.	8805	4518	798

**For the non-clinical participants (i.e. studies 1 and 2), cut off times were established for each measure (i.e. how quickly the measure could legitimately be completed) and then the time taken by the participant was compared to the total of these cut-off times for the measures that were completed. However clinical participants in study 3 were not removed on the basis of completion time as they were supported in completing questionnaires by a clinical studies officer so there were fewer concerns about data quality, and it was deemed reasonable for clinical participants to take longer to complete the full battery of measures).*

3.4.1 The meaning of grandiosity in the non-clinical population

Grandiosity Meaning Measure

Study 1: Bartlett's test of sphericity and the KMO test indicated that factor analysis was appropriate ($\chi^2(325)=36346{\cdot}11$, $p<0{\cdot}0001$, KMO=0·95). Parallel analysis showed that two-factor and three-factor solutions appeared viable, but the three-factor solution was identified as the most appropriate model from a theoretical and empirical perspective. The factors mapped directly onto the experience of meaning in life constructs of coherence, significance, and purpose, and the between-factor correlation coefficients indicated these as related but not synonymous constructs (coherence and significance, r=0.36; coherence and purpose, r=0.31; significance and purpose, r=0.70). Following the criteria for item removal, EFA led to retention of 22 of the 26 items (Table 3.3 provides factor loadings).

These 22 items and three additional items constituted the revised item pool for Study 2. Of the 22 items retained from Study 1, 18 were included in identical form. The other four had minor revisions made to wording to ensure optimum clarity (e.g., "…*have a clear understanding of the meaning of life"* was reworded to *"…have a clear understanding of the meaning of my life"* to better capture the theoretical definition of coherence). Two items that were originally intended to assess 'purpose', but were removed during EFA for cross-loading with 'significance', were reviewed. These were substantively revised to make the 'future' aspect more explicit and re-added to the item pool (e.g., *"…has given me a purpose and direction in life"* was changed to *"…gives me a purpose for the future"*). One additional item was also added *("…gives me a reason to keep going")* yielding a revised item pool of 25 items for Study 2 (see Appendix 3.5).

Study 2: Bartlett's test of sphericity and the KMO test indicated factor analysis to be appropriate for the first subsample (n=788, robust-$\chi^2(300)=18919{\cdot}24$, $p<0{\cdot}0001$, 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 (Table 3.4 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 (robust-$\chi^2(167)=938{\cdot}08$, CFI=0·97, TLI=0·97, RMSEA=0·077, SRMR=0·049). To shorten the item bank and improve the model fit, post-hoc

Table 3.2. Socio-demographic data and descriptive statistics for participants included in the measure development analyses

		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						
Mean(SD)		32.9 (16.2)	39.7(18.5)	44.2 (19.2)	41.5(13.0)	41.4(12.8)
Range (years)		18-90	18-89	18-82	16-78	16-72
Gender	Female	1416 (76.5)	909 (57.6)	63 (26.8)	135 (37.8)	39 (36.4)
n (%)	Male	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/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)
n (%)	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/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)
n (%)	Cohabiting	267 (14.4)	194 (12.3)	22 (9.4)	18 (5.0)	7 (6.5)
	Married/civil partnership	376 (20.3)	461 (29.2)	87 (37.0)	32 (9.0)	6 (5.6)
	Separated/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 FT	457 (24.7)	409 (25.9)	58 (24.7)	31 (8.7)	11 (10.3)
n (%)	Employed PT	252 (13.6)	178 (11.3)	31 (13.2)	25 (7.0)	4 (3.7)
	Housewife/husband	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						
Mean (SD)		10.6 (3.4)	9.0 (3.9)	8.6 (3.7)	11.6 (5.3)	12.1 (5.5)
Range		7-24	5 -24	5-22	5-24	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)	-	-
n (%)	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)	-	-
n (%)	Prefer not to say	35 (3.0)	22 (2.6)	3 (2.2)		
Diagnosis	Schizophrenia				123 (34.5)	39 (36.4)
n (%)	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 NOS	-	-	-	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
MH service recruited from	Inpatient unit				92 (25.8)	21 (19.6)
	Forensic inpatient				16 (4.5)	8 (7.5)
n (%)	EIP service	-	-	-	56 (15.7)	19 (17.8)
	Adult CMHT				178 (49.9)	54 (50.5)
	Forensic adult CMHT				1 (0.2)	1 (0.9)
	Other				14 (3.9)	4 (3.7)

* The socio-demographic information presented here is for the participants whose data were used in factor analyses for the gram and/or the grams. In Study 1, 458 participants provided complete gram data only; 1386 participants provided complete gram and grams data, and 7 gave complete grams data only. In Study 2, 189 participants provided complete gram data only; 1577 provided complete gram and grams data. In Study 3, 24 participants provided complete gram data only, 324 provided complete gram and grams data, and 9 provided complete grams data only. For the test-retest analyses, in Study 2, 223 participants provided complete gram and grams test-retest data, and an additional 12 provided data for the gram only. In Study 3, 96 participants provided complete gram and grams test-retest data, 7 provided gram data only, and 4 provided grams data only.

Table 3.3. Factor loadings for the Grandiosity Meaning Measure (gram) after exploratory factor analysis (Study 1)

		Factor loadings*			Communalities
Item		Significance	Coherence	Purpose	(h2)
Item 15	…makes my life significant.	0.89			0.78
Item 10	…means that my life is important.	0.88			0.62
Item 11	…makes my life meaningful.	0.86			0.73
Item 17	…makes my life worthwhile.	0.78			0.79
Item 13	…gives me a reason to live.	0.73			0.71
Item 20	…means that I can hold my life in high regard.	0.68			0.65
Item 25	…means that I really value my life.	0.63			0.58
Item 22	…makes living deeply fulfilling.	0.57			0.63
Item 9	…understand why upsetting things have happened.		0.77		0.56
Item 2	…understand why particular events have happened in my life.		0.74		0.58
Item 5	…make sense of some odd, strange, or unusual experiences that I have had.		0.73		0.5
Item 6	…feel less confused about the things that happen around me.		0.73		0.57
Item 1	…make sense of what is going on in the world.		0.62		0.43
Item 3	…predict what will happen in certain circumstances.		0.62		0.34
Item 8	…understand why people behave towards me as they do.		0.61		0.38
Item 4	…see how my life fits together into a bigger picture or pattern.		0.58		0.51
Item 7	…have a clear understanding of the meaning of life.		0.47		0.42
Item 26	…gives me very clear goals.			0.89	0.78
Item 16	…means that I know where my life is going in the future.			0.78	0.67
Item 21	…means that I have a much better idea of what I want to do in my life than others do.			0.72	0.58
Item 12	…means that I have future plans that I am looking forward to.			0.58	0.62
Item 19	…gives me something I can be really committed to.			0.56	0.67

* factor loadings >0.4 are shown.; NB: When presented to participants, items 1 to 9 were prefaced with the statement *"Knowing that I have these exceptional abilities/identity/mission/wealth helps me…"* and items 10-26 were prefaced with the statement *"Having these exceptional abilities/identity/mission/wealth…"*

analyses were conducted evaluating the model adequacy based on the modification index (Freeman, Lambe, et al., 2021 provide a detailed description of this method). This produced the final 17-item, three-factor model, which fitted the data well (robust-$\chi^2(116)=401{\cdot}86$, CFI=0·99, TLI=0·99, RMSEA=0·056, SRMR=0·035). The pattern of factor correlations supported a meaning-in-life 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. Figure 3.1 shows the final model with factor loadings (see also Appendix 3.8). The correlations between factor scores and corresponding raw scores were very strong (see Appendix 3.9).

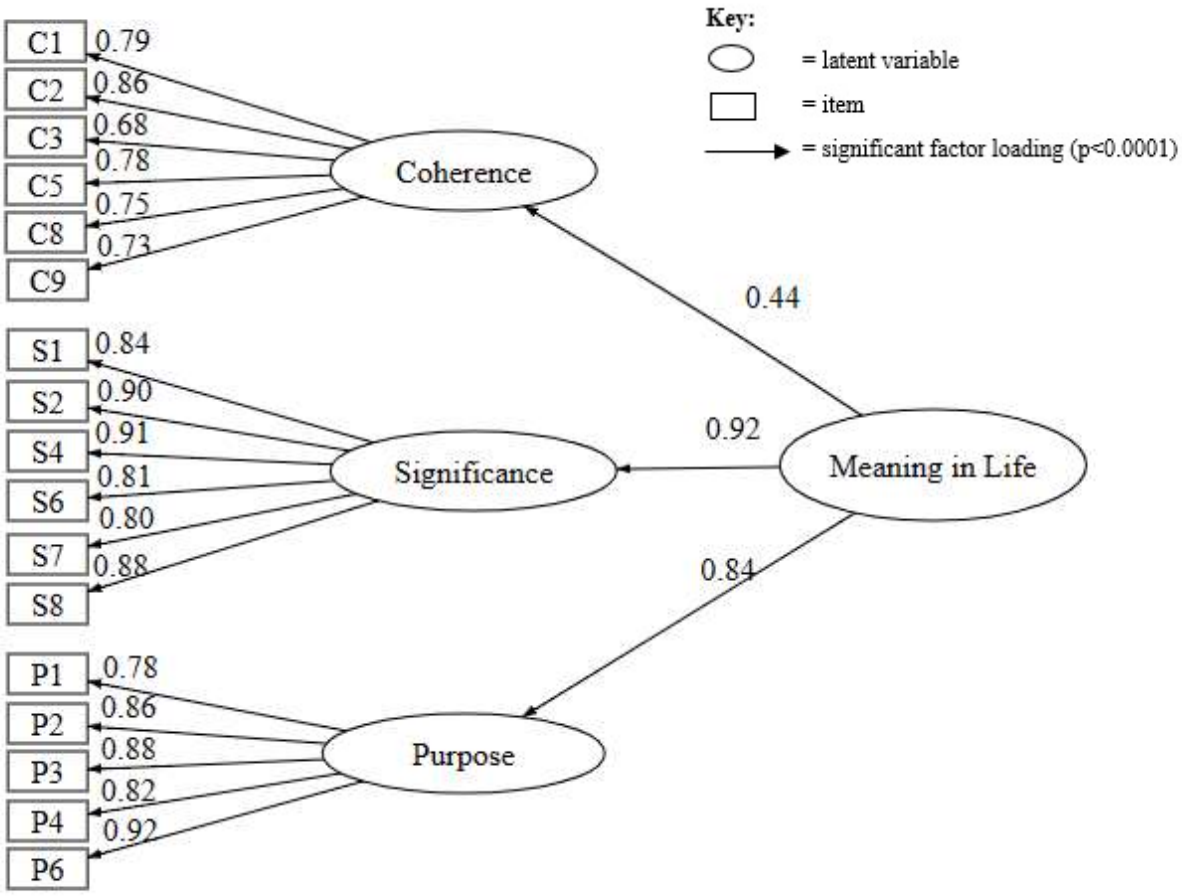
The Grandiosity Meaning Measure had good psychometric properties with strong internal consistency (ordinal α 0·89–0·94; see Appendix 3.10). A total of 235 participants provided follow-up data within 7-10 days (mean=7·56, SD=0·81) and the intraclass correlation coefficient of 0·82 indicated that the Grandiosity Meaning Measure had excellent test-retest reliability.

Table 3.4. Factor loadings for the Grandiosity Meaning Measure (gram) after exploratory factor analysis (Study 2)

Item		Factor loadings*			Communalities
		Significance	Coherence	Purpose	(h2)
C1	…helps me to make sense of what is going on in the world.		0.76		0.62
C2	…helps me to understand why particular events have happened in my life.		0.79		0.62
C3	…helps me to predict what will happen in certain circumstances.		0.66		0.44
C4	…helps me to see how my life fits together into a bigger picture or pattern.		0.55		0.56
C5	…helps me to make sense of odd, strange, or unusual experiences that I have had.		0.69		0.54
C6	…helps me to feel less confused about the things that happen around me.		0.79		0.66
C8	…helps me to understand why people behave towards me as they do.		0.78		0.58
C9	…helps me to understand why upsetting things have happened.		0.78		0.61
S1	…means that my life is important.	0.91			0.76
S2	…makes my life meaningful.	0.80			0.75
S4	…makes my life worthwhile.	0.85			0.82
S5	…means that I can hold my life in high regard.	0.69			0.59
S6	…makes living deeply fulfilling.	0.71			0.66
S7	…means that I really value my life.	0.88			0.71
S8	… gives me a reason to live.	0.80			0.73
P1	…means that I have future plans that I am looking forward to.			0.63	0.52
P2	…means that I know where my life is going in the future.			0.87	0.75
P3	…gives me something I can be really committed to in the future.			0.73	0.71
P4	…means that I have a much better idea of what I want to do in my life than others do.			0.83	0.68
P6	... gives me a clear direction to follow in life.			0.84	0.81

* Factor loadings >0.4 are shown. Items were labelled according to experience of meaning factor they were anticipated to represent (C = coherence, S = significance, P = purpose). When presented to participants, coherence items were prefaced with "*Knowing that I have these exceptional abilities/identity/job/ mission/wealth…"* and all other items were prefaced with *"Having these exceptional abilities/identity/job/mission/wealth…"*

Figure 3.1. The Grandiosity Meaning Measure (gram) final 17-item higher order factor model



Grandiosity Meaning Measure – Sources

Study 1: Bartlett's test of sphericity and the KMO test indicated that factor analysis was appropriate ($\chi^2(2485)=85027{\cdot}34$, $p<0.0001$, 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. In the six-factor solution (explaining 57% of the variance), items loaded onto factors which could be summarised as: i) greater good (e.g., "*[the grandiose belief]…means I have something important to contribute to society"*; ii) positive relationships (e.g., "*…means I have someone who loves me"*; "*...means I am trusted by others")*; iii) compensating for difficulties (e.g., *"I have experienced much anxiety and fear in my life, but my special abilities/identity/mission/wealth has made this easier to bear*"; iv) spirituality (e.g., *"… has given me a*

special relationship with God"; "….means I am not concerned about death"); v) confidence in self amongst others *(e.g., "… gives me the confidence in my opinions even if they are different to the opinions of other people"*); and vi) happiness (e.g., *"… makes me feel happy"; "…has led me to accomplish things which I feel good about").*

The higher number of factor solutions indicated that there may be additional dimensions of interest. For example, in the eight- to 13-factor solutions, the 'positive relationships' items appeared to split into two factors – 'close relationships with loved ones' (e.g., *"I can make the people I love happy"; "I have someone who loves me")* and 'positive social perceptions' (how the person perceived they are seen by others e.g., "…*I am liked by others"; "…others respect me"*). In the 10- to 13-factor solutions, the 'compensating' items split with an additional potential factor, 'overcoming adversity', emerging (e.g., "…*has helped me to adjust and cope with my problems"*; "…*has allowed me to be at peace with my past"*). Several of these potential factors, whilst theoretically compelling, had insufficient items at this stage to be able to determine whether they were 'true' factors or spurious results. The item pool was revised therefore to include sufficient items to represent eight potential factors to be tested in Study 2 (see Appendix 3.6). These were: i) greater good; ii) close relationships with loved ones; iii) positive social perceptions; iv) compensation for difficulties; v) overcoming adversity, vi) spirituality; vii) confidence in self amongst others, and viii) happiness**.**

Study 2: Prior to EFA, inspection of the correlation matrix in the first subsample (n=830) led to the removal of six items due to multicollinearity. Bartlett's test of sphericity and KMO tests indicated factor analysis to be appropriate ($\chi^2(2701)=57471.34$, $p<0.0001$, KMO 0.96). Parallel analysis suggested a seven-, eight-, or nine-factor solution. In both the eight- and nine-factor solutions, items split off to form additional spurious factors that did not make sense from a theoretical perspective. Thus, a seven-factor solution was determined to be the most appropriate. These factors were predominantly as predicted except that items developed for 'compensation' and 'overcoming adversity' loaded onto a single factor, and the final 'close relationships with loved ones' had a more specific focus than initially conceptualised and so was renamed as 'supporting loved ones'. The seven final factors therefore were: i) greater good, ii) supporting loved ones, iii) positive social perceptions, iv) overcoming adversity, v) spirituality, vi) confidence in self amongst others, and vii) happiness. EFA led to the removal of a further 28 items resulting in a 46-item, seven-factor model explaining 60% of the variance (Table 3.5 provides factor loadings).

Table 3.5. Factor loadings for the Grandiosity Meaning Measure – Sources (grams) after exploratory factor analysis (Study 2)

		Standardised Factor loadings*							Communalities
Items	***Having these exceptional abilities/identity/job/ mission/wealth…***	**Positive social perception**	**Spirituality**	**Overcoming adversity**	**Confidence in self amongst others**	**Greater good**	**Supporting loved ones**	**Happiness**	**h2**
PSP6	…means that others see me as successful.	0.79							0.72
PSP5	…means that others find me interesting.	0.78							0.63
PSP4	…means that others see me as talented.	0.72							0.55
PSP3	…means that others see me as powerful.	0.71							0.57
PSP2	…means that others respect me.	0.70							0.66
H10	…makes me attractive.	0.65							0.45
PSP1	… means that I am liked by others.	0.56							0.51
PSP8	…means that others see me as brave.	0.54							0.61
PSP9	…means that other see me as a good person.	0.42							0.56
Sp3	…has given me a personal relationship with God..		0.93						0.86
Sp4	…means that I have a special religious mission to carry out.		0.92						0.92
Sp1	…has made me sure that there is an afterlife.		0.89						0.78
Sp6	…has made me a more spiritual person.		0.77						0.67
Sp8	…has prevented the Devil's work.		0.71						0.69
Sp9	…has helped me to stop evil forces.		0.57						0.57
O6	…has made it easier to bear much sadness.			0.75					0.62
O9	…has helped me cope with the anxiety and fear that I have experienced in my life.			0.75					0.64
O2	…has enabled me to cope with my problems.			0.65					0.68
Co5	…helps me feel better about the things that I don't have in life.			0.62					0.58
O3	…has allowed me to be at peace with my past.			0.57					0.57
Co6	…makes it easier to cope with the fact that my relationships with others are not as I would like them to be.			0.57					0.43
O8	…has allowed me to deal with difficulties in my life.			0.54					0.60
Sp13	…helps me feel less sad or anxious about the death of loved ones.			0.52					0.43
Co1	…helps me to feel better about the fact that I have not experienced many warm or trusting relationships.			0.51					0.33
Co2	…makes up for not having achieved as much as I would have liked in my job/career/professional role.			0.46					0.32
Co3	…helps me to feel better about the fact that I have not experienced many warm or trusting relationships.			0.45					0.36
CSO4	…gives me confidence in my opinions even if they are different to the opinions of other people				0.76				0.70
CSO3	…gives me confidence to make my own decisions without being influenced by what everyone else is doing.				0.75				0.66
CSO8	…makes me feel confident to do what I think is right, even if others don't agree.				0.71				0.71
CSO5	…gives me the confidence to stand up for myself.				0.63				0.68

Table 3.5. cont.

		Standardised Factor loadings*							Communalities
Items	***Having these exceptional abilities/identity/job/ mission/wealth…***	**Positive social perception**	**Spirituality**	**Overcoming adversity**	**Confidence in self amongst others**	**Greater good**	**Supporting loved ones**	**Happiness**	**h2**
O4	…has meant that I can find solutions to my problems.				0.51				0.65
GG3	…means that I am dedicating my life to a worthwhile cause.					0.75			0.70
GG2	…gives me a mission in life.					0.67			0.71
GG5	…means that I have something valuable to give to the world.					0.63			0.66
GG6	…means that I can leave behind something good when I'm gone.					0.58			0.58
GG8	…means I am destined to accomplish something important.					0.49			0.53
Sp11	… has meant that I can help to keep the world balanced towards good.					0.48			0.50
L9	…means that I can make the people I love happy.						0.77		0.68
L7	…means that I can support those I care about.						0.71		0.68
L4	…has led to me finding someone who looks out for and protects me.						0.52		0.40
L6	…means that I can protect my loved ones from harm.						0.51		0.64
L1	… has led to me finding someone who loves me.						0.48		0.39
H2	…makes me feel happy.							0.64	0.70
H5	…makes me feel energised.							0.49	0.57
H13	…has helped me to feel confident about myself.							0.48	0.58
H3	…makes me feel excited.							0.43	0.57

*Factor loadings >0.4 are shown.

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 (robust-χ^2 (968)=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 (robust-χ^2(608)=1582·24, CFI=0·95, TLI=0·95, RMSEA=0·054, SRMR=0·057). Figure 3.2 shows the final model and factor loadings (additional details are provided in Appendix 3.11). The correlations between factor scores and corresponding raw scores were very strong (see Appendix 3.9).

The Grandiosity Meaning Measure - Sources had good psychometric properties with strong internal consistency for each factor (ordinal α 0·81-0·93). A total of 223 participants provided follow-up data within 7-10 days (mean=7·56, SD=0·81). Test-retest reliability coefficients were excellent with intraclass correlations ranging from 0.77 to 0.89. Appendix 3.10 provides full details.

3.4.2 Assessing the meaning of grandiosity in a clinical population

Grandiosity Meaning Measure (gram)

Endorsement of items: To summarise frequency of endorsement, item responses were dichotomised as 'not endorsed' or 'endorsed' (see Table 3.6; Appendix 3.12 shows non-dichotomised responses) Participants endorsed on average 12 out of the 17 items of the gram (mean=12.36, SD=4.58) and all items were more commonly endorsed than not (item endorsement rates ranged from 64.1% to 78.4%). The most commonly 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"*. A total of 241 (69.3%) participants endorsed "...*gives me a reason to live."*

Measure validation: In the clinical validation sample (n=348), the CFA model indicated that the 17-item final higher order model from Study 2 had good fit indices: CFI=0.96; TLI=0.96.; RMSEA=0.090; SRMR=0.055. Although the RMSEA was above threshold, RMSEA is not suited for the wlsmv estimator, with SRMR considered a better fit index for categorical data (Shi, Maydeu-Olivares, et al., 2019; Xia & Yang, 2019) . As such the gram was considered to have good fit (Appendix 3.11 provides factor loadings). Associations between factor scores and corresponding raw scores were strong (see Appendix 3.9). The gram had good psychometric properties (Appendix 3.10 provides full details). Internal consistencies for each factor were strong (ordinal alphas 0.88-0.95). A total of 103 participants provided complete follow-up data 3

Figure 3.2. The Grandiosity Meaning Measure-Sources (grams) final 37-item correlated-factor model

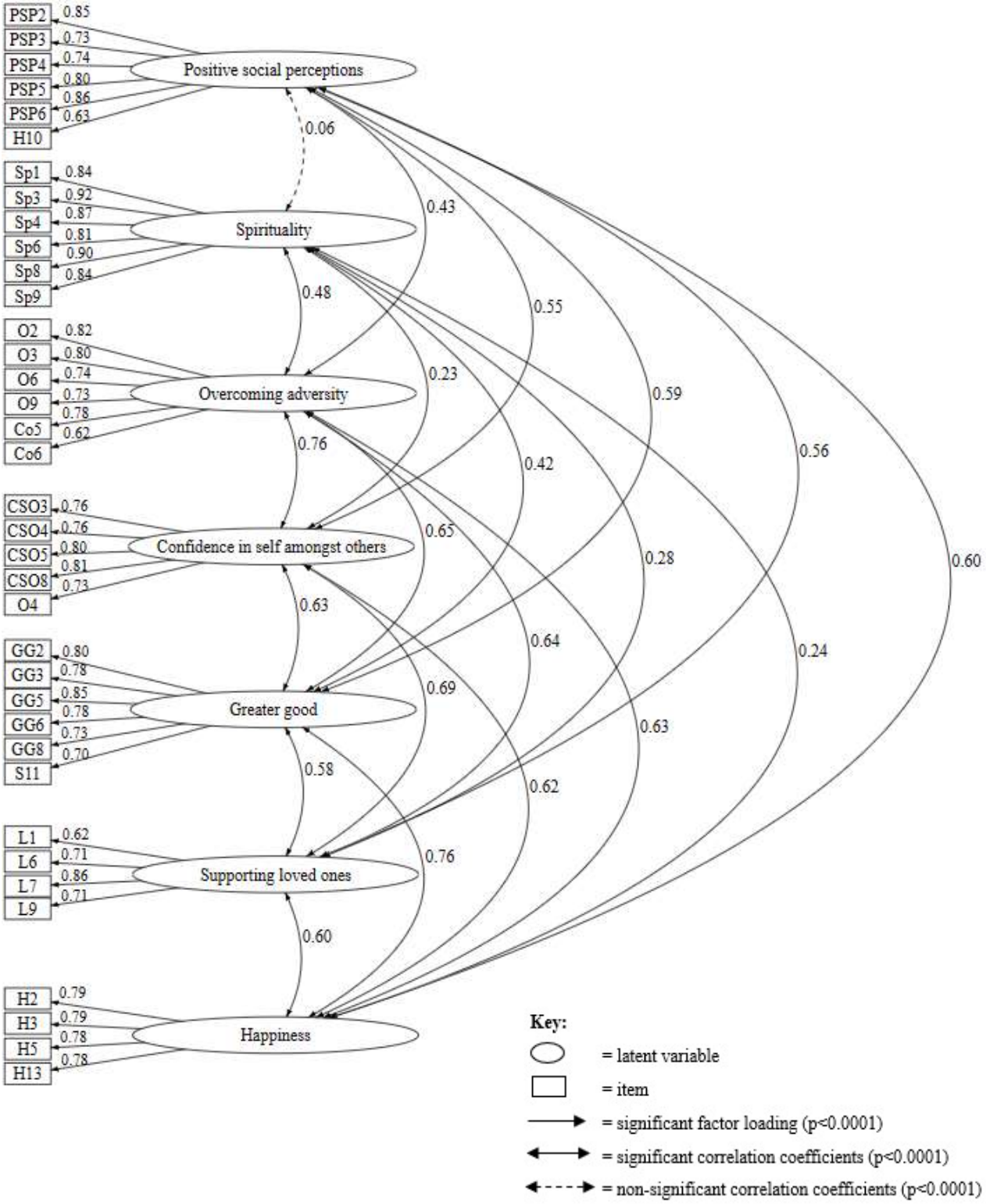


Table 3.6. Frequencies of endorsement for Grandiosity Meaning Measure (gram) items within the clinical group (Study 3, n=348)

Factor	Item	Item content*	Endorsement level** 0	1
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%)

*Items are preceded with either *"Knowing that I have these exceptional abilities/identity/job/mission/wealth…"* or *"Having these exceptional abilities/identity/job/mission/wealth…."*. ** Items were answered on a 0 to 4 scale from 0=do not agree to 4=agree totally. Responses were recoded into 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.

to 10 days after baseline (mean=7.30, SD=1.41) and test-retest reliability was excellent (ICC =0.82).

Measurement invariance: Four levels of measurement invariance were tested between the clinical (n=324) and non-clinical (n=1386) groups. Measurement invariance was achieved at the strongest scalar level (see Table 3.7). This means that whilst the gram was initially developed in a non-clinical group, it can be used within a clinical population. It also indicates that latent factor scores can be meaningfully compared between these populations. To do this the latent factor means of the non-clinical group were set to zero (the reference group) and the others were allowed to be freely estimated. For all three experience of meaning factors, the clinical group had significantly larger factor means than the non-clinical group (see Table 3.8).

Table 3.7. Model comparison to determine measurement invariance for the Grandiosity Meaning Measure (gram)

Models	Model Comparison	K	χ2	DF	RMSEA	SRMR	CFI
Configural	-	176	1108.27	232	0.067	0.040	0.982
Weak - Threshold	Threshold vs Configural	210	1197.64	266	0.064 (Δ = -0.003)	0.040 (Δ = 0.000)	0.981 (Δ =-0.001)
Weak - Metric	Metric vs Threshold	213	1217.03	280	0.063 (Δ = -0.001)	0.040 (Δ = 0.000)	0.981 (Δ = 0.000)
Strong - Scalar	Scalar vs Metric	199	1240.97	294	0.061 (Δ = -0.002)	0.040 (Δ = 0.000)	0.981 (Δ = 0.000)

K = no. of parameters; χ2 = Chi-Square; DF = Degrees of Freedom; RMSEA = Root Mean Square Error of Approximate; SRMR = Standardised Root Mean Square Residual; CFI = Comparative Fit Index

Table 3.8. Difference in factor means in the clinical group (in contrast to the non-clinical reference group) on the Grandiosity Meaning Measure (gram)

Measure	Factor	Estimated difference in factor mean*	Standard error
Grandiosity Meaning Measure (gram)	Coherence	0.70	0.08
	Purpose	0.51	0.08
	Significance	0.63	0.09

*To compare the latent factor means between the non-clinical and clinical groups, the latent factor means of the non-clinical group were set to zero (the reference group) and those of the clinical group were allowed to be estimated freely. All differences were found to be significant at p<0.0001

Grandiosity Meaning Measure - Sources (grams)

Endorsement of items: The grams items were dichotomised into 'endorsed' and 'not endorsed'. On average, 25 out of 37 items were endorsed (mean=24·63, SD=9·80; see Table 3.9 for endorsement rates). 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 3.13 shows non-dichotomised responses).

Measure validation: In the clinical validation sample (n=333) the CFA model indicated that the 37-item, seven-factor model had good fit (robust-χ^2(608)=1212·32, CFI=0·96, TLI=0·96, RMSEA=0·055, SRMR=0·052; Appendix 3.11 provides factor loadings). Associations between factor scores and corresponding raw scores were strong (Appendix 3.9). The Grandiosity Meaning Measure–Sources had good psychometric properties with strong internal consistency (ordinal α 0·86–0·92). A total of 100 clinical participants provided follow-up data within 3–10

Table 3.9. Frequencies of endorsement for Grandiosity Meaning Measure – Sources (grams) items within the clinical group (Study 3, n=333)

			Endorsement level**	
Factor	**Item**	**Item content***	**0**	**1**
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%)
	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 amongst 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%)
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/wealth….'* or *'Having these exceptional abilities/identity/job/mission/wealth….'*. ** Items were answered on a 0 to 4 scale from 0=do not agree to 4=agree totally. Responses were recoded into 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.

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; Appendix 3.10 provides full details).

Measurement invariance: Testing for measurement invariance in the grams, across all levels there were only minute changes in RMSEA, well within the acceptable threshold (see Table 3.10). The change in CFI at the scalar level (-0.003) was slightly above Sventina and Rutkowski's recommended threshold of -0.00229. However, given that this is a highly conservative threshold based on having a large number of groups (ten to twenty) whereas in the present study there were only two groups (clinical and non-clinical) it was considered that measurement invariance was demonstrated at all four levels. All source of meaning factor means were significantly higher ($p<0.0001$) in the clinical group than in the non-clinical (reference) group (see Table 3.11 for estimated difference in factor means).

Table 3.10. Model comparison to determine measurement invariance for the Grandiosity Meaning Measure - Sources (grams)

Models	Model Comparison	K	χ2	DF	RMSEA	SRMR	CFI
Configural	-	412	4552.06	1216	0.057	0.054	0.941
Weak - Threshold	Threshold vs Configural	486	4692.98	1290	0.056 (Δ = -0.001)	0.054 (Δ = 0.000)	0.940 (Δ = -0.001)
Weak - Metric	Metric vs Threshold	493	4681.10	1320	0.055 (Δ = -0.001)	0.054 (Δ = 0.000)	0.941 (Δ = +0.001)
Strong - Scalar	Scalar vs Metric	463	4885.29	1350	0.055 (Δ = 0.000)	0.054 (Δ = 0.000)	0.938 (Δ = -0.003)

K = no. of parameters; χ2 = Chi-Square; DF = Degrees of Freedom; RMSEA = Root Mean Square Error of Approximate; SRMR = Standardised Root Mean Square Residual; CFI = Comparative Fit Index

Table 3.11. Difference in factor means in the clinical group (in contrast to the non-clinical reference group) on the Grandiosity Meaning Measure – Sources (grams).

Measure	Factor	Estimated difference in factor mean*	Standard error
Grandiosity Meaning Measure – Sources (grams)	Positive social perception	0.33	0.09
	Spirituality	1.29	0.08
	Overcoming adversity	0.72	0.08
	Confidence in self amongst others	0.41	0.08
	Greater good	0.76	0.09
	Supporting loved ones	0.68	0.11
	Happiness	0.59	0.09

*To compare the latent factor means between the non-clinical and clinical groups, the latent factor means of the non-clinical group were set to zero (the reference group) and those of the clinical group were allowed to be estimated freely. All differences were found to be significant at $p<0.0001$

3.4.3 Testing the contribution of meaning to the degree of grandiosity

Step 1: The relationship between sources and experience of meaning in grandiose beliefs

The extent to which the source of meaning factors from the Grandiosity Meaning Measure – Sources were associated with the experience of meaning factors from the Grandiosity Meaning Measure was investigated. 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 non-clinical group (see Table 3.12). The results of structural equation modelling, regressing each of the Grandiosity Meaning Measure experience factors on the Grandiosity Meaning Measure – Sources source factors, are provided in Table 3.13. 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 non-clinical group, although overcoming adversity remained in the final model as a predictor of coherence and significance. Fit statistics were good in the clinical group (robust-χ^2(1346)=2276·47, CFI=0·96, TLI=0·96, RMSEA=0·046, SRMR=0·052) and acceptable in the non-clinical group (robust-χ^2(1344)=6655·85, CFI=0·94, TLI=0·94, RMSEA=0·053, SRMR=0·055).

Step 2: Predicting grandiosity and belief conviction from meaning.

Finally, the degree to which grandiose beliefs were associated with meaning was investigated. Pairwise correlations between the grandiose belief measures and each meaning factor were all significant (see Table 3.12). 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 non-clinical group 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 3.14. Fit indices were good in the clinical group (robust-χ^2(1856 df)=2969·99, CFI=0·96, TLI=0·95, RMSEA=0·043, SRMR=0·057) and acceptable in the non-clinical group (robust-χ^2(1851)=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 non-clinical group, all three experience factors (coherence, significance, and purpose) remained in the final models predicting grandiosity and

Table 3.12. Associations between experience of meaning, sources of meaning, grandiose belief conviction, and grandiosity (using Pearson's correlation coefficient).

Clinical group (Study 3, n=324)

			Experience of meaning factors				Source of meaning factors						
	Gr	**Conv**	**C**	**S**	**P**	**MIL**	**PSP**	**Sp**	**O**	**CSO**	**GG**	**L**	**H**
Grandiosity (Gr)	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 (Conv)	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 (C)	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 (S)	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 (P)	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 (higher order factor; MIL)	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 (PSP	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 (Sp)	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 (O)	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 amongst others (CSO)	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 (GG)	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
Supportive loved ones (L)	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 (H)	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

Non-clinical group (Study 2, n=1386)

			Experience of meaning factors				Source of meaning factors						
	Gr	**Conv**	**C**	**S**	**P**	**MIL**	**PSP**	**Sp**	**O**	**CSO**	**GG**	**L**	**H**
Grandiosity (Gr)	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 (Conv)	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 (C)	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 (S)	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 (P)	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 (higher order factor, MIL)	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 (PSP)	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 (Sp)	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 (O)	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 amongst others (CSO)	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 (GG)	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
Supportive loved ones (L)	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 (H)	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

NB: Table gives Pearson correlation coefficients between factor scores (latent variables) and raw scores (for grandiosity and grandiose belief conviction). All p-values were significant ($p<0.0001$)

Table 3.13. Predicting experience of meaning by sources of meaning – structural equation model outcomes.

Sample	Experience of meaning (response variable)	Sources of meaning (explanatory variables)	Estimate	Std. Error	p-value	Std. Est.
Clinical group (Study 3, n= 324)	Coherence ~	Spirituality	0.33	0.07	<0.0001	0.30
		Confidence in self amongst others	0.46	0.07	<0.0001	0.44
		Supporting loved ones	0.24	0.10	0.022	0.19
	Purpose ~	Greater good	0.64	0.07	<0.0001	0.59
		Happiness	0.39	0.07	<0.0001	0.35
	Significance ~	Greater good	0.49	0.07	<0.0001	0.47
		Happiness	0.49	0.07	<0.0001	0.46
Non-clinical group (Study 2, n=1386)	Coherence ~	Spirituality	0.10	0.03	0.0029	0.11
		Overcoming adversity	0.23	0.05	<0.0001	0.24
		Confidence in self amongst others	0.32	0.05	<0.0001	0.30
		Supporting loved ones	0.14	0.05	0.0073	0.11
	Purpose ~	Greater good	0.45	0.03	<0.0001	0.49
		Happiness	0.33	0.03	<0.0001	0.35
	Significance ~	Overcoming adversity	0.17	0.02	<0.0001	0.17
		Greater good	0.27	0.03	<0.0001	0.27
		Happiness	0.48	0.03	<0.0001	0.47

Note. Std Error = Standard Error; Std. Est. = Standardised Estimates

Table 3.14. Predicting grandiosity and grandiose belief conviction by grandiose delusion meaning – structural equation model outcomes.

Sample	Response Variable	Explanatory Variable	Estimate	Std. Error	p-value	Std.Est
Clinical population (n=324)	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 amongst 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
Non-clinical group (n=1386)	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 amongst 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

Note. Std Error = Standard Error; Std. Est. = Standardised Estimates

grandiose belief conviction. The model explained 46·2% of the variance in grandiosity and 16·0% of the variance in grandiose belief conviction.

3.5 Discussion

This chapter builds upon the findings from the earlier qualitative study (Chapter 2) which indicated that the meaning in grandiose delusions may be a potential causal mechanism for grandiose delusions. Using quantitative data from three consecutive cross-sectional studies across clinical and non-clinical cohorts, the current chapter delineates 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 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 the 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 their

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 described in Chapter 2.

The study has limitations. Primarily, the cross-sectional design means that causal relationships cannot be determined. Future longitudinal studies, including those which carry out casual tests of increasing meaning from other areas of life to establish whether grandiosity then reduces, are warranted. Additionally, although multiple different types of meaning were assessed, it is plausible that an exhaustive list was not examined. The participant groups were large but predominantly White-British limiting the generalisability. It would be valuable to establish whether the measures perform similarly in diverse populations and across different countries. Finally, causation in delusions is likely to be multifactorial. The meaning of grandiosity could be a central causal factor, but it will not be the only one and further studies are needed to determine the extent to which other mechanisms may drive grandiose delusions.

In the next chapter, repetitive thinking about grandiose beliefs and immersion behaviours, two other factors identified in Chapter 2 as potential maintenance mechanisms for grandiose delusions, are investigated. Using data from two of the cohorts described in the current chapter (the second non-clinical cohort, n=4518, and the clinical cohort, n=798), the development of measures of these constructs and tests of their association with grandiosity are described. The extent to which patients with grandiose delusions subjectively identify harm arising from their grandiose delusions is also investigated, as this may provide a potential route for engagement in treatment.

4. The difficulties of grandiose delusions: harms, challenges, and implications for treatment engagement[3]

4.1 Chapter abstract

Rationale

Grandiose delusions may entail difficult responsibilities and detrimental actions for patients. Recognition of these consequences by patients may provide an avenue for engagement in treatment. Furthermore, when patients carry out actions within the delusional system ('immersion behaviours') or spend considerable time thinking about their grandiose beliefs this may contribute to the persistence of the grandiosity and further harmful consequences. Thus, in the current chapter grandiose-related subjective harm, immersion behaviours, and perseverative thinking are investigated.

Methods

A cross-sectional study with 798 patients with psychosis (375 of whom had grandiose delusions) and 4518 non-clinical adults was conducted. Factor analyses using data from participants scoring highly on grandiosity were used to form three scales: Subjective Harm from Exceptional Experiences Questionnaire; Immersion Behaviours Questionnaire – Exceptional Experiences; and Thinking about Exceptional Experiences Questionnaire. Associations with grandiosity were tested using structural equation modelling.

Results

A total of 268 (77.9%) patients with grandiose delusions identified grandiose-related harms in the past six months and 199 (55.1%) wanted help. Immersion behaviours and perseverative thinking were highly prevalent and explained 39.5% and 20.4% of variance in grandiosity respectively. Immersion behaviours and perseverative thinking were significantly associated with subjective harm, even when severity of grandiosity was controlled. Requests for help were associated with higher levels of subjective harm, use of immersion behaviours, and perseverative thinking but not severity of grandiosity.

[3] *This chapter is adapted from the paper: Isham, L., Loe, B.S., Hicks, A., Wilson, N., Bentall, R.P., & Freeman, D. (2023). The difficulties of grandiose delusions: harms, challenges, and implications for treatment, Schizophrenia Bulletin, sbad016. This is provided in Appendix 6.*

Conclusion

Acting on grandiose delusions, including harmful behaviours and excessive thinking about grandiose delusions, may be routes for clinicians to engage patients in treatment. This could be a starting point for targeted psychological interventions for grandiose delusions.

4.2 Introduction

As highlighted in Chapter 1, there is no evidence-based, theoretically driven, psychological intervention specifically for harmful grandiose delusions. Grandiose delusions are often overlooked in the treatment of psychosis and this may be partly because the belief content can seem benign compared to other psychotic experiences. However, the qualitative interviews with patients with these beliefs described in Chapter 2 indicated problematic burdens, responsibilities, and behaviours are often inherent in the belief systems (e.g., believing one is Jesus and feeling under pressure to save humanity). Indeed, participants with experience of grandiose delusions described difficulties occurring across multiple life domains including physical (e.g., trying to fly), sexual (e.g., going home with strangers believing them to be God), social (e.g., rejection by others), emotional (e.g., feeling suicidal) and occupational (e.g., dropping out of university). Shared recognition by patients and clinicians of such difficulties could form the basis of engagement in treatment. Grandiosity is associated with lower patient motivation to engage in standard mental health treatment (Mulder et al., 2005). This likely results from interactions with services that do not provide patients with a suitable rationale for engagement. Engagement might be enhanced if clinicians are able to ask knowledgeably about the different types of problems - often fairly subtle - that grandiose delusions bring in their wake. A key aim of the study described in the current chapter therefore was to develop a measure that could capture these harms.

In Chapter 3 the multiple meanings obtained from grandiose delusions were highlighted as a potential key reason why the beliefs persist despite the associated difficulties. Yet there are also other plausible factors that may help to explain why grandiosity endures and problems result. Immersion behaviours are when individuals take actions in line with their grandiose beliefs (Isham et al., 2021), which includes acting according to the perceived identity (e.g., blessing people believing that one is Jesus). Such behaviours might provide compelling memories that provide confirmatory evidence for the belief. Further, individuals may withdraw from others and become engrossed in information linked to their belief (e.g., researching the second coming of Christ online) potentially reducing access to disconfirmatory evidence and providing further confirmatory evidence. A second potential driver is excessive time spent thinking about the

belief. As highlighted in Chapter 2, patients describe thinking about their grandiose beliefs *"all the time"*, having difficulty stopping such thoughts, and experiencing verbal and imagery-based repetitive thinking. Such thoughts are often pleasurable which may partially explain their perseverative nature, but they may also be driven by the belief's meaning (e.g., it might feel important to focus on how one will save humanity, even if it is stressful rather than pleasurable to do so). It seems probable – akin to worry in persecutory delusions (Freeman et al., 2015) – that such repetitive thinking can drive grandiose beliefs by bringing the belief to mind, elaborating its details, and increasing conviction. Consistent with this hypothesis, a study with 109 non-clinical participants found that compared to distraction, rumination on a positive memory was associated with maintenance of grandiose ideation (Bortolon & Raffard, 2021). Additionally, in both groups with a bipolar I diagnosis (n=27) and non-clinical individuals (n=27), compared to 'distanced reflection', immersive rumination on a positive memory was associated with increased number of positive thoughts (Gruber et al., 2009). It has yet to be investigated in a clinical population whether repetitive thinking specifically about grandiose beliefs is associated with higher levels of grandiosity and degree of conviction.

The aims of the study presented in this chapter were to: (i) determine the extent to which patients identify difficulties arising from their grandiose delusions; (ii) assess the extent to which they engage in immersion behaviours and repetitive thinking about their grandiose delusions and whether these processes are associated with higher levels of grandiosity and subjective harm; (iii) determine factors associated with patients wanting help.

4.3 Method

4.3.1 Study design and participants

A cross-sectional questionnaire study was conducted with two of the three cohorts whose recruitment was described in the previous chapter (the second of the two non-clinical cohorts, and the clinical cohort). As full details of the recruitment process are provided in Chapter 3 (see p. 41), only a brief summary is presented here. In the clinical cohort, participants were recruited from 39 NHS mental health trusts across England and Wales. Inclusion criteria were: aged 16+, 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/drug disorder, personality disorder, or organic syndrome. Participants provided informed consent and data were collected in person or online via

Qualtrics. The non-clinical cohort was recruited via social media advertisements. Inclusion criteria were: aged 18+, having internet access, and UK/ROI nationality/residence. There were no exclusion criteria. Participants provided informed consent online. Data were collected using Qualtrics.

4.3.2 Assessment Measures

Grandiosity

The Specific Psychotic Experiences Questionnaire-Grandiosity subscale (SPEQ-G; described in Chapter 3, p42) was used to assess grandiosity severity. It yields scores between 0 and 24 with higher scores indicating higher levels of grandiosity. The SPEQ-G was used to identify participants scoring highly enough in grandiosity for administration of the item pools. The cut-off was ≥5 which corresponds to the top 15th percentile scores in a non-clinical sample (Černis et al., 2021). To identify the grandiose belief explicitly, those scoring above threshold were asked for a brief description of their specific experience of having exceptional abilities, identity, role, mission or wealth (e.g., '*I am on a special mission from God to save the world')* and to rate belief conviction (0-100%). Instructions specified that subsequent measures should be answered in relation to this content.

Subjective harm, immersion behaviours, and repetitive thinking

Item pool development: Item pools for the Subjective Harm from Exceptional Experiences Questionnaire (SHEEQ), Immersion Behaviours Questionnaire-Exceptional Experiences (IBQ-EE), and Thinking about Exceptional Experiences Questionnaire (TEEQ) were generated using deductive and inductive methods. For the IBQ-EE and SHEEQ there was little in the way of relevant literature to draw on, so item generation relied heavily on participant descriptions from the qualitative study (Chapter 2) as well as discussion and consensus between experts from a patient advisory group with lived experience of grandiose delusions, and clinical psychologists and psychiatrists specialising in psychosis.

For the IBQ-EE, participants in the qualitative study described behaviours that involved 'acting in role' (for example going out on a mission believing one is an undercover agent or blessing people believing one is Jesus), but also withdrawing or becoming engrossed in information that fitted with the belief, and items capturing a range of these behaviours were included.

For the SHEEQ, participants described harms occurring in relation to their grandiose delusion across physical, emotional, social, sexual, and occupational domains, so items related to each were generated. Participants also said that whilst they themselves were often the recipient of harm, there were also occasions where the belief caused harm or distress to others, so this was also included as an item.

Patient descriptions were also central to developing items for the TEEQ. For example, descriptions of thinking about the grandiose belief "*all the time"* and "*as much as I could…but it makes you go stir crazy"* emphasised the need to capture the repetitive/frequent nature of the thoughts. The item "*it feels important to think about it a lot"* was also added based on a participant describing the importance of thinking about having to save the world from ending, despite finding this very distressing. Powerful descriptions of thoughts in imagery form, as well as findings that imagery can increase conviction that imagined events could occur in the future (Carroll, 1978), informed the decision to add the item "*images (or pictures) associated with it have come into my mind"*. When conceptualising the TEEQ, the intention was to develop a measure that specifically assessed repetitive thinking about the grandiose delusion, to capture a process akin to worry in the context of paranoia (worry has been demonstrated to be a key maintenance mechanism for persecutory delusions; Freeman et al., 2015). Therefore the measure development was also informed by reviewing measures of worry and positive rumination, and adapting items where relevant to grandiose delusions and including them in the item pool. Measures reviewed included the Dunn Worry Questionnaire (Freeman et al., 2019), Paranoia Worries Questionnaire (Freeman et al., 2019), Response to Positive Affect Questionnaire (self-focused and emotion-focused positive rumination subscales; Feldman et al., 2008) and Future-Oriented Repetitive Thought Scale (Miranda et al., 2017).

Measures of grandiose delusions and grandiosity more generally were reviewed (Bortolon et al., 2020; Ronald et al., 2014; Wing et al., 1990) to prompt consideration of a wide range of grandiose beliefs and ensure items generated would be applicable across a range of experiences. Items for all three measures were generated by the author and the primary DPhil supervisor, and then reviewed by the expert panel (comprising two members of a patient advisory group with lived experience of grandiose delusions, and five clinical research psychologists and a psychiatrist with expertise in psychosis). The feedback indicated that the items captured the relevant constructs well, however some items were further refined in response to suggestions by the panel. For example, in the IBQ-EE, the item "*spent time keeping a record or making notes of information that relates to your special abilities/identity/role/mission/wealth*" was added based on a suggestion from

the expert panel, and the wording for several items was simplified and examples added to aid clarity.

Item pool administration: The initial item pools for the SHEEQ, IBQ-EE, and TEEQ had nine, 22, and seven items respectively with answers given on a five-point Likert scale (0=not at all/none of the time and 4=all of the time; see Appendix 4.1-4.3). The nine SHEEQ items asked about harm in the last six months, but participants were also asked two lifetime harm questions. These items did not contribute to the SHEEQ total score, but the last of these *('Is this something you have ever wanted help with?')* was used to measure wanting help. The TEEQ was administered in clinical and non-clinical groups. The SHEEQ and IBQ-EE were only administered to the clinical group as these required a clearly specified grandiose delusion. As noted in Chapter 3, additional measures were administered in each cohort but the analyses relating to these is beyond the scope of this thesis (further details provided in Appendix 3.2).

4.3.3 Statistical analysis

Similar analytic methods were used in the present study as those described in Chapter 3 (see pp 45-47). Analyses were conducted in R version 4.0.3 (R Core Team, 2021) using packages: 'psych' version 2.0.9 (Revelle, 2020) and 'lavaan' version 0.6-9 (Rosseel, 2012). For measure development prior to factor analysis Bartlett's Test of Sphericity (Bartlett, 1954) and the Kaiser-Meyer Olkin (Kaiser, 1974) Measure of Sampling Adequacy (KMO) were used to assess the feasibility of factor recovery based on the observed dataset. Parallel analysis based on polychoric correlations (assuming ordinal data) was used to identify the number of factors to retain. Retention of factors was based on comparisons between the eigenvalues of the observed data and random data (Ruscio & Roche, 2012).

Cohorts were randomly split into two subsamples enabling item pool refinement using exploratory factor analysis (EFA) in the first subsample and a test of the factor structure using confirmatory factor analysis (CFA) in the second. For the SHEEQ and IBQ-EE analyses, the first and second subsamples had 151 and 211 clinical participants respectively. For the TEEQ analysis, data from the non-clinical and clinical cohorts were combined. The first subsample comprised 699 non-clinical and 122 clinical participants and the second comprised 700 non-clinical and 236 clinical participants. More clinical participants were included in the second subsample to ensure sufficient numbers for measurement invariance analysis (used to assess whether the measure performed similarly across the non-clinical and clinical groups). When

conducting the factor analysis for the Immersion Behaviours Questionnaire – Exceptional Experiences (IBQ-EE) the *a priori* intention was to provide a uni-dimensional 'total' score which would have clinical utility whilst also being able to capture the possibility of smaller subfacets of behaviour. Thus, during model comparison, exploratory uni-dimensional models were considered (incorporating correlation of residuals between related items where appropriate) as well as bifactorial models.

Psychometric properties were assessed using ordinal alpha for internal consistency (Gadermann et al., 2012; Zumbo et al., 2007) and intra-class correlations (ICC) for one-week test-retest reliability.

The poor-fit criteria used to determine item removal during EFA, the thresholds used to judge the fit of the measurement model in CFA, and the thresholds used to determine whether the levels of internal consistency and test-retest reliability were acceptable were all consistent with those described in Chapter 3 (pp 45-46).

The extent to which immersion behaviours and repetitive thinking about grandiose beliefs were associated with the degree of grandiosity, grandiose belief conviction, and subjective harm, and which factors were associated with wanting help, were assessed. Pairwise associations were tested using Pearson's correlations, using factor scores for latent variables and raw scores for grandiose belief conviction and wanting help. Structural equation modelling delivered prediction models incorporating multiple predictors. For the tests of association, 352 participants provide >95% power to detect a Pearson's correlation coefficient of 0.2 at a 5% significance level.

For the TEEQ analysis, only participants who provided complete data were included. For the IBQ-EE and SHEEQ analyses however, as data were only available from the clinical group, participants with up to 20% missing data were included, imputing missing items using the median score.

4.4 Results

Socio-demographic information for participants included in the measure development analyses (i.e., those with high grandiosity) is summarised in Tables 4.1 and 4.2. The full sample was the same as the full sample in Studies 2 and 3 from Chapter 3 and socio-demographic information for this group are therefore found in Appendix 3.6.

Table 4.1. Socio-demographic and clinical data for participants in the SHEEQ, IBQ-EE, and TEEQ measure development analyses.

		Subjective harm & immersion behaviour questionnaires (SHEEQ; IBQ-EE)	Thinking about Exceptional Experiences Questionnaire (TEEQ)	
		Clinical group (n=361)	Clinical group (n=358)	Non-clinical group (n=1399)
Age				
Mean (SD)		41.5 (12.9)	41.5 (12.9)	40.2 (18.6)
Range (years)		16-77	16-77	18-89
Gender	Female	132 (36.6)	132 (36.9)	812 (58.0)
n (%)	Male	222 (61.5)	219 (61.2)	531 (38.0)
	Non-binary	3 (0.8)	3 (0.8)	45 (3.2)
	Other/Prefer not to say	4 (1.1)	4 (1.1)	11 (0.8)
Ethnicity	White (any)	259 (71.7)	257 (71.8)	1208 (86.3)
n (%)	Black (any)	40 (11.1)	39 (10.9)	13 (0.9)
	Asian (any)	27 (7.5)	27 (7.5)	51 (3.6)
	Mixed or Multiple Ethnic Group/Other	34 (9.4)	34 (9.5)	109 (7.8)
	Prefer not to say	1 (0.3)	1 (0.3)	18 (1.3)
Marital status	Single	260 (72.0)	257 (71.2)	633 (45.2)
n (%)	Cohabiting	18 (5.0)	18 (5.0)	172 (12.3)
	Married/civil partnership	31 (8.6)	31 (8.7)	419 (29.9)
	Separated/divorced	43 (11.9)	43 (12.0)	118 (8.4)
	Widowed	9 (2.5)	9 (2.5)	28 (2.0)
	Prefer not to say	0	0	29 (2.1)
Employment	Employed FT	30 (8.3)	31 (8.7)	357 (25.5)
n (%)	Employed PT	25 (6.9)	25 (7.0)	158 (11.3)
	Housewife/husband	5 (1.4)	5 (1.4)	19 (1.4)
	Retired	22 (6.1)	22 (6.1)	178 (12.7)
	Student	19 (5.3)	19 (5.3)	359 (25.7)
	Self-employed	9 (2.5)	9 (2.5)	168 (12.0)
	Unemployed	235 (65.1)	231 (64.5)	130 (9.3)
	Voluntary work (option in clinical group only)	16 (4.4)	16 (4.5)	-
	Prefer not to say	0	0	30 (2.1)
SPEQ-G total*				
Mean (SD)		11.5 (5.3)	11.5 (5.4)	8.9 (3.9)
Range		5-24	5-24	5-24
Grandiose belief conviction (%)				
Mean (SD)		67.0 (31.4)	67.1 (31.3)	66.0 (25.6)
Range		0-100	0-100	0-100
History of mental health difficulties?	Yes	-	-	762 (54.5)
	No	-	-	614 (43.9)
n (%)	Prefer not to say	-	-	23 (1.6)
If yes are these ongoing?	Yes	-	-	510 (66.9)
	No	-	-	232 (30.4)
n (%)	Prefer not to say	-	-	20 (2.6)
Diagnosis	Schizophrenia	126 (34.9)	124 (34.6)	-
n (%)	Schizoaffective disorder	70 (19.4)	70 (19.6)	-
	Delusional disorder	6 (1.7)	6 (1.7)	-
	Brief psychotic disorder	4 (1.1)	4 (1.1)	-
	Psychotic disorder NOS	67 (18.6)	67 (18.7)	-
	Bipolar affective disorder	83 (23.0)	83 (23.2)	-
	Psychotic depression	2 (0.6)	2 (0.6)	-
	Other	3 (0.8))	2 (0.6)	-
MH service recruited from	Inpatient unit	89 (24.7)	87 (24.3)	-
	Forensic inpatient	16 (4.4)	16 (4.5)	-
n (%)	EIP service	57 (15.8)	57 (15.9)	-
	Adult CMHT	183 (50.7)	182 (50.8)	-
	Forensic adult CMHT	1 (0.3)	1 (0.3)	-
	Other	15 (4.2)	15 (4.2)	-

* Only participants with high grandiosity (scoring ≥5 on the SPEQ-G) were included in the measure development analyses. Socio-demographic and clinical data for this subgroup are provided here. Socio-demographic and clinical data for all participants are provided in Appendix 3.6.

Table 4.2. Socio-demographic and clinical data for clinical participants whose data were used in the SHEEQ, IBQ-EE, and TEEQ test-retest analyses.

		Subjective harm and immersion behaviour questionnaires (SHEEQ/ IBQ-EE) - test retest	Thinking about Exceptional Experiences Questionnaire (TEEQ) - test retest	
		Clinical group (n=133)	**Clinical group (n=111)**	**Non-clinical group (n=227)**
Age				
Mean (SD)		42.4 (12.5)	41.6 (12.5)	44.5 (19.2)
Range (years)		16-72	16-72	18-82
Gender	Female	48 (36.1)	40 (36.0)	159 (70.0)
n (%)	Male	83 (62.4)	69 (62.2)	60 (26.4)
	Non-binary	1 (0.8)	1 (0.9)	6 (2.6)
	Other/Prefer not to say	1 (0.8)	1 (0.9)	2 (0.9)
Ethnicity	White (any)	95 (72.0)	77(69.4)	206 (90.7)
n (%)	Black (any)	16 (12.1)	12 (10.8)	1 (0.4)
	Asian (any)	9 (6.8)	9 (8.1)	3 (1.3)
	Mixed or Multiple Ethnic Group/Other	12 (9.0)	12 (10.8)	14 (6.2)
	Prefer not to say	1 (0.8)	1 (0.9)	3 (1.3)
Marital status	Single	94 (70.7)	83 (74.8)	88 (38.8)
n (%)	Cohabiting	9 (6.8)	7 (6.3)	19 (8.4)
	Married/civil partnership	8 (6.0)	6 (5.4)	86 (37.9)
	Separated/divorced	19 (14.3)	13 (11.7)	21 (9.3)
	Widowed	3 (2.3)	2 (1.8)	10 (4.4)
	Prefer not to say	0	0	3 (1.3)
Employment	Employed FT	13 (9.8)	12 (10.8)	55 (24.2)
n (%)	Employed PT	7 (5.3)	5 (4.5)	31 (13.7)
	Housewife/husband	2 (1.5)	1 (0.9)	6 (2.6)
	Retired	8 (6.0)	6 (5.4)	36 (15.9)
	Student	3 (2.3)	3 (2.7)	52 (22.9)
	Self-employed	1 (0.8)	1 (0.9)	25 (11.0)
	Unemployed	92 (69.2)	76 (68.5)	17 (7.5)
	Voluntary work (option in clinical group only)	7 (5.3)	7 (6.3)	-
	Prefer not to say	0	0	5 (2.2)
SPEQ-G total				
Mean (SD)		11.8 (5.5)	11.9 (5.4)	8.5 (3.7)
Range		5-24	5-24	5-22
Grandiose belief conviction (%)				
Mean (SD)		68.3 (31.2)	68.5 (30.4)	66.1 (26.7)
Range		0-100	0-100	2-100
History of mental health difficulties?	Yes	-	-	131 (57.7)
	No	-	-	93 (41.0)
n (%)	Prefer not to say	-	-	3 (1.3)
If yes are these ongoing?	Yes	-	-	88 (67.2)
	No	-	-	40 (30.5)
n (%)	Prefer not to say	-	-	3 (2.3)
Diagnosis	Schizophrenia	48 (36.1)	42 (37.8)	-
n (%)	Schizoaffective disorder	31 (23.3)	28 (25.2)	-
	Delusional disorder	2 (1.5)	1 (0.9)	-
	Brief psychotic disorder	3 (2.3)	3 (2.7)	-
	Psychotic disorder NOS	21 (15.8)	17 (15.3)	-
	Bipolar affective disorder	28 (21.1)	20 (18.0)	-
	Psychotic depression	0	0	-
	Other	0	0	-
MH service recruited from	Inpatient unit	25 (18.8)	22 (19.8)	-
	Forensic inpatient	9 (6.8)	8 (7.2)	-
n (%)	EIP service	24 (18.0)	21 (18.9)	-
	Adult CMHT	70 (52.6)	55 (49.5)	-
	Forensic adult CMHT	1 (0.8)	1 (0.9)	-
	Other	4 (3.0)	4 (3.6)	-

4.4.1 Measure development

Subjective harm (SHEEQ)

Bartlett's test of sphericity and KMO tests indicated that factor analysis was appropriate for the first subsample ($\chi^2(36)=870.13$, $p<0.0001$; KMO=0.83). Following parallel analysis and model comparison, a one-factor solution was determined best. No items were removed, and all had a factor loading of >0.4. The nine-item one-factor model after EFA explained 49.7% of the variance. Table 4.3 provides factor loadings. CFA in the second subsample showed that the nine-item one-factor model had fit indices: robust-$\chi^2(27)=80.993$, CFI=0.973, TLI=0.964, RMSEA=0.098, SRMR=0.059. Whilst these were mostly good, the RMSEA was above the acceptable threshold, so post-hoc analysis was conducted evaluating model adequacy based on the modification index (Freeman, Lambe, et al., 2021). This indicated that the residuals of items H7 ("*Have you put yourself in a risky situation due to your special abilities, identity, role, mission or wealth*?") and H8 ("*What would a friend, family member, or someone else who knows you well say if asked whether they think you have put yourself in a risky situation due to your special abilities, identity, role, mission or wealth?")* were correlated. As there is a clear association between these items beyond the main factor of general 'harm' these correlations were added to the model. The final nine-item one-factor model had acceptable fit indices: robust-$\chi^2(26)=53.535$, CFI=0.986, TLI=0.981, RMSEA=0.071, SRMR=0.054. Table 4.3 provides factor loadings. The covariance between the correlated residuals was 0.44. The SHEEQ had excellent internal consistency (ordinal $\alpha=0.92$). 133 participants provided follow-up data within 3 to 10 days (mean=7.29, SD=1.29). The intraclass correlation was 0.68 indicating good test-retest reliability. The final version of the SHEEQ is presented in Appendix 1.2.

Immersion behaviours (IBQ-EE)

Bartlett's test of sphericity and KMO tests indicated that factor analysis was appropriate for the first subsample ($\chi^2(231)=2422.826$, $p<0.0001$; KMO=0.88). Parallel analysis indicated that a multiple-factor model may be appropriate but as the largest eigenvalue was 7.5 times the size of the next largest, the possibility of a simple one-factor solution was also considered. Model comparisons were conducted to determine the most appropriate solution and, given that the *a priori* intention was to provide a uni-dimensional measure that could capture any potential variances at a factor level, exploratory bifactor models based on two-, three-, and four-factor solutions (rather than simple correlated factor models) were compared to the one-factor solution. Ultimately, the simple one-factor solution was considered most appropriate. Although the more complex bifactor models explained slightly more of the variance in the data, there was

Table 4.3. Factor loadings for the Subjective Harm from Exceptional Experiences Questionnaire (SHEEQ) nine-item one-factor model after EFA and CFA (clinical cohort).

Item	Item content	Standardised factor loadings after EFA (n=151)	Standardised factor loadings after CFA (n=210)
	Have your special abilities/identity/role/mission/wealth…		
H1	…caused any difficulties for you?	0.80	0.79
H2	…resulted in physical harm occurring to you?	0.74	0.69
H3	…caused you emotional distress?	0.86	0.84
H4	…resulted in problems or difficulties socially for you?	0.85	0.79
H5	…caused problems with your work?	0.63	0.68
H6	…caused you to be in a situation where you have been sexually taken advantage of?	0.43	0.64
H7	Have you put yourself in a risky situation, due to your special abilities/--/wealth?	0.67	0.74
H8	What would a friend, family member, or someone else who knows you well say if asked whether they think you have put yourself in a risky situation due to your special abilities/…/wealth?	0.59	0.71
H9	Have you caused harm, upset, or distress to others due to your special abilities/…/wealth?	0.65	0.81

substantial cross-loading of items which would have necessitated removing several clinically valuable items. In the one-factor solution, all items loaded with a value >0.4. The 22-item one-factor solution explained 40.8% of the variance (Table 4.4 provides factor loadings).

CFA in the second subsample showed that the 22-item one-factor model derived from the EFA had fit indices: robust-$\chi^2(209)=527.514$; CFI=0.911, TLI=0.901; RMSEA=0.085; SRMR=0.087. These were on the boundary of acceptability. To improve fit further, post-hoc analyses evaluating the model adequacy based on the modification index were conducted. This indicated that residuals from two pairs of items were correlated. These were items B2 (*acting in a public space)* and B3 (*acting in private)*; and B5 (*directly approaching strangers)* and B6 (*directly approaching friends/family)*. Again, each of these associations made theoretical sense and as such these correlations were incorporated into the model. Once this was done the final model had a marginally high SRMR but as all other fit indices were comfortably in the acceptable range, and robust rather than standard indices are reported, it was considered the model had acceptable fit: robust-$\chi^2(207)=467.536$; CFI=0.927, TLI=0.919; RMSEA=0.078; SRMR=0.082 (Table 4.4 provides factor loadings). The covariances between the correlated residuals were: 0.481 (B2, B3), and 0.461 (B5, B6).

The IBQ-EE had excellent internal consistency (ordinal $\alpha=0.95$). A total of 133 participants provided follow-up data within 3 to 10 days (mean=7.29, SD=1.29) and the intraclass correlation (ICC=0.76) indicated good test-retest reliability. The final version of the IBQ-EE is presented in Appendix 1.3.

Table 4.4. Factor loadings for the 22-item one-factor solution for the Immersion Behaviours Questionnaire – Exceptional Experiences (IBQ-EE) following EFA and CFA (clinical cohort)

Item	Item content	Standardised factor loadings	
		After EFA (n=151)	After CFA (n=210)
B1	**Used** your special abilities, identity, or wealth, or carried out your special role or mission.	0.79	0.63
B2	Acted in relation to your special abilities/identity/role/mission/wealth in a **public place.**	0.72	0.67
B3	Acted in relation to your special abilities/identity/role/mission/wealth in **private**	0.73	0.66
B4	**Dressed** in a particular way to fit with your special abilities/identity/role/mission/wealth	0.65	0.68
B5	**Directly approached or interacted** with **strangers or people you do not know well** in the context of your special abilities/identity/role/mission /wealth	0.60	0.65
B6	**Directly approached or interacted** with **friends, family members, or others you know well** in the context of your special abilities/identity/role/mission/wealth	0.58	0.57
B7	**Stopped doing, or reduced, your usual activities** to focus on your special abilities/identity/role/mission/wealth	0.62	0.68
B8	**Withdrawn** from others to explore, understand, or immerse yourself in your special abilities/identity/role/mission/wealth	0.56	0.67
B9	Spent time **collecting things** to use in relation to your special abilities/identity/role/mission/wealth	0.67	0.67
B10	Spent time **researching or finding out information** that relates to your special abilities/identity/role/mission/wealth	0.57	0.68
B11	**Put information** about your special abilities/identity/role/mission/wealth on **social media**	0.42	0.55
B12	Spent time **keeping a record or making notes** or information that relates to your special abilities/identity/role/mission/wealth	0.56	0.66
B13	Used your abilities/powers to try to heal or bless someone or perform other religious acts	0.48	0.64
B14	Tried to get into contact with famous, important or powerful people.	0.73	0.75
B15	Gone on an undercover mission.	0.77	0.74
B16	Had (or tried to have) a sexual relationship with strangers who have an important role in relation to your special abilities/identity/role/mission/ wealth	0.46	0.75
B17	Used your special intelligence to solve a highly complex problem	0.70	0.73
B18	Performed royal duties or acts.	0.67	0.78
B19	Engaged in a spiritual battle	0.59	0.53
B20	Used your special abilities to try to save or help others/the world.	0.75	0.77
B21	Tried to teach or educate others.	0.66	0.80
B22	Spent a lot of your money (or a lot more than usual) on an important project, idea, or cause.	0.62	0.76

Perseverative thinking (TEEQ)

Bartlett's test of sphericity and KMO tests indicated that factor analysis was appropriate for the first subsample ($\chi^2(21)=5100.51$, $p<0.0001$; KMO=0.90). Parallel analysis and model comparison indicated that one- or two-factor solutions were viable, but the two-factor solution ('thinking a lot' and 'difficulty controlling thoughts') was considered most appropriate theoretically. These are arguably related but not synonymous constructs (a person might think about their perceived role as an SAS operative repetitively, not because they can't control the thoughts, but because it feels important to do so). The factor correlation between the two factors was 0.71, supporting the idea of these as distinct albeit strongly related constructs. Following criteria for item-removal, one item was considered for removal (Q5 "*It has been hard to think about*

anything else") due to cross-loading. It was decided to retain this item however, as theoretically it matched well with the 'difficulty controlling thoughts' factor, had clinical utility, and could be removed at CFA stage if still problematic. Therefore, all items remained following EFA and the final seven-item two-factor model explained 78.0% of the variance in the data (Table 4.5 shows factor loadings).

CFA in the second subsample showed that the seven-item, two-factor model derived from the EFA had fit indices: robust-$\chi^2(13)=304.367$; CFI=0.980, TLI=0.968; RMSEA=0.155; SRMR=0.045. The high RMSEA indicated poor fit so post-hoc analysis, evaluating model adequacy based on the modification index, were conducted. This demonstrated that the residuals of Q6 and Q7, *("thinking about it has stopped me sleeping"* and *"thoughts about it are hard to control"*), and Q1 and Q2 *("I've been thinking about it a lot"* and *"it feels important to think about it a lot"*) were highly correlated. When these associations were added to the model, the fit indices indicated an excellent fit to the data (robust-$\chi^2(11)=48.051$; CFI=0.997, TLI=0.995, RMSEA=0.060, SRMR=0.018; Table 4.5 provides factor loadings). The covariances between the correlated residuals were: 0.511 (Q6, Q7) and 0.308 (Q1, Q2).

The factor correlations in the CFA sample were very high (0.94), and therefore the CFA was run again post-hoc, first with a one-factor model and then with a bifactor model with one general and two specific factors, to see whether either provided a better solution. The one-factor model had a poor fit to the data as the RMSEA was very high (robust-$\chi^2(14)=548.215$, CFI=0.964, TLI=0.946, RMSEA=0.202, SRMR=0.071) and to achieve an adequate fit many pairs of residuals had to be correlated. The bifactor model failed to converge. The original two-factor solution was therefore retained.

Table 4.5. Factor loadings for the seven-item two-factor model for the Thinking about Exceptional Experiences (TEEQ) following EFA and CFA (combined clinical and non-clinical cohort).

Item	Item Content	Standardised factor loadings after EFA (n=821)		Standardised factor loadings after CFA (n=936)	
		Thinking a lot	*Difficulty controlling thoughts*	*Thinking a lot*	*Difficulty controlling thoughts*
Q1	I've been thinking about it a lot	0.88		0.84	
Q2	It feels important to think about it a lot	0.96		0.85	
Q3	Anything and everything has set my mind to thinking about it	0.85		0.94	
Q4	Images (or pictures) associated with it have come into my mind	0.59		0.73	
Q5	It has been hard to think about anything else	0.53	0.44		0.95
Q6	Thinking about it has stopped me sleeping		0.96		0.69
Q7	Thoughts about it are hard to control		0.81		0.77

Measurement invariance was tested across four levels. Changes in CFI and RMSEA were within the acceptable threshold, indicating that the TEEQ performs similarly in the non-clinical and clinical groups (Table 4.6). Comparisons of latent factor means between these groups are therefore valid, and these were significantly higher in the clinical group than the non-clinical group.

The TEEQ had good internal consistency (ordinal alphas were 0.91 and 0.88 for 'thinking a lot' and 'difficulty controlling thoughts'). A total of 338 participants (227 from the non-clinical group and 111 from the clinical group) provided follow-up data within 7 to 10 days (mean=7.58, SD=0.86). Test-retest reliability was good (ICCs were: 0.76 for 'thinking a lot' and 0.72 for 'difficulty controlling thoughts'). The final version of the TEEQ is provided in Appendix 1.4.

Table 4.6. Model comparison to determine measurement invariance between clinical and non-clinical groups for the TEEQ.

Measure	Models	Model Comparison	K	χ2	DF	RMSEA	SRMR	CFI
TEEQ	Configural	-	76	72.32	22	0.070	0.021	0.996
	Weak - Threshold	Threshold vs Configural	90	116.32	36	0.069 (Δ = -0.001)	0.021 (Δ =0.000)	0.993 (Δ = -0.003)
	Weak - Metric	Metric vs Threshold	92	101.73	41	0.056 (Δ =-0.013)	0.021 (Δ =0.000)	0.995 (Δ =+0.002)
	Strong - Scalar	Scalar vs Metric	87	111.54	46	0.055 (Δ =-0.001)	0.022 (Δ = +0.001)	0.995 (Δ = 0.000)

N=936 (700 non-clinical participants and 236 clinical participants)

4.4.2 Item endorsement in the grandiose delusion clinical group

To describe how frequently clinical participants endorsed items on each measure, responses were dichotomised as 'not endorsed' or 'endorsed' (see Table 4.7, and for non-dichotomised responses Appendices 4.4-4.6). A total of 77.9% (268/344) of patients endorsed at least one item of harm as occurring in the past six months. This rose to 84.6% (291/344) for lifetime occurrence. Even when removing item H8, which asks about whether others think the person has put themselves at risk, endorsement rates remained high: 75.6% (260/344) endorsed at least one item for the past six months, and 83.7% (288/344) for lifetime occurrence. Participants typically endorsed five of the 11 harm items (mean=4.67, SD=3.28). The most endorsed domains were emotional distress (58.7%, 212/361) and social problems (53.2%, 192/361). 28.0% (101/361) of patients thought that their experience had caused harm to others. 55.1% (199/361) said they had wanted help with difficulties arising from their grandiose belief.

Table 4.7. Frequencies of item endorsement (clinical cohort)

Measure	Factor	Item		Frequencies of endorsement, n (%) No	Yes	Missing data
	NA (not included in factor analysis)	In relation to your whole lifetime:				
		L1	Have your special abilities/…/wealth ***ever*** caused any difficulties for you?	115 (31.9)	246 (68.1)	0
		L2	Is this something you have ever wanted help with?	158 (43.8)	199 (55.1)	4 (1.1)
SHEEQ (n=361)	Harm	In relation to the last 6 months *Have your special abilities/identity/role/mission/wealth:*				
		H1	…caused any difficulties for you?	157 (43.5)	204 (56.5)	0
		H2	…resulted in physical harm occurring to you?	270 (74.8)	91 (25.2)	0
		H3	…caused you emotional distress?	149 (41.3)	212 (58.7)	0
		H4	…resulted in problems or difficulties socially for you?	168 (46.5)	192 (53.2)	1 (0.3)
		H5	…caused problems with your work?	239 (66.2)	118 (32.7)	4 (1.1)
		H6	…caused you to be in a situation where you have been sexually taken advantage of?	323 (89.5)	37 (10.2)	1 (0.3)
		H7	Have you put yourself in a risky situation, due to your special abilities/--/wealth?	229 (63.4)	130 (36.0)	2 (0.6)
		H8	What would a friend, family member, or someone else who knows you well say if asked whether they think you have put yourself in a risky situation due to your special abilities/…/wealth?	209 (57.9)	147 (40.9)	5 (1.4)
		H9	Have you caused harm, upset, or distress to others due to your special abilities/…/wealth?	258 (71.5)	101 (28.0)	2 (0.6)
IBQ-EE (n=361)	Immersion behaviours	B1	**Used** your special abilities, identity, or wealth, or carried out your special role or mission.	171 (47.4)	189 (52.4)	1 (0.3)
		B2	Acted in relation to your special abilities/identity/role/mission/wealth in a **public place.**	212 (58.7)	149 (41.3)	0
		B3	Acted in relation to your special abilities/identity/role/mission/wealth in **private.**	131 (36.3)	229 (63.4)	1 (0.3)
		B4	**Dressed** in a particular way to fit with your special abilities/identity/role/mission/wealth.	244 (67.6)	117 (32.4)	0
		B5	**Directly approached or interacted** with **strangers or people you do not know well** in the context of your special abilities/identity/role/mission /wealth.	233 (64.5)	128 (35.5)	0
		B6	**Directly approached or interacted** with **friends, family members, or others you know well** in the context of your special abilities/identity/role/mission/wealth.	181 (50.1)	180 (49.9)	0
		B7	**Stopped doing, or reduced, your usual activities** to focus on your special abilities/identity/role/mission/wealth.	211 (58.4)	150 (41.6)	0
		B8	**Withdrawn** from others to explore, understand, or immerse yourself in your special abilities/identity/role/mission/wealth.	165 (45.7)	196 (54.3)	0
		B9	Spent time **collecting things** to use in relation to your special abilities/identity/role/mission/wealth.	220 (60.9)	141 (39.1)	0
		B10	Spent time **researching or finding out information** that relates to your special abilities/identity/role/mission/wealth.	171 (47.4)	190 (52.6)	0
		B11	**Put information** about your special abilities/identity/role/mission/wealth on **social media.**	289 (80.1)	72 (19.9)	0
		B12	Spent time **keeping a record or making notes** or information that relates to your special abilities/identity/role/mission/wealth.	225 (62.3)	134 (37.1)	2 (0.6)
		B13	Used your abilities/powers to try to heal or bless someone or perform other religious acts.	273 (75.6)	88 (24.4)	0

		B14	Tried to get into contact with famous, important or powerful people.	290 (80.3)	71 (19.7)	0
		B15	Gone on an undercover mission.	291 (80.6)	69 (19.1)	1 (0.3)
		B16	Had (or tried to have) a sexual relationship with strangers who have an important role in relation to your special abilities/identity/role/mission/ wealth.	333 (92.2)	26 (7.2)	2(0.6)
		B17	Used your special intelligence to solve a highly complex problem.	207 (57.3)	154 (42.7)	0
		B18	Performed royal duties or acts.	324 (89.8)	37(10.2)	0
		B19	Engaged in a spiritual battle.	226 (62.6)	134 (37.1)	1 (0.3)
		B20	Used your special abilities to try to save or help others/the world.	187 (51.8)	173 (47.9)	1 (0.3)
		B21	Tried to teach or educate others.	184 (51.0)	176 (48.8)	1 (0.3)
		B22	Spent a lot of your money (or a lot more than usual) on an important project, idea, or cause.	221 (61.2)	140 (38.8)	0
TEEQ (n=358)	Thinking a lot	Q1	I've been thinking about it a lot.	80 (22.3)	278 (77.7)	NA
		Q2	It feels important to think about it a lot.	94 (26.3)	264 (73.7)	NA
		Q3	Anything and everything has set my mind to thinking about it.	113 (31.6)	245 (68.4)	NA
		Q4	Images (or pictures) associated with it have come into my mind.	121 (33.8)	237 (66.2)	NA
	Difficulty controlling thoughts	Q5	It has been hard to think about anything else.	173(48.3)	185 (51.7)	NA
		Q6	Thinking about it has stopped me sleeping.	197(55.0)	161 (45.0)	NA
		Q7	Thoughts about it are hard to control.	156 (43.6)	202 (56.4)	NA

** Items for each measure were answered on a 0 to 4 scale with 0=not at all/none of the time and 4=all of the time. Responses were recoded into a dichotomous scale where items rated 0 and 1 were coded as endorsement level 0, and those rated from 2 to 4 were rated 1.

A total of 92.6% (326/352) of participants endorsed using at least one immersion behaviour in the past month, with the average number being eight of 22 items (mean=8.21, SD=5.66). The three most commonly endorsed items were: *"acted in relation to your special abilities/identity/role/mission/wealth in private"* (63.4%, 229/361); "*withdrawn from others to explore, understand, or immerse yourself in your special abilities/identity/role/mission/wealth*" (54.3%, 196/361); and "*spent time researching or finding information that relates to your special abilities/identity/role/mission/wealth"* (52.6%, 190/361).

A total of 89.1% (319/358) of patients endorsed at least one of the thinking about exceptional experiences items. Participants endorsed a mean of 2.86 of the 4 'thinking a lot' items (SD=1.46) and 1.53 of the 3 'difficult to control' items (SD=1.20). Endorsement rates of 'thinking a lot' items (66.2-77.7%) were higher than for 'difficulty controlling thoughts' items (45.0-56.4%).

4.4.3 Tests of associations with grandiosity in the clinical group

Pairwise correlations tested whether immersion behaviours and repetitive thinking were associated with grandiosity and harm (Table 4.8). Immersion behaviours (IBQ-EE total) was significantly associated with grandiosity and grandiose delusion conviction, explaining 39.5% and 13.8% of the variance respectively. TEEQ factors 'thinking a lot' and 'difficulty controlling thoughts' explained 28.4% and 19.3% of the variance in grandiosity and 19.4% and 11.4% of the variance in grandiose delusion conviction, respectively. The TEEQ factors were strongly correlated and when entered into structural equation models (with grandiosity and grandiose delusion conviction as outcome variables), only 'thinking a lot' remained in the models, explaining 20.4% of the variance in grandiosity and 29.6% of the variance in grandiose delusion conviction. Significant associations were found between immersion behaviours and harm, and the TEEQ factors and harm (Table 4.8). Structural equation models indicated that these associations remained when controlling for grandiosity (Table 4.9).

Pairwise correlations were used to test the associations between wanting help and grandiosity, grandiose delusion conviction, harm, immersion behaviours, and grandiosity-related repetitive thinking. Wanting help was not significantly associated with grandiosity severity (Spearman's ϱ=0.04, p=0.404) or grandiose belief conviction (ϱ=0.006, p=0.914), but was significantly related to harm (ϱ=0.48, p<0.0001), immersion behaviours (ϱ=0.25, p<0.0001), and grandiosity-related repetitive thinking ('thinking a lot': ϱ=0.16, p=0.002; 'difficulty controlling thoughts': ϱ=0.24, p<0.0001).

Table 4.8. Pairwise Pearson's correlations (clinical cohort, n=352).

	Grandiosity (SPEQ-G)	Grandiose delusion conviction	Subjective harm (SHEEQ)	Immersion Behaviours (IBQ-EE)	Thinking a lot (TEEQ factor 1)
Grandiose delusion conviction	0.43 p<0.0001	1.00			
Subjective harm (SHEEQ)	0.18 p=0.0006	0.05 p=0.355	1.00		
Immersion behaviours (IBQ-EE)	0.63 p<0.0001	0.38 p<0.0001	0.54 p<0.0001	1.00	
Thinking a lot (TEEQ factor 1)	0.53 p<0.0001	0.44 p<0.0001	0.34 p<0.0001	0.72 p<0.0001	1.00
Difficulty controlling thoughts (TEEQ factor 2)	0.44 p<0.0001	0.34 p<0.0001	0.51 p<0.001	0.72 p<0.0001	0.94 p<0.0001

Table 4.9. Structural equation models (clinical cohort, n=352)

SEM regression step	Response Variable	Explanatory variable	Estimate	Std. Error	p-value	Std.Est
1) Harm regressed on immersion behaviours and grandiosity						
Step 1: all predictors included	Harm	Grandiosity	-0.190	0.067	0.004	-0.184
		Immersion behaviours	0.694	0.081	<0.0001	0.603
Step 2: Grandiosity removed (suppressor effect)	Harm	Immersion behaviours	0.549	0.066	<0.0001	0.478
2) Harm regressed on TEEQ factor 1 (thinking a lot) and grandiosity						
Step 1: all predictors included	Harm	Thinking a lot	0.405	0.061	<0.0001	0.410
		Grandiosity	-0.048	0.069	0.486	-0.046
Step 2: Grandiosity removed (non-significant predictor)	Harm	Thinking a lot	0.375	0.051	<0.0001	0.381
3) *Harm regressed on TEEQ factor 2 (difficulty controlling thoughts) and grandiosity*						
Step 1: all predictors included	Harm	Difficulty controlling thoughts	0.348	0.051	<0.0001	0.417
		Grandiosity	0.001	0.061	0.992	0.001
Step 2: Grandiosity removed (non-significant predictor)	Harm	Difficulty controlling thoughts	0.349	0.048	<0.0001	0.417
4) *Harm regressed on TEEQ factors (both) and grandiosity*						
Step 1: all predictors included	Harm	Grandiosity	0.066	0.081	0.412	0.064
		Thinking a lot	-0.489	0.213	0.022	-0.507
		Difficulty controlling thoughts	0.781	0.189	<0.0001	0.897
Step 2: removing 'thinking a lot' (suppressor effect)	Harm	Grandiosity	0.001	0.061	0.992	0.001
		Difficulty controlling thoughts	0.348	0.051	<0.0001	0.417
Step 3: removing grandiosity (non-significant predictor)	Harm	Difficulty controlling thoughts	0.349	0.048	<0.0001	0.417

Note: Std.Est=Standardised estimate

4.4.4 *Post hoc* analyses

The study described in this chapter was written up for publication (see Isham et al., 2023) and, following a query from reviewers, *post hoc* analyses were conducted to investigate whether the three measures performed similarly across diagnostic groups. The clinical group with grandiose delusions (n=352) was divided into two subgroups: those with non-affective psychosis diagnoses (n=270) and those with affective psychosis (n=82). There were too few participants with a bipolar diagnosis to conduct confirmatory factor analysis for each questionnaire separately by diagnosis. However, using between-group t-tests to compare mean factor scores, no statistically significant differences by diagnostic group were found for any of the questionnaire scores (SHEEQ, IBQ-EE, TEEQ), although there was an indication that subjective harm may be higher in the affective psychosis group than in the non-affective psychosis group (see Appendix 4.7).

The internal consistency was found to be good within each diagnostic subgroup for all measures (see Appendix 4.8). Furthermore, test-retest analyses were conducted for each diagnostic subgroup separately (see Appendix 4.9). Intra-class coefficients for each measure were similar across diagnostic groups, and all at an acceptable level as per the Cicchetti (1994) guidelines.

For one measure, the TEEQ, it was possible to conduct measurement invariance analysis. To get an adequate sample size, the EFA and CFA subgroups were combined. Furthermore, both participants from the clinical group and those from the non-clinical cohort who had indicated that they had either a diagnosis of psychosis or bipolar disorder (excluding any participant who had said they had both) were included. At the configural level, the RMSEA was rather elevated, which could be due to the small sample size (Shi, Lee, et al., 2019). The remaining fit indices were all excellent however, so it was determined that measurement invariance was obtained at a scalar level (see Appendix 4.10). These analyses could be repeated with a larger sample to confirm the findings, but the overall indication was that the measures performed similarly across the diagnostic groups.

4.5 Discussion

Patients frequently reported harm from grandiose beliefs: over three-quarters reported at least one grandiose-related harmful effect over the past six months. Patients identified difficulties across physical, sexual, occupation, social, and emotional domains, the latter two being most common. Over half of patients wanted help. Therefore, there is a clear route to engagement

related to the range of difficulties that grandiose delusions bring in their wake. Notably, awareness of harm and wanting help were independent of the severity of grandiose delusions. Severity of presentation may well not forestall successful up-take of treatment.

The majority of patients reported immersion behaviours and grandiosity-related repetitive thinking. Each may plausibly contribute to the persistence of grandiose delusions. Memories for self-performed actions may be stronger compared to imagined actions (Engelkamp & Zimmer, 1989) and thus acting 'in role' may provide particularly compelling memories that are perceived as confirmatory evidence for the belief. Alternatively, immersion behaviours may involve withdrawal from others and becoming engrossed in belief-related information, potentially reducing access to disconfirmatory evidence and providing further confirmatory evidence. Repetitive thinking about the grandiose delusion is likely to act by bringing the belief to mind, elaborating the details, and increasing conviction.

Immersion behaviours and grandiosity-related repetitive thinking may also contribute to the occurrence of grandiose-related harm. Why might this be the case? Clearly in some instances the immersion behaviour is harmful in its own right (e.g., trying to fly). Immersion behaviours (e.g., blessing people believing one is Jesus) could also lead to social rejection. Being unable to control overwhelming thoughts about one's responsibility for saving the world could lead to emotional distress. Immersion behaviours and repetitive thinking were each associated with wanting help, independent of severity of grandiosity, providing a further route for engagement in treatment.

The results indicate that many patients would like help, and therefore may well engage with treatments that address their concerns. It will be important for the development of targeted treatments to set out clearly how they will achieve the desired change for patients. Clinicians often anticipate that those with the strongest grandiose delusions may be the most difficult to engage in therapy, but this study indicates there should be caution about this assumption. A clear route to engagement is via discussion about the difficulties of grandiose delusions, but there may be a discrepancy between initial clinician and patient perspectives. Clinicians may focus on readily observable and potentially life-threatening forms of harm and physical harms may be the easiest to observe. Indeed, existing research on acting on grandiose delusions focuses almost exclusively on physical harm, typically to others (Ullrich et al., 2014, 2018; van Dongen et al., 2015). This of course is important but patients endorse this type of harm at relatively low rates. They report social and emotional harms far more frequently, yet these may be less obvious to clinicians. Patients are likely to experience distressing harms that may only be apparent on careful assessment. Similarly, immersion behaviours like 'acting in private' and repetitive internal

thinking are both difficult for clinicians to observe directly. The questionnaires developed could help facilitate shared awareness between patients and clinicians.

The study has limitations. Primarily, the cross-sectional design means that causal relationships cannot be determined, although the measures developed will enable future longitudinal and interventionist designs to be conducted. Another limitation was the recruitment of the non-clinical group via social media (potentially unrepresentative of the general population) and the representativeness of the participant group (who were predominantly White-British) impacting on the potential generalisability of findings. Our clinical group comprised people who were typically in established contact with mental health services. Many were supported by adult community mental health teams and likely to have had long-term support from services. Engagement in treatment for grandiose delusions may differ across stages of difficulties and points of contact with services. This would be a relevant area to consider in future research.

The measures had good psychometric properties, although whether the TEEQ factors, 'thinking a lot' and 'difficulty controlling thoughts', are truly distinct or may be better considered as a single factor was not entirely clear. Furthermore, it is possible that an exhaustive set of items for each measure was not obtained, and aspects of variance may therefore have been missed. The number of participants with a bipolar diagnosis was small, meaning that the factor structure for each questionnaire could not be separately examined by diagnosis. However, total scores on the questionnaires did not differ by diagnosis, although there was an indication that levels of subjective harm associated with grandiose delusions might be higher in the context of bipolar disorder. Measurement invariance across diagnoses was found for the one questionnaire that could be tested in such a way. Although there was no clear evidence of differences in these measures across diagnostic groups, it is still plausible that the influence of different maintenance mechanisms may vary across clinical presentations or across differing belief content. Finally, in this chapter two putative maintenance mechanisms for grandiose delusions have been investigated, but causation will likely be multi-factorial. Future studies should assess the contributions of multiple factors. Within the next chapter another potential maintenance factor for grandiose delusions, daydreaming, is investigated.

5. Daydreaming and grandiose delusions: development of the Qualities of Daydreaming Scale[4]

5.1 Chapter abstract

Rationale

Daydreaming may contribute to the maintenance of grandiose delusions. Repeated, pleasant, and vivid or perceptually realistic daydreams about the content of grandiose delusions may keep the ideas in mind, elaborate the details, and increase the degree of conviction in the delusion. Pleasant daydreams more generally could contribute to elevated mood which may influence the delusion content. The aim of the study presented in this chapter was to develop a brief questionnaire, suitable for research and clinical practice, to assess daydreaming and test potential associations with grandiosity.

Method

798 patients with psychosis (375 with grandiose delusions) and 4518 non-clinical adults (1788 with high grandiosity) were recruited. Participants completed a daydreaming item pool and measures of grandiosity, time spent thinking about the grandiose belief, and grandiose belief conviction. Factor analysis was used to derive the Qualities of Daydreaming Scale (QuOD) and associations were tested using pairwise correlations and structural equation modelling.

Results

The questionnaire had three factors: realism, pleasantness, and frequency of daydreams. The measure was invariant across clinical and non-clinical groups. Internal consistency was good (alpha-ordinals: realism=0.86, pleasantness=0.93, frequency=0.82) as was test-retest reliability (intra-class coefficient=0.75). Daydreaming scores were higher in patients with grandiose delusions than in patients without grandiose delusions and in the non-clinical group. Daydreaming was significantly associated with grandiosity, time spent thinking about the grandiose delusion, and grandiose delusion conviction, explaining 19.1%, 7.7%, and 5.2% of the variance in the clinical group data respectively. Similar associations were found in the non-clinical group.

[4] *This chapter is adapted from: Isham, L., Loe, B.S., Hicks, A., Wilson, N., Bentall, R.P., & Freeman, D. Daydreaming and grandiose delusions: development of the Qualities of Daydreaming Scale. [Manuscript in preparation]*

Conclusions

The process of daydreaming may be one target in psychological interventions for grandiose delusions.

5.2 Introduction

As shown in Chapter 4, patients frequently report harm from grandiose beliefs that occurs across multiple life domains (physical, sexual, occupation, social, and emotional). More than three-quarters identified at least one grandiose-related harmful effect within the previous six months and over half of patients want help with the difficulties that grandiose delusions leave in their wake. Developing a targeted psychological therapy for harmful grandiose delusions is a clear research and clinical priority.

Central to this endeavour is the advancement of our understanding of the causal elements driving grandiose delusions that may be amenable to intervention. So far in the thesis, the meaning in grandiose delusions, repetitive thinking about the grandiose beliefs, and immersion behaviours have all been identified and explored as putative maintenance factors. Within this chapter, one further potential driver is investigated – daydreaming.

Daydreaming – also referred to as mind wandering or fantasising – has been defined as a train of thoughts or images that occur when one's attention drifts away from external tasks and perceptual input towards a more private stream of consciousness (McMillan et al., 2013). It is a widespread phenomenon. Estimates suggest that people typically spend 30-60% of their time engaged in daydreaming (Poerio & Smallwood, 2016). Daydreaming can occur both automatically and volitionally, can feature positive or negatively oriented content, and can be focused on past, present, or future experiences (real or imagined).

For many people daydreaming is adaptive, bringing such benefits as pleasure, relief from boredom, enhanced social skills, and improved creativity and problem solving (Baird et al., 2012; Poerio & Smallwood, 2016; Singer & Antrobus, 1963; R. P. Smith, 1981). For a minority of people it can become problematic however, interfering with academic, interpersonal, and vocational functioning (Somer, 2002). Fantasy proneness is a tendency towards a style of daydreaming characterised by fantastical thinking and a disposition towards vivid mental imagery, psychic experience, and an overactive creative imagination. It has been found to be associated with higher levels of depression and dissociation, and also with delusion severity,

preoccupation, conviction, and distress in patients with affective and non-affective psychosis diagnoses (Tan et al., 2019).

Daydreaming could have a role in the occurrence of grandiose delusions via several routes. First, it may be that the grandiose ideation itself features as the content of daydreams. The initial genesis of the grandiose belief, as well as its ongoing elaboration, may come directly from the content of pleasant daydreams. In this case it might be expected that those who have more pleasant and frequent daydreams will experience more frequent thoughts about the grandiose belief, keeping these ideas at the forefront of the mind and increasing delusional conviction. Similarly, a propensity for particularly vivid daydreams that are perceptually realistic in quality might make the content of such thoughts seem more believable, and thus also be associated with increased delusional conviction. Alternatively, even when the content of daydreams is not focused on the grandiose belief itself, experiencing more frequent and pleasant daydreams could generate increased positive affect which, in line with a mood-congruent theory of grandiose delusions (Garety et al., 2012; N. Smith et al., 2005), may feed into the grandiose content of a delusional belief.

The aims of the study described in this chapter were: i) to develop a quick and easy to use questionnaire to assess the qualities of daydreams (perceptual realism, pleasantness, and frequency); ii) to determine the extent to which daydreaming is reported by patients with grandiose delusions in the context of psychosis as compared with patients with psychosis but without grandiose delusions, non-clinical individuals with high grandiosity, and non-clinical individuals with low grandiosity; and iii) to assess whether daydreaming is associated with higher levels of grandiosity, time spent thinking about grandiose delusions, and grandiose belief conviction.

5.3 Method

5.3.1 Study Design and Participants

The study design and participants for the present study were the same as those in Chapter 4 (see pp 69-70 for details). In brief, a cross-sectional questionnaire study was conducted with two cohorts – a clinical group, diagnosed with non-affective or affective psychosis who were recruited from 39 NHS mental health trusts across England and Wales, and a non-clinical group recruited online via social media advertisements.

5.3.2 Measures

The Qualities of Daydreaming Scale (QuOD): An item pool to measure daydreaming was developed via review of the literature concerning daydreaming, fantasising, and imaginal processes, and adapting items from existing associated measures including: the Future Oriented Repetitive Thought Scale (FoRT; Miranda et al., 2017); Inventory of Childhood Imaginings (ICMI; Wilson & Barber, 1981); Creative Experiences Questionnaire (CEQ; Merckelbach et al., 2001); Imaginal Processes Inventory-short form (Huba et al., 1982); Response to Positive Affect Questionnaire (RPA; Feldman et al., 2008); and Maladaptive Daydreaming Scale (MDS; Somer et al., 2016).

The existing literature on daydreaming reports a three-factor structure for the type of daydreaming: 'positive constructive', 'guilty-dysphoric', and 'poor attentional control' daydreams (Mcmillan et al., 2013; Singer, 1975). Items relating to the first subtype were of particular interest as it was anticipated that daydreaming with positive or meaningful content might be most pertinent to grandiose delusions. Items were selected that captured the frequency of daydreaming, and that assessed how perceptually realistic or vivid was the quality of the daydreams, as it was anticipated that this might be a key factor in how plausible a daydream may feel to an individual.

Items were chosen to focus on current (as opposed to childhood) experiences as it was the extent to which current daydreaming behaviour might be associated with grandiosity that was of particular interest. Items were excluded that might confound with psychotic experience (for example, the CEQ item *"I have the feeling I can often predict things that are bound to happen in the future"*). Once items had been identified for the initial item-pool, minor adaptations were made to wording for consistency. Specifically, the word 'daydreaming' (rather than an alternative such as fantasizing) was used throughout (for example, the CEQ item, *"many of my fantasies have a realistic intensity"* was amended to *"many of my daydreams have a realistic intensity"*). The initial item pool comprised 15 items (see Table 5.1), with each rated on a five-point Likert scale (0=do not agree, 4=agree totally). All participants (across the spectrum of grandiosity) were asked to complete the item pool.

Grandiosity: As described in previous chapters, The Specific Psychotic Experiences Questionnaire–Grandiosity Subscale (SPEQ-G) was used to assess severity of grandiosity.

Grandiose belief conviction and time spent thinking about grandiose beliefs: Participants with high grandiosity (≥5 on the SPEQ-G) were asked to write down a brief description in one or two sentences of their specific 'experience of feeling exceptional' (i.e., the grandiose belief) and asked to rate their conviction in this belief (on a 0-100% scale). They were then asked how many hours

Table 5.1. Original item pool for the Qualities of Daydreaming Scale (QuOD)

Item	Item content
Q1	Many of my friends and/or relatives do not know that I have such detailed daydreams.
Q2	Many of my daydreams have a realistic intensity.
Q3	Many of my daydreams are often just as lively as a good movie.
Q4	I often confuse my daydreams with real memories.
Q5	I am never bored because I start daydreaming when things get boring.
Q6	As an adult I (still) occasionally live in a make-believe world.
Q7	As an adult I spend a substantial part of my total waking day imagining.
Q8	My daydreams usually provide me with pleasant thoughts
Q9	My daydreams are often stimulating and rewarding
Q10	My daydreams offer me useful clues to tricky situations I face
Q11	My daydreams often leave me with a warm, happy feeling.
Q12	I daydream about what I would like to see happen in the future.
Q13	I find my daydreams are worthwhile and interesting to me.
Q14	I daydream about the things that I want happening to me in the future.
Q15	When I picture something good happening to me, I get so caught up in the moment that I don't pay attention to other things.

Items 1-5 were adapted from the Creative Experiences Questionnaire (Merckelbach et al., 2001), 6-7 from the Inventory of Childhood Memories and Imaginings (Wilson & Barber, 1981), 8-13 from the Imaginal Process Inventory - Short Form (Huba et al., 1982), and 14-15 from the Future-Oriented Repetitive Thought scale (Miranda et al., 2017).

per day on average did they spend thinking about their exceptional abilities, identity, role, mission, or wealth (ratings were on a 0 to 5 scale where 0=0-4 hours, 1=5-8 hours, 2=9-12 hours, 3=13-16 hours, 4=17-20 hours, and 5=21-24 hours). Consistent with the studies presented in preceding chapters, the cut-off of ≥5 on the SPEQ-G was used and corresponds to the top 15th percentile of SPEQ-G scores in a non-clinical sample (Černis et al., 2021).

As noted in Chapter 3, additional measures were administered in each cohort but the analyses relating to these is beyond the scope of this thesis (further details provided in Appendix 3.2).

5.3.3 Statistical analyses

Analytic methods used in the present study were very similar to those described in Chapters 3 and 4 (see p. 45 and p. 72) so only a brief summary is presented here.

For measure development, prior to factor analysis, Bartlett's Test of Sphericity and Kaiser-Meyer Olkin Measure of Sampling Adequacy were used to check for the feasibility of factor recovery based on the observed dataset. Parallel analysis was used to identify the number of factors to retain. Cohorts were randomly split to generate two subsamples, enabling item pool refinement using exploratory factor analysis (EFA) with the first subsample, and a test of factor structure using confirmatory factor analysis (CFA) with the second subsample. Data from the non-clinical

and clinical cohorts were combined. The first subsample comprised 1883 non-clinical and 385 clinical participants, and the second comprised 1884 non-clinical and 385 clinical participants.

Measurement invariance analysis was used to assess whether the measure performed similarly across the non-clinical and clinical groups. Psychometric properties were assessed using ordinal alpha to determine internal consistency and intra-class correlations (ICC) for one-week test-retest reliability. The poor-fit criteria used to determine item removal during EFA, the thresholds used to judge the fit of the measurement model in CFA, and the thresholds used to determine whether the levels of internal consistency and test-retest reliability were acceptable were all as described in Chapters 3 and 4 (see pp. 45-46).

The extent to which items on the QuOD were endorsed by participants was inspected by dichotomising responses on each item to either 'not endorsed' (if the participant answered 0=do not agree, or 1= agree a little) or 'endorsed' (if the participant answered between 2=agree moderately and 4=agree). The numbers of participants endorsing each item are reported for each of four subgroups: a clinical group with grandiose delusions, a clinical group without grandiose delusions, a non-clinical group with high grandiosity (SPEQ-G>=5), and a non-clinical group with low grandiosity (SPEQ-G<5).

Kruskal-Wallis one-way ANOVAs and post-hoc pairwise Wilcoxon tests using the Benjamini-Hochberg correction for multiple testing were used to examine differences in mean factor scores for the daydreaming questionnaire across the four groups. Pairwise associations between daydreaming and grandiosity severity, time spent thinking about the grandiose belief, and grandiose belief conviction were tested using simple correlations, using factor scores for latent variables and raw scores for time spent thinking about the grandiose belief and grandiose belief conviction. Pearson's correlation was used except for testing associations with time spent thinking about the grandiose belief, when a Spearman's correlation was used due to the ordinal nature of the variable. Structural equation modelling delivered final prediction models incorporating multiple predictors.

5.4 Results

A total of 4537 participants (3767 from the non-clinical group and 770 from the clinical group) provided complete questionnaire item pool data. The socio-demographic information for these participants is summarised in Table 5.2. The full sample was the same as the full sample in

Table 5.2. Socio-demographic and clinical data for participants in the QuOD measure development analyses.

		Non-clinical group (n=3767)	Clinical group (n=770)	Clinical group test-retest (n=110)
Age				
Mean (SD)		45.17 (18.9)	43.2 (13.7)	41.8 (12.8)
Gender	Female	2379 (63.2)	300 (39.0)	39 (35.5)
n (%)	Male	1283 (34.1)	460 (59.8)	69 (62.7)
	Non-binary	81 (2.2)	5 (0.7)	1 (0.9)
	Other/Prefer not to say	24 (0.6)	5 (0.7)	1 (0.9)
Ethnicity	White (any)	3390 (90.0)	593 (77.1)	76 (69.1)
n (%)	Black (any)	26 (0.7)	70 (9.1)	16 (14.5)
	Asian (any)	104 (2.8)	51 (6.6)	8 (7.3)
	Multiple or Multiple Ethnic Group/Other	189 (5.0)	55 (7.1)	10 (9.1)
	Prefer not to say	58 (1.5)	1 (0.1)	0
Marital status	Single	1370 (36.4)	523 (67.9)	79 (71.8)
n (%)	Cohabiting	459 (12.2)	36 (4.7)	7 (6.4)
	Married/civil partnership	1445 (38.4)	108 (14.0)	6 (5.5)
	Separated/divorced	317 (8.4)	91 (11.8)	15
	Widowed	117 (3.1)	12 (1.6)	3
	Prefer not to say	59 (1.6)	0	0
Employment	Employed FT	979 (26.0)	75 (9.8)	10 (9.1)
n (%)	Employed PT	489 (13.0)	55 (7.2)	4 (3.6)
	Housewife/husband	71 (1.9)	10 (1.3)	2 (1.8)
	Retired	771 (20.5)	63 (8.2)	7 (6.4)
	Student	745 (18.8)	33 (4.3)	2 (1.8)
	Self-employed	365 (9.7)	17 (2.2)	0
	Unemployed	286 (7.6)	469 (61.1)	81 (73.6)
	Voluntary work (option in clinical group only)	-	46 (6.0)	4 (3.6)
	Prefer not to say	61 (1.6)	0	0
SPEQ-G total				
Mean (SD)		4.5 (4.3)	6.2 (6.2)	12.1 (5.6)
Range		0-24	0-24	5-24
Hours per day spent thinking about the grandiose belief	0-4 hours	1426 (37.9)	171 (22.2)	56 (51.4)
	5-8 hours	124 (3.3)	67 (8.7)	24 (22.0)
	9-12 hours	49 (1.3)	35 (4.5)	6 (5.5)
	13-16 hours	22 (0.6)	16 (2.1)	5 (4.6)
(where present)	17-20 hours	9 (0.2)	16 (2.1)	5 (4.6)
n (%)	21-24 hours	25 (0.7)	55 (7.1)	13 (11.9)
	Not applicable (no grandiose belief)	2112 (56.1)	410 (53.2)	-
Grandiose belief conviction 0-100%				
Mean (SD)		61.1 (29.0)	67.3 (31.3)	69.1 (30.4)
Range		0-100%	0-100%	0-100%
History of mental health difficulties?	Yes	1844 (49.0)	-	-
	No	1838 (48.8)	-	-
n (%)	Prefer not to say	85 (2.3)	-	-
If yes are these ongoing?	Yes	1154 (62.6)	-	-
	No	650 (35.2)	-	-
n (%)	Prefer not to say	40 (2.2)	-	-
Diagnosis	Schizophrenia	-	270 (35.1)	39 (35.5)
n (%)	Schizoaffective disorder	-	119 (15.5)	24 (21.8)
	Delusional disorder	-	17 (2.2)	2 (1.8)
	Brief psychotic disorder	-	13 (1.7)	3 (2.7)
	Psychotic disorder NOS	-	154 (20.0)	18 (16.4)
	Bipolar affective disorder	-	184 (23.9)	24 (21.8)
	Psychotic depression	-	8 (1.0)	0
	Other	-	5 (0.6)	0
MH service recruited from	Inpatient unit	-	142 (18.4)	20 (18.2)
	Forensic inpatient	-	25 (3.2)	8 (7.3)
n (%)	EIP service	-	139 (18.1)	20 (18.2)
	Adult CMHT	-	425 (55.2)	57 (51.8)
	Forensic adult CMHT	-	6 (0.6)	1 (0.9)
	Other	-	4.4	4 (3.6)

Studies 2 and 3 from Chapter 3 and socio-demographic information for this group is therefore found in Appendix 3.6.

5.4.1 Measure development

Prior to EFA, inspection of the correlation matrix for the first subsample led to removal of one item (Q14 *"I daydream about the things that I want happening to me in the future"*) which was highly correlated (Spearman's ρ=0.89) with Q12 (*"I daydream about what I would like to see happen in the future"*) and judged to have a similar (but slightly narrower) meaning. Bartlett's test of sphericity and KMO tests indicated factor analysis as appropriate ($\chi^2(105)=30280.31$, $p<0.0001$; KMO=0.94).

Parallel analysis indicated a multiple factor (two-, three-, or four-factor) model may be most appropriate but, as the largest eigenvalue was nine times the size of the next largest, the possibility of a simple one-factor solution was also considered. After model comparison the three-factor solution (mapping onto constructs of 'pleasantness of daydreams', 'realism of daydreams', and 'frequency of daydreams') was identified as most appropriate from a theoretical and empirical perspective. Following criteria for item removal, exploratory factor analysis led to the removal of three items which did not fit closely with the factor definitions. Another item (Q4 "*I often confuse my daydreams with real memories"*) was considered for removal as it cross-loaded onto both the 'realism' and 'frequency' factors. It was decided to retain this item however, as it had a good theoretical fit with the realism factor, strong clinical utility, and could be removed at CFA stage if it continued to be problematic. After EFA, the 11-item, three-factor model accounted for 73% of the variance in the data (see Table 5.3 for factor loadings). The between factor correlation coefficients were: pleasantness and realism, r=0.62; pleasantness and frequency, r=0.61; realism and frequency, r=0.65.

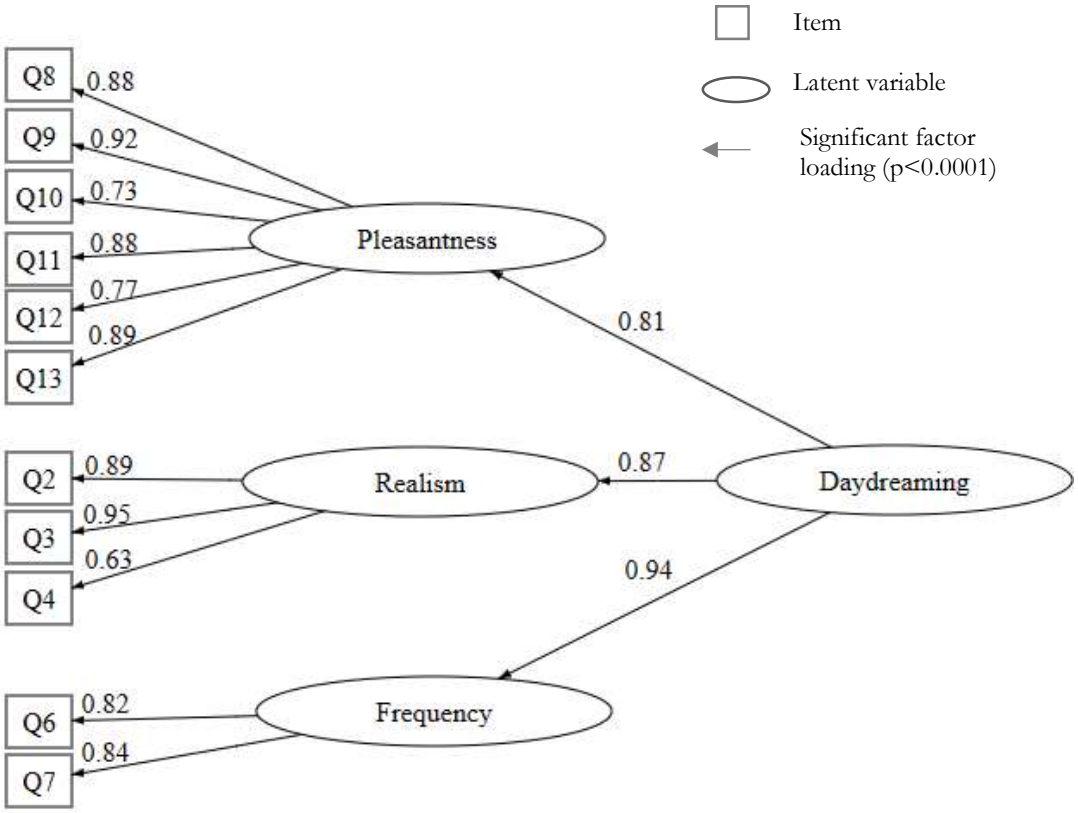
CFA in the second subsample (n=2269) showed that the 11-item, three-factor model derived from the EFA (placing Q4 with the realism factor) had fit indices: robust-$\chi^2(41)=706.510$, CFI=0.987, TLI=0.983, RMSEA=0.085, SRMR=0.035. The RMSEA was slightly above the threshold of 0.08. However, RMSEA is not suited for the wlsmv estimator, with SRMR considered a better fit index for categorical data (Shi, Maydeu-Olivares, et al., 2019; Xia & Yang, 2019). As such, it was determined that the QuOD had a good fit to the data. The pattern of factor correlations supported a higher-order factor. Results from the higher-order confirmatory factor analysis showed that the three primary factors loaded significantly onto the higher-order factor (standardised factor loadings were: pleasantness 0.81, frequency 0.94, and realism 0.87).

Table 5.3. Factor loading after EFA for The Qualities of Daydreaming Scale (QuOD), combined clinical and non-clinical group (n=2268)

Item	Item content	Standardised Factor Loadings		
		Pleasantness	Realism	Frequency
Q8	My daydreams usually provide me with pleasant thoughts	0.90		
Q9	My daydreams are often stimulating and rewarding	0.87		
Q10	My daydreams offer me useful clues to tricky situations I face	0.55		
Q11	My daydreams often leave me with a warm, happy feeling.	0.93		
Q12	I daydream about what I would like to see happen in the future.	0.65		
Q13	I find my daydreams are worthwhile and interesting to me.	0.82		
Q2	Many of my daydreams have a realistic intensity.		0.96	
Q3	Many of my daydreams are often just as lively as a good movie.		0.62	
Q4	I often confuse my daydreams with real memories.		0.45	0.50
Q6	As an adult I (still) occasionally live in a make-believe world.			0.82
Q7	As an adult I spend a substantial part of my total waking day imagining.			0.68

Figure 5.1 shows the final model with factor loadings. The correlations between the QuOD factor scores and raw scores were very high (realism r=0.94, pleasantness r=0.98, frequency r=0.91, higher order daydreaming=0.96).

Figure 5.1. The QuOD final 11-item higher-order factor model after CFA (n=2269)



Measurement Invariance: Using the CFA sample (n=2269) we tested four levels of measurement invariance between the clinical (n=385) and non-clinical (n=1884) groups. Measurement invariance was achieved at the strongest scalar level (see Table 5.4), meaning that the measure performed the same across the two groups and that latent factor scores can meaningfully be compared between these groups. There was no significant difference between factor means in the clinical and non-clinical groups. Setting the non-clinical group as the reference group, the estimated differences in factor means were: pleasantness of daydreams latent mean estimate=-0.11, std.error=0.09, p=0.21; realism of daydreams latent mean estimate=0.15, std.error=0.11, p=0.19; frequency of daydreams latent mean estimate=-0.12, std.error=0.11, p=0.30.

Psychometric properties: Using the CFA sample (n=2269) it was found that the QuOD had good internal consistency (alpha ordinals were: realism of daydreams=0.86, pleasantness of daydreams=0.93, frequency of daydreams=0.82, and higher order factor daydreaming = 0.94). 109 participants in the clinical group provided repeat data 3 to 10 days after baseline (mean=7.29, SD=1.37). Test-retest reliability was good (ICC=0.75).

Table 5.4. Model comparison to determine measurement invariance between clinical and non-clinical groups for the Qualities of Daydreaming Scale (QuOD), n=2269.

Models	Model Comparison	K	χ2	DF	RMSEA	SRMR	CFI
Configural	-	116	735.959	82	0.084	0.036	0.987
Weak - Threshold	Threshold vs Configural	138	822.533	104	0.078 Δ=-0.006	0.036 Δ=0	0.985 Δ=-0.002
Weak - Metric	Metric vs Threshold	141	835.096	112	0.075 Δ=-0.003	0.036 Δ=0	0.985 Δ=0
Strong - Scalar	Scalar vs Metric	133	919.105	120	0.077 Δ=+0.002	0.037 Δ=-0.001	0.984 Δ=-0.001

5.4.2 Item endorsement

Table 5.5 shows the rates of endorsement of the QuOD items for each of four subgroups: the clinical group with grandiose delusions (n=360), the clinical group without grandiose delusions (n=406), the non-clinical group with high grandiosity (n=1374), and the non-clinical group with low grandiosity (n=2393). The mean numbers of items endorsed for each of the QuOD factors in these subgroups are shown in Table 5.6, and the non-dichotomised endorsement rates are provided in Appendices 5.1 and 5.2. In the clinical group with grandiose delusions, 84.7% (n=305) endorsed at least one item on the QuOD. The equivalents rates were 67.0% (n=272) in the clinical group without grandiose delusions, 79.2% (n=1088) in the non-clinical group with high grandiosity, and 66.7% (n=1595) in the non-clinical group with low grandiosity.

The mean factor scores for each of the four groups are shown in Table 5.7. Kruskal-Wallis one-way ANOVAs indicated that there were significant differences in factor means across the four groups for each of the QuOD factors: pleasantness of daydreams ($H(3)=241.24$, $p<0.0001$), frequency of daydreams ($H(3)=246.87$, $p<0.0001$), realism of daydreams ($H(3)=258.33$, $p<0.0001$), and higher order daydreaming ($H(3)=350.86$, $p<0.0001$).

Post-hoc pairwise multiple comparison tests found that the clinical group with grandiose delusions had significantly higher ($p<0.01$) mean factor scores for all daydreaming factors (pleasantness, frequency, realism, and higher order daydreaming) than all other groups. The next highest for all factors was the non-clinical high grandiosity group ($p<0.01$). There were no significant differences between the clinical group without grandiose delusions and the non-clinical low grandiosity group for mean factor scores except for on the pleasantness factor where the clinical group without grandiose delusions had the lowest rates of all subgroups ($p<0.001$; see Table 5.7 and Table 5.8).

5.4.3 Tests of association

Daydreaming and grandiosity

In the clinical group (n=766) there were significant ($p<0.0001$) moderate-sized correlations between grandiosity and each of the QuOD first order and higher order factors (see Table 5.9). The QuOD factors were themselves strongly associated. When the first order factors were entered into a structural equation model with grandiosity as the response variable, only 'pleasantness' remained in the model (Std.Est=0.437, $p<0.0001$), explaining 19.1% of the variance in grandiosity (Table 5.10).

Table 5.5. Frequencies of endorsement for Qualities of Daydreaming Scale (QuOD) items in the clinical groups with and without grandiose delusions, and the non-clinical groups with high versus low grandiosity

QuOD subscale		Item content	Clinical group with grandiose delusions (n=360)		Clinical group without grandiose delusions (n=406)		Non-clinical group with high grandiosity (n=1374)		Non-clinical group with low grandiosity (n=2393)	
			Frequencies of endorsement of items with dichotomised response; n (%)							
			Not endorsed n (%)	Endorsed n (%)	Not endorsed n (%)	Endorsed n (%)	Not endorsed n (%)	Endorsed n (%)	Not endorsed n (%)	Endorsed n (%)
Pleasantness	Q8	My daydreams usually provide me with pleasant thoughts	183 (50.8)	177 (49.2)	263 (64.78)	143 (35.22)	701 (51.02)	673 (48.98)	1480 (61.85)	913 (38.15)
	Q9	My daydreams are often stimulating and rewarding	186 (51.7)	174 (48.3)	299 (73.65)	107 (26.35)	731 (53.20)	643 (46.80)	1727 (72.17)	666 (27.83)
	Q10	My daydreams offer me useful clues to tricky situations I face	173 (48.1)	187 (51.9)	309 (76.11)	97 (23.89)	842 (61.28)	532 (38.72)	1885 (78.77)	508 (21.23)
	Q11	My daydreams often leave me with a warm, happy feeling.	178 (49.4)	182 (50.6)	303 (74.63)	103 (25.37)	821 (59.75)	553 (40.25)	1748 (73.05)	645 (26.95)
	Q12	I daydream about what I would like to see happen in the future.	123 (34.2)	237 (65.8)	232 (57.14)	174 (42.86)	562 (40.90)	812 (59.10)	1353 (56.54)	1040 (43.46)
	Q13	I find my daydreams are worthwhile and interesting to me.	130 (36.1)	230 (63.9)	259 (63.79)	147 (36.21)	655 (47.67)	719 (52.33)	1531 (63.98)	862 (36.02)
Realism	Q2	Many of my daydreams have a realistic intensity.	151 (41.9)	209 (58.1)	242 (59.61)	164 (40.39)	694 (50.51)	680 (49.49)	1595 (66.65)	798 (33.35)
	Q3	Many of my daydreams are often just as lively as a good movie.	162 (45.0)	198 (55.0)	265 (65.27)	141 (34.73)	793 (57.71)	581 (42.29)	1737 (72.59)	656 (27.41)
	Q4	I often confuse my daydreams with real memories.	233 (64.7)	127 (35.3)	311 (76.60)	95 (23.40)	1151 (83.77)	223 (16.23)	2192 (91.60)	201 (8.40)
Frequency	Q6	As an adult I (still) occasionally live in a make-believe world.	207 (57.5)	153 (42.5)	305 (75.12)	101 (24.88)	949 (69.07)	425 (30.93)	1892 (79.06)	501 (20.94)
	Q7	As an adult I spend a substantial part of my total waking day imagining.	196 (54.4)	164 (45.6)	297 (73.15)	109 (26.85)	896 (65.21)	478 (34.79)	1849 (77.27)	544 (22.73)

** Items for the QuOD were answered on a 0 to 4 scale with 0=do not agree and 4=agree totally. Responses were recoded into a dichotomous scale where items rated 0 and 1 were coded as endorsement level 0, and those rated from 2 to 4 were rated 1.

Table 5.6. Mean number of items endorsed on each subscale of the Qualities of Daydreaming Scale (QuOD) across different groups

	Mean (SD) number of items endorsed			
QuOD subscale	Clinical group with grandiose delusions (n=360)	Clinical group without grandiose delusions (n=406)	Non-clinical group with high grandiosity (n=1374)	Non-clinical group with low grandiosity (n=2393)
Pleasantness (out of 6 items)	3.30 (2.36)	1.90 (2.13)	2.86 (2.32)	1.94 (2.11)
Realism (out of 3 items)	1.48 (1.16)	0.99 (1.16)	1.08 (1.09)	0.69 (0.97)
Frequency (out of 2 items)	0.88 (0.88)	0.52 (0.77)	0.66 (0.82)	0.44 (0.71)
Total (out of 11 items)	5.66 (3.73)	3.40 (3.42)	4.60 (3.63)	3.06 (3.21)

Table 5.7. Mean factor scores and standard deviations for each subscale of the Qualities of Daydreaming Scale (QuOD) across clinical and non-clinical groups

Daydreaming Factor	Group	Factor mean	Standard Deviation	Significantly different grouping*
Pleasant	Clinical grandiose delusions	0.37	0.96	1
	Non-clinical high grandiosity	0.22	0.84	2
	Non-clinical low grandiosity	-0.11	0.73	3
	Clinical without grandiose delusions	-0.23	0.87	4
Frequency	Clinical grandiose delusions	0.38	0.79	1
	Non-clinical high grandiosity	0.20	0.68	2
	Non-clinical low grandiosity	-0.09	0.62	3
	Clinical without grandiose delusions	-0.14	0.73	3
Realism	Clinical grandiose delusions	0.47	0.87	1
	Non-clinical high grandiosity	0.22	0.76	2
	Clinical without grandiose delusions	-0.06	0.85	3
	Non-clinical low grandiosity	-0.11	0.69	3
Higher order	Clinical grandiose delusions	0.40	0.72	1
	Non-clinical high grandiosity	0.22	0.63	2
	Non-clinical low grandiosity	-0.11	0.57	3
	Clinical without grandiose delusions	-0.14	0.67	3

* For each daydreaming factor, the groups have been arranged in order from highest factor mean to lowest. In the 'significantly different grouping' column, groups with the same number allocation have factor means that are not significantly different from one another. For example, for the pleasant daydreaming factor, all groups are significantly different from all other groups. For the other factors however, the non-clinical low grandiosity group and clinical without grandiose delusions groups are not significantly different from each other. The p-values for each pairwise comparison are given in Table 5.7.

Table 5.8. p-values for pairwise Wilcoxon post-hoc tests testing for significant differences between groups on each subscale of the Qualities of Daydreaming Scale (QuOD)

Daydreaming factor	Group	Group: Clinical with grandiose delusions	Group: Clinical without grandiose delusions	Group: Non-clinical high grandiosity
Pleasantness	Clinical without grandiose delusions	*<0.0001*	-	-
	Non-clinical high grandiosity	*0.0025*	*<0.0001*	-
	Non-clinical low grandiosity	*<0.0001*	*0.00079*	*<0.0001*
Frequency	Clinical without grandiose delusions	*<0.0001*	-	-
	Non-clinical high grandiosity	*0.00014*	*<0.0001*	-
	Non-clinical low grandiosity	*<0.0001*	0.060	*<0.0001*
Realism	Clinical without grandiose delusions	*<0.0001*	-	-
	Non-clinical high grandiosity	*<0.0001*	*<0.0001*	-
	Non-clinical low grandiosity	*<0.0001*	0.52	*<0.0001*
Higher Order	Clinical without grandiose delusions	*<0.0001*	-	-
	Non-clinical high grandiosity	*<0.0001*	*<0.0001*	-
	Non-clinical low grandiosity	*<0.0001*	0.24	*<0.0001*

NB: p-values indicating significant differences are given in italics.

Table 5.9. Pairwise correlations of associations between daydreaming, grandiosity, time spent thinking about grandiose beliefs, and grandiose belief conviction.

	Pleasantness of daydreams (QuOD factor 1)	**Frequency of daydreams (QuOD factor 2)**	**Realism of daydreams (QuOD factor 3)**	**Daydreaming (QuOD higher order factor)**
	Full clinical group (n=766)			
Grandiosity (SPEQ-G factor score)	0.42 p<0.0001	0.41 p<0.0001	0.41 p<0.0001	0.49 p<0.0001
Pleasantness of daydreams (QuOD factor 1)		0.75 p<0.0001	0.79 p<0.0001	0.88 p<0.0001
Frequency of daydreams (QuOD factor 2)			0.88 p<0.0001	0.94 p<0.0001
Realism of daydreams (QuOD factor 3)				0.97 p<0.0001
	Clinical group with grandiose delusions **(n=353)**			
Time spent thinking about the grandiose delusion	0.16 p=0.002	0.16 p=0.003	0.20 p=0.0002	0.20 p=0.0002
Grandiose delusion conviction	0.14 p=0.010	0.08 p=0.154	0.11 p=0.042	0.12 p=0.029
	Full non-clinical group **(n=3767)**			
Grandiosity (SPEQ-G factor score)	0.37 p<0.0001	0.37 p<0.0001	0.37 p<0.0001	0.42 p<0.0001
Pleasant (FEQ factor 1)		0.87 p<0.0001	0.80 p<0.0001	0.94 p<0.0001
Frequency (FEQ factor 2)			0.87 p<0.0001	0.97 p<0.0001
Realism (FEQ factor 3)				0.93 p<0.0001
	High grandiosity non-clinical group (n=1374)			
Time spent thinking about the grandiose belief	0.15 p<0.0001	0.18 p<0.0001	0.17 p<0.0001	0.18 p<0.0001
Grandiose belief conviction	0.09 p=0.0005	0.05 p=0.043	0.05 p=0.046	0.08 p=0.003

NB: All correlation coefficients are Pearson's r, except for those with 'time spent thinking about the grandiose delusion' where Spearman's rho was used, due to the categorical nature of the data.

Table 5.10. Structural equation models examining the associations between daydreaming and grandiosity, time spent thinking about the grandiose belief, and grandiose belief conviction.

SEM regression step	Response Variable	Explanatory variable	Estimate	Std. Error	p-value	Std.Est
1) Grandiosity regressed on QuOD factors (full clinical group n=766)						
Step 1: all predictors included	Grandiosity	Pleasantness of daydreams	0.369	0.061	<0.0001	0.356
		Frequency of daydreams	0.085	0.109	0.433	0.085
		Realism of daydreams	0.014	0.114	0.905	0.014
Step 2: Realism removed (non-significant)	Grandiosity	Pleasantness of daydreams	0.371	0.057	<0.0001	0.359
		Frequency of daydreams	0.097	0.060	0.102	0.097
Step 3: Frequency removed (non-significant)	Grandiosity	Pleasantness of daydreams	0.454	0.038	<0.0001	0.437
2) Grandiosity regressed on QuOD factors (non-clinical group, n=3767)						
Step 1: all predictors included	Grandiosity	Pleasantness of daydreams	0.217	0.030	<0.0001	0.244
		Frequency of daydreams	-0.119	0.050	0.017	-0.120
		Realism of daydreams	0.227	0.036	<0.0001	0.253
Step 2: Frequency removed (suppressor effect)	Grandiosity	Pleasantness of daydreams	0.175	0.025	<0.0001	0.198
		Realism of daydreams	0.164	0.027	<0.0001	0.184
3) *Time spent thinking about grandiose belief regressed on QuOD factors (clinical group with grandiose delusions, n=353)*						
Step 1: all predictors included	Time thinking about grandiose belief	Pleasantness of daydreams	-0.697	0.649	0.283	-0.606
		Frequency of daydreams	-5.288	3.799	0.164	-4.358
		Realism of daydreams	5.731	3.964	0.148	5.004
4) *Time spent thinking about grandiose belief regressed on QuOD factors (high grandiosity non-clinical group, n=1374)*						
Step 1: all predictors included	Time thinking about grandiose belief	Pleasantness of daydreams	-0.124	0.091	0.170	-0.112
		Frequency of daydreams	0.506	0.142	<0.0001	0.405
		Realism of daydreams	0.050	0.096	0.603	0.044
Step 2: Realism removed (non-significant)	Time thinking about grandiose belief	Pleasantness of daydreams	-0.133	0.092	0.150	-0.120
		Frequency of daydreams	0.570	0.111	<0.0001	0.456
Step 3: Pleasantness removed (non-significant)	Time thinking about grandiose belief	Frequency of daydreams	0.376	0.047	<0.0001	0.329
5) *Grandiose delusion conviction regressed on QuOD factors Pleasantness and Realism (clinical group with grandiose delusions, n=353)*						
Step 1: all predictors included	Grandiose delusion conviction	Pleasantness of daydreams	-0.014	0.097	0.885	-0.012
		Realism of daydreams	0.272	0.100	0.007	0.241
Step 2: Pleasantness removed (non-significant)	Grandiose delusion conviction	Realism of daydreams	0.257	0.063	<0.0001	0.228
6) *Grandiose delusion conviction regressed on all QuOD factors (high grandiosity non-clinical group, n=1374)*						
Step 1: all predictors included	Grandiose delusion conviction	Pleasantness of daydreams	0.114	0.064	0.078	0.103
		Frequency of daydreams	0.197	0.099	0.047	0.157
		Realism of daydreams	-0.147	0.064	0.021	-0.129
Step 2: remove Pleasantness (non-significant)	Grandiose delusion conviction	Frequency of daydreams	0.535	0.094	<0.0001	0.416
		Realism of daydreams	-0.331	0.080	<0.0001	-0.290
Step 3: remove Realism (suppressor effect)	Grandiose delusion conviction	Frequency of daydreams	0.179	0.036	<0.0001	0.143

Note: Std.Est=Standardised estimate

This analysis was repeated in the non-clinical group. Similar but slightly smaller-sized associations were observed in the pairwise correlations (Table 5.8). In the structural equation model both pleasantness (Std.Est=0.198, p<0.0001) and realism (Std.Est=0.184, p<0.0001) remained in the final model, which explained 12.6% of the variance in grandiosity (Table 5.10).

Daydreaming and time spent thinking about the grandiose belief

In the clinical group with grandiose delusions (n=353), there were significant (p<0.01) small-sized correlations between time spent thinking about the grandiose delusion and each of the QuOD first order and higher order factors (Table 5.9). When all three first order factors were entered into a structural equation model none of the factor coefficients were significant, indicating that it is the shared variance of daydreaming that predicts the time spent thinking about the grandiose belief, rather than there being a unique effect from any of the three factors (Table 5.10). When the higher order factor 'daydreaming' was entered as the only predictor it explained 7.7% of the variance in time spent thinking about the grandiose delusion (Std.Est=0.277, p<0.0001).

In the non-clinical group with high grandiosity similar associations were observed in the pairwise correlations (Table 5.9). In the structural equation model however, frequency of daydreams remained as a predictor in the final model (Std.Est=0.329, p<0.0001; Table 5.10) explaining 10.8% of the variance in time spent thinking about the grandiose belief.

Daydreaming and grandiose belief conviction

In the clinical group with grandiose delusions (n=353), there were significant (p<0.05) small-sized correlations between grandiose delusion conviction and pleasantness, realism, and the higher order daydreaming factor but not with frequency (see Table 5.9. When pleasantness and realism were entered as explanatory variables into a structural equation model with grandiose delusion conviction as the response variable, only realism remained in the final model (Std.Est=0.228, p<0.0001), explaining 5.2% of the variance in grandiose delusion conviction (Table 5.10).

In the non-clinical group with high grandiosity all of the daydreaming factors were significantly associated (p<0.05) with grandiose belief conviction, however the sizes of these associations were very small. In the structural equation model, only frequency remained as a predictor of grandiose belief conviction (Std.Est=0.143, p<0.0001) explaining 2.0% of the variance (Table 5.10).

5.5 Discussion

This chapter reports the development of the Qualities of Daydreaming Scale (QuoD), a measure designed to allow researchers and clinicians quickly to assess current daydreaming experience with minimal burden for the respondent. Evidence demonstrating an association between daydreaming and grandiosity is presented, and suggests that pleasant, perceptually realistic, and frequent daydreaming may play a role in maintaining grandiose delusions.

Factor analyses during measure development showed that a three-factor model had a good fit to the data. These factors were pleasantness of daydreams (e.g., *"my daydreams usually provide me with pleasant thoughts"; "I daydream about what I would like to see happen in the future"*), perceptual realism of daydreams (e.g., "*many of my daydreams have a realistic intensity"; "I often confuse my daydreams with real memories"*), and frequency of daydreams (e.g., "*as an adult I spend a substantial part of my total waking day imagining"; "as an adult I (still) occasionally live in a make-believe world"*.) The pattern of correlations supported a higher-order 'daydreaming' factor, indicating that the subscale scores for pleasantness, realism, and frequency may be summed together to give a total 'daydreaming' score. Each subscale, as well as the higher order factor, had good internal consistency and test-retest reliability, and the measure was invariant across non-clinical and clinical groups. As such, the QuOD can reliably measure daydreaming across the spectrum of grandiosity.

There was clear evidence of an association between daydreaming and grandiose delusions. Patients with grandiose delusions reported significantly more frequent, perceptually realistic, and pleasant daydreams than patients without grandiose delusions or participants in the non-clinical groups. The non-clinical high grandiosity group had the second highest subscale scores, with patients without grandiose delusions and non-clinical participants with low grandiosity having the lowest scores. Furthermore, daydreaming was moderately associated with grandiosity severity in both clinical and non-clinical groups, and there were significant albeit small associations between daydreaming and time spent thinking about the grandiose belief, and grandiose belief conviction.

What might explain this relationship between daydreaming and grandiose delusions? There are several possibilities. One direct route may be that part or all of the daydreaming content focuses on the grandiose delusion. In this case frequent pleasant daydreaming could mean frequently thinking about the grandiose ideation, potentially keeping the ideas at the forefront of the mind, elaborating the details, and increasing delusional conviction. Additionally, those with a tendency for more vivid and perceptually realistic daydreams would likely have more vivid and perceptually realistic thoughts about the grandiose delusion, potentially making it more

believable and hence increasing delusional conviction. Alternatively, having more pleasant, frequent, and realistic daydreams in general, irrespective of the content, might contribute to elevated mood. Elation has been identified as a putative mechanism in the formation and maintenance of grandiose delusions, potentially acting by reinforcing or amplifying pre-existing inflated or accurate positive perceptions of the self which feed into the content of the delusional belief (Freeman & Garety, 2003). As such there may be an indirect route between daydreaming and grandiose delusions which is mediated by affect. This study did not assess the content of daydreams, but this would be important in future work as it will have implications for therapeutic interventions. It is clear however that people with grandiose delusions are spending more time daydreaming, and it may be valuable therefore to support patients to find other meaningful activities.

The study has limitations similar to those described in Chapters 3 and 4. The cross-sectional design means that causal relationships cannot be determined. The recruitment of the non-clinical group via social media (potentially unrepresentative of the general population) and the representativeness of the participant group (who were predominantly White-British) impacts the extent to which the findings are generalisable. The QuOD had good psychometric properties; however it may benefit from further refinement. For example, the version presented here only used items adapted from existing measures, and the frequency of daydreams scale in particular may benefit from additional items that would allow for more detailed quantification of the amount of time spent daydreaming. Given the potential importance of daydreaming about grandiose ideation specifically, it would also be helpful to add items that assess the specific content of daydreams as well. Clarification regarding the differences and similarities between constructs of daydreaming, rumination, and repetitive thinking would also be a helpful avenue for future research. Finally, the associations between daydreaming and grandiose delusions were in the small to moderate range, and an intervention targeting only this mechanism would likely not be sufficient to effect meaningful change. Causation is likely to be multi-factorial and, as highlighted in previous chapters, the contribution of multiple factors should be considered.

6. Discussion

> *"[Good therapy would be] something that makes them feel good, [..] makes them want to be in reality. Getting up every day, going for a morning run, having some good breakfast [..] having projects to work on, having skills you learn. [..] What's your love life like? [..] You need to look at all aspects of the person's life."; "You've also got to have a sense of belonging [..] a place within your society, a sense you have some worth."*
>
> Bob, participant in the qualitative study (Chapter 2)

Despite being a relatively common type of delusion occurring in clinical presentations of psychosis, grandiose delusions have been notably neglected as a specific focus of research, and there is no evidence-based targeted psychological intervention for harmful grandiose delusions.

To begin to address this issue, a systematic programme of research was undertaken and is presented in this thesis. There were two key aims. The first was to determine the extent to which patients identify harmful consequences occurring as a result of grandiose delusions, and whether they want help with these harms. The rationale to intervene is inextricably linked to harm, and therefore understanding the degree to which patients identify and want help with difficulties arising from delusions may indicate a possible route by which to engage patients in a psychological treatment. The second aim was to learn from patients about potential psychological drivers of grandiose delusions in order to develop a theoretical maintenance model, and then to conduct preliminary tests of this model by testing associations between hypothesised maintenance factors and grandiosity. This work was conducted to inform the future development of an evidence-based targeted psychological treatment for harmful grandiose delusions.

In this chapter, a summary of the findings will be presented in relation to these aims. The limitations of the research will be discussed together with directions for future research. The chapter concludes by considering the clinical implications of the research presented in this thesis.

6.1 Overview of findings

6.1.1 Harm from grandiose delusions and wanting help

The harmful consequences of grandiose delusions were investigated in Chapters 2 and 4. In the qualitative study (Chapter 2), all participants described harm arising from their grandiose beliefs. Harms occurred across multiple life domains (physical, sexual, social, emotional, and occupational), could be to self or others, and could occur as a direct consequence of the belief, due to preoccupation with the belief, or from the responses of others. The implication was that harmful consequences of grandiose delusions may be highly prevalent, be recognised by patients, and have a far greater breadth of focus than is reflected in the existing limited literature (which concentrates primarily on violence and offending). However, as this was a qualitative study, further quantitative evidence was required to determine whether these findings were generalisable.

To this end a cross-sectional self-report questionnaire study (described in Chapter 4) with 361 patients with current grandiose delusions and a diagnosis of affective or non-affective psychosis was conducted. Factor analysis was used to develop the Subjective Harm from Exceptional Experiences Questionnaire (SHEEQ), a nine-item one-factor measure with good psychometric properties. The items on the SHEEQ predominantly elicit the respondent's view as to whether the grandiose belief has caused harm to self (including across each of the five life domains identified in the qualitative study) but also includes one item about harm to others and another about others' perceptions of whether the belief has caused harm. More than three-quarters of the patients identified at least one harm occurring within the last six months, with social and emotional harms to self being the most commonly reported. Furthermore, more than half of patients reported wanting help with these difficulties. Wanting help was significantly associated with harm as well as with measures of two putative maintenance mechanisms, repetitive thinking about the grandiose belief and immersion behaviours, and these associations remained when controlling for grandiosity. This is encouraging as it indicates that patients might potentially be willing to engage in a targeted therapy to help with the difficulties of grandiose delusions irrespective of their level of belief conviction.

6.1.2 Potential maintenance mechanisms for grandiose beliefs

Patient descriptions in the qualitative study (Chapter 2) led to a theoretical psychological maintenance model of grandiose delusions being developed. The meaning of grandiose delusions was identified as a potentially important driver of the persistence of the beliefs alongside

anomalous experiences (e.g., voices, felt sense of salience), symptoms of mania, fantasy elaboration (which included repetitive thinking about the grandiose belief and daydreaming), reasoning biases, and immersion behaviours (acting within the delusional system).

Preliminary tests of this model were conducted in relation to four of these processes: the meaning in grandiose delusions (Chapter 3); repetitive thinking about the grandiose belief and immersion behaviours (Chapter 4); and daydreaming (Chapter 5). These studies drew on cross-sectional data from two large non-clinical cohorts (n=8805 and n=4518) and a clinical cohort (798 patients with psychosis, 375 of whom had grandiose delusions). Five measures of the relevant constructs were developed (the Grandiosity Meaning Measure, gram; Grandiosity Meaning Measure – Sources, grams; Thinking about Exceptional Experiences Questionnaire, TEEQ; Immersion Behaviours Questionnaire – Exceptional Experiences, IBQ-EE; and Qualities of Daydreaming Scale, QuOD) and associations with grandiosity tested.

For each mechanism separately, structural equation modelling was used to assess the amount of the variance in grandiosity severity and grandiose delusion conviction explained by that mechanism. Table 6.1 provides a summary of these findings for the clinical cohort. Give the cross-sectional nature of the data causality cannot be determined. However the findings are consistent with the hypotheses that meaning in grandiose delusions, immersion behaviours, repetitive thinking about the grandiose belief, and daydreaming may each contribute to the maintenance of grandiose delusions. If this is found to be the case, then there are implications for clinical intervention (discussed further in section 6.3). Given the differences in the strength of associations, the meaning in grandiose delusions, immersion behaviours, and repetitive thinking may have stronger potential as possible targets for a psychological intervention for harmful grandiose delusions than daydreaming.

This thesis represents one of the few concerted programmes of research dedicated to understanding grandiose delusions with a view to developing a psychological therapy, and the findings are encouraging. Plausible maintenance mechanisms were identified, and the studies also evidence that it is possible to talk in depth to patients about their experience of grandiose delusions and to recruit large numbers of clinical and non-clinical participants who experience grandiose beliefs to participate in research. However, this is only a first step in the journey towards developing an evidence-based psychological treatment for harmful grandiose delusions and there were several limitations of the research presented in this thesis.

Table 6.1. Summary of the amount of variance explained in grandiosity and grandiose delusion conviction by each mechanism tested separately in the structural equation models from Chapters 3, 4, and 5

Response variable	Structural equation model	Amount of variance explained, R^2 (clinical group)
Grandiosity severity	*SEM 1:* Grandiosity regressed on the meaning in grandiose delusions (gram and grams)	53.5%
	SEM 2: Grandiosity regressed on immersion behaviours (IBQ-EE)	39.5%
	SEM 3: Grandiosity regressed on repetitive thinking about the grandiose belief (TEEQ)	20.4%
	SEM 4: Grandiosity regressed on daydreaming (QuOD)	19.1%
Grandiose delusion conviction (0-100%)	*SEM 5:* conviction regressed on the meaning in grandiose delusions (gram and grams)	27.4%
	SEM 6: conviction regressed on immersion behaviours (IBQ-EE)	13.8%
	SEM 7: conviction regressed on repetitive thinking about the grandiose belief (TEEQ)	29.6%
	SEM 8: conviction regressed on daydreaming (QuOD)	5.2%

6.2 Limitations and areas for future research

A key limitation is the cross-sectional nature of the data. This means that it is not possible to determine the direction of effect between predictors and grandiose beliefs, nor can it be ascertained whether the associations observed are causal or if there are other potential confounders underlying the relationships. A priority for future research will be to test the associations between the putative maintenance mechanisms identified and grandiosity using both longitudinal and experimental designs. As highlighted by P. Brown and colleagues (2019), there are two main methodological approaches that may be used to gain this type of evidence. The first is a short-term randomised controlled experimental study where the putative explanatory mechanism (e.g., repetitive thinking about grandiose ideas) is deliberately manipulated and immediate change in the clinical outcome of interest (e.g., severity of grandiosity) is measured. The other option is via an interventionist-causal (Kendler & Campbell, 2009) randomised controlled trial where a specific sustained intervention to target the putative causal mechanism (e.g., an intervention designed to reduce repetitive thinking about grandiose delusions) is provided and change in the clinical outcome (e.g., grandiosity severity or grandiose delusion

conviction) is assessed. Both study designs can be reinforced using mediation analysis, and both would be of value. However, the latter approach may be particularly apposite given that the overarching aim is to develop an intervention for harmful grandiose delusions. A series of interventionist-causal studies, each targeting a single hypothesised maintenance mechanism with a specified treatment technique, would not only allow causal links to be demonstrated but would also incorporate the development and preliminary evaluation of a set of treatment techniques. Once several successful techniques have been identified, they could be combined to form a full therapy to be tested initially with a case series and subsequently via a randomised controlled trial.

Within this thesis, four potential maintenance mechanisms (the meaning in grandiose delusions, immersion behaviours, repetitive thinking about grandiose beliefs, and daydreaming) are investigated but there will likely be others and additional factors (for example anomalous experiences, mania, and reasoning biases) warrant further investigation. Determining the relative contributions of multiple factors to grandiose delusions and the interplay between different mechanisms would be of interest. Furthermore, understanding which of these mechanisms patients really want help with, are amenable to change via psychological intervention, and have moderate to large associations with grandiosity (and thus if targeted in intervention might be expected to result in a clinically meaningful change) will be critical to the successful development of a psychological intervention.

Another limitation of the studies presented is that the participants were predominantly White-British thus limiting the extent to which the findings may be generalisable. Future research to establish whether the measures perform similarly in diverse populations and across different countries would be valuable. Cultural influences are not only central to determining what is or is not a delusion (as discussed in the introduction) but may also have an important influence over the different constructs investigated in the thesis. For example, given that there appear to be cultural differences in relation to the experience and sources of happiness and well-being (Brailovskaia et al., 2022; Joshanloo et al., 2014; Lu & Shih, 1997) one might also expect there to be cultural differences in relation to the meaning in grandiose delusions and the sources of that meaning. Similarly, cultures differ in their moral evaluations of modesty versus self-promotion (Cameron et al., 2012), and it might be expected that there could be greater social harm in response to grandiose delusions in those cultures where self-promotion is viewed particularly negatively. Investigating the similarities and differences across cultures in relation to grandiosity, harm from grandiose delusions, and each putative maintenance mechanism will be key steps for future research.

6.3 Clinical implications

It is clear that further research determining the mechanisms underpinning grandiose delusions and developing and evaluating targeted interventions is required before the findings from this thesis may be widely applied in clinical practice. However, there are some relevant clinical implications that are worthy of consideration at this point.

Firstly, talking to patients about the harm they experience in relation to their grandiose beliefs is key. As stated in Chapter 4, clinicians may focus on harms that are most readily observable and potentially life-threatening (such as those that might lead to physical injury). However, patients report a far wider range of harms across multiple life domains, and many of the harms experienced by patients may be quite subtle and not readily observable to clinicians. Using questions from the Subjective Harm in Exceptional Experiences Questionnaire alongside the Immersion Behaviours Questionnaire and Thinking about Exceptional Experiences Questionnaire (as these mechanisms were associated with harm and wanting help) may offer a helpful way for clinicians and patients to start to develop a shared understanding of the difficulties of grandiose beliefs that may facilitate engagement in therapy. Such conversations would enable the clinician to gain a better understanding of the patient's perspective on harm but could also provide an opportunity for the clinician to discuss harms that they may be concerned about but which the patient has not identified as being problematic. Bringing family members into the conversation may also be helpful in gaining a broader perspective on the full range of difficulties that may be experienced due to the grandiose delusion.

Collaborative discussions about harm might also have a critical role in informing the direction that an intervention might take. Consider Sophie and Mandy, participants in the qualitative study (Chapter 2). Both had experienced beliefs that they were deities (Sophie believed "I am God" and Mandy believed "I am a Goddess"), however the associated harms were notably different. Sophie believed that she could walk on water and described attempting to do so whilst wearing heavy winter clothing and without consideration to the depth of the water she was entering. In this instance there was a clear risk of physical harm occurring as a direct result of her belief regarding her perceived identity and special powers, and this would be an important focus for intervention. In Mandy's case however the predominant harm was not from the belief itself (indeed, the belief was a source of great comfort) but rather from others' reactions to it. Mandy did not typically engage in behaviours that caused any physical risk to herself or others but had experienced social rejection from family members when she had talked to them about her belief, and this was a source of distress for her. In Mandy's case there would arguably be a case not to

try to modify the belief itself, but rather to support her to discern whom she talks to about her experience.

Mandy's case emphasises the importance of asking patients not only about harm but also about the meaning of the grandiose delusion. Whilst harm arising from a grandiose delusion provides a rationale for intervention, any decision regarding possible intervention must also necessarily weigh this up against the meaning that the person gains from their belief. Both the qualitative (Chapter 2) and quantitative (Chapter 3) studies presented in this thesis demonstrate that grandiose delusions are highly meaningful experiences that go far beyond simply making a person feel happy or powerful. By providing a sense that one's life makes sense (coherence), has a future focus (purpose), and is worthwhile (significance), grandiose delusions provide the experience of having meaning in life. The sources of this meaning are numerous, and grandiose delusions provide a sense of being able 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. Furthermore two-thirds of clinical participants indicated that the grandiose delusion gave them a reason to live. It is important that clinicians hold this in mind as attempts to change the belief without compensating for the meaning it provides could be both difficult and harmful.

Whilst the development of a psychological intervention for harmful grandiose delusions is a task for future research, it seems probable that consideration of harm and meaning will be central. Given that the more than three-quarters of patients identify harm or difficulties occurring in relation to their grandiose belief, a collaborative therapy goal of reducing harm seems viable. Of course, both the patient's and clinician's understanding of the full extent of harm may evolve over the course of therapy but having a shared agreement to work towards addressing even just one or two difficulties might be a sufficient starting point. If this were the therapy goal, then assessment would need: to elicit a clear articulation of the grandiose belief and the strength of conviction with which it is held; to determine the range and severity of harms arising from the belief both from the patient and observer perspectives; to facilitate understanding of the experience and sources of meaning that it provides; and to identify and measure the additional causal maintenance mechanisms that are operating and may be suitable targets for intervention. This would then enable the development of an idiosyncratic clinical formulation outlining which of the key maintenance processes are driving the difficulties and might be suitable targets for intervention.

In terms of developing a psychological intervention, the intention going forwards is to create a series of targeted treatment modules, each focusing on a specific mechanism. Although it is not yet possible to say with certainty what drives grandiose delusions, from the studies presented here it seems likely that the intervention might incorporate modules on the meaning in grandiose delusions, immersion behaviours, repetitive thinking about grandiose beliefs, and possibly daydreaming. Evidence from other studies (summarised in Chapter 1) as well as the qualitative study in Chapter 2 also point to anomalous experiences, mania, self-esteem, and reasoning biases as additional potential modules.

The process of developing each module will involve deriving content from theory but with extensive consultation with those with lived experience of grandiose delusions. This approach will ensure that interventions developed are effective, accessible, and acceptable to patients. Whilst each module will necessarily differ in content, building up meaningful activity is likely to be a common thread across many of them. Supporting patients to develop equivalent meaning to the grandiose belief from other areas of life might reduce the extent to which the grandiose belief is needed to provide a sense of meaning in life, whilst also leaving less time to engage in repetitive thinking about grandiose beliefs, daydreaming, or immersion behaviours.

> Interviewer: *"Do you remember at what point it* [the belief "I have special powers – I have been chosen by God to save the world] *started to change? […]. What actually happened?"*
>
> Mildred: *"We moved. I graduated. We set up a theatre company. […]. My mood started to come down and my focus shifted, and it was as simple as that. Nothing…, you know, nothing else at all [..]. I wasn't medicated at all."*
>
> Interviewer: *"What did your focus shift onto?"*
>
> Mildred: *"Creating."*
>
> Interviewer: *"In terms of work? like drama?"*
>
> Mildred: *"Yes, because we'd started a company. So my focus shifted from creating an army and what we were going to do to creating narrative."*
>
> Mildred – qualitative study, Chapter 2.

This thesis has contributed to the understanding of grandiose delusions but there is much still to do. Indeed, even the naming of the phenomenon arguably requires improvement. The qualitative interviews (Chapter 2) indicated that grandiosity was not synonymous with high levels of superiority, arrogance, or entitlement, and yet the term 'grandiose' is often used in society to indicate exactly those traits. Since possessing exceptional abilities or identity is not synonymous with viewing oneself as being inherently better than others, then superiority should not be assumed to occur in the context of grandiose delusions, and terms such as 'delusions of exceptionality' or 'experiences of feeling exceptional' may be a more accurate reflection of the experience. Gaining peer input at all stages of the research process moving forwards will be essential. Perhaps one of the first conversations should be to consider whether another term might better encapsulate this important experience.

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Appendices

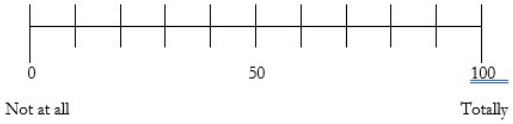
Appendix 1. Final versions of questionnaires developed

Appendix 1.1. The Grandiosity Meaning Measure (gram) and Grandiosity Meaning Measure – Sources (grams)

Preliminary questions

1) This questionnaire asks about your experiences of feeling exceptional. This could include having special abilities, identity, role, mission or wealth. Please write below a brief description, in one or two sentences, of your specific experience of being exceptional (e.g., "I have superior intelligence to others"; "I am on a special mission from God to save the world"; "I have the ability to predict the future" etc.)

2) At present, how strongly do you believe that you have these exceptional abilities, identity, role, mission, or wealth?
(please rate this on a scale from 0 to 100 where 0 = do not believe it at all, and 100 = believe it totally)



The following questions ask about the **impact of feeling exceptional**. Please indicate how strongly you agree with each statement listed below. Please base your answers on your thoughts and feelings over the **last two weeks** in relation to feeling exceptional. Some of these will apply to you but some may not.

The Grandiosity Meaning Measure (gram)

		Do not agree	Agree a little	Agree moderately	Agree very much	Agree totally
1	Having these exceptional abilities/identity/role/mission/wealth **gives me a clear direction to follow in life.**	0	1	2	3	4
2	Having these exceptional abilities/identity/role/mission/wealth **gives me something I can be really committed to in the future.**	0	1	2	3	4
3	Knowing that I have these exceptional abilities/identity/role/mission/wealth **helps me to make sense of odd, strange, or unusual experiences that I have had.**	0	1	2	3	4
4	Having these exceptional abilities/identity/role/mission/wealth **means that I have a much better idea of what I want to do in my life than others do.**	0	1	2	3	4
5	Having these exceptional abilities/identity/role/mission/wealth **gives me a reason to live.**	0	1	2	3	4
6	Having these exceptional abilities/identity/role/mission/wealth **makes living deeply fulfilling.**	0	1	2	3	4
7	Having these exceptional abilities/identity/role/mission/wealth **means that I know where my life is going in the future.**	0	1	2	3	4
8	Having these exceptional abilities/identity/role/mission/wealth **makes my life meaningful.**	0	1	2	3	4
9	Knowing that I have these exceptional abilities/identity/role/mission/wealth **helps me to understand why people behave towards me as they do.**	0	1	2	3	4
10	Knowing that I have these exceptional abilities/identity/role/mission/wealth **helps me to make sense of what is going on in the world.**	0	1	2	3	4
11	Having these exceptional abilities/identity/role/mission/wealth **means that my life is important**.	0	1	2	3	4
12	Having these exceptional abilities/identity/role/mission/wealth **means that I really value my life.**	0	1	2	3	4
13	Having these exceptional abilities/identity/role/mission/wealth **makes my life worthwhile.**	0	1	2	3	4
14	Knowing that I have these exceptional abilities/identity/role/mission/wealth **helps me to understand why upsetting things have happened.**	0	1	2	3	4
15	Knowing that I have these exceptional abilities/identity/role/mission/wealth **helps me to predict what will happen in certain circumstances.**	0	1	2	3	4
16	Having these exceptional abilities/identity/role/mission/wealth **means that I have future plans that I am looking forward to.**	0	1	2	3	4
17	Knowing that I have these exceptional abilities/identity/role/mission/wealth **helps me to understand why particular events have happened in my life.**	0	1	2	3	4

The Grandiosity Meaning Measure – Sources (grams)

	Having these exceptional abilities/identity/role/mission/wealth….	Do not agree	Agree a little	Agree moderately	Agree very much	Agree totally
1	…gives me the confidence to stand up for myself.	0	1	2	3	4
2	…means that I have a special religious mission to carry out.	0	1	2	3	4
3	…has allowed me to be at peace with my past.	0	1	2	3	4
4	…makes me feel happy.	0	1	2	3	4
5	…gives me a mission in life.	0	1	2	3	4
6	…has helped me to stop evil forces.	0	1	2	3	4
7	… has led to me finding someone who loves me.	0	1	2	3	4
8	…means that I am dedicating my life to a worthwhile cause.	0	1	2	3	4
9	…gives me confidence in my opinions even if they are different to the opinions of other people.	0	1	2	3	4
10	…has helped me cope with the anxiety and fear that I have experienced in my life.	0	1	2	3	4
11	…has given me a personal relationship with God.	0	1	2	3	4
12	…has made me sure that there is an afterlife.	0	1	2	3	4
13	…means that I can support those I care about.	0	1	2	3	4
14	…makes me attractive.	0	1	2	3	4
15	…means that I can leave behind something good when I'm gone.	0	1	2	3	4
16	…helps me feel better about the things that I don't have in life.	0	1	2	3	4
17	…means that others find me interesting.	0	1	2	3	4
18	…means that others see me as powerful.	0	1	2	3	4
19	…has made it easier to bear much sadness.	0	1	2	3	4
20	…makes me feel confident to do what I think is right, even if others don't agree.	0	1	2	3	4
21	…means that I am destined to accomplish something important.	0	1	2	3	4
22	…means that others see me as successful.	0	1	2	3	4
23	…means that I have something valuable to give to the world.	0	1	2	3	4
24	…means that I can protect my loved ones from harm.	0	1	2	3	4
25	…makes me feel excited.	0	1	2	3	4
26	…means that I can make the people I love happy.	0	1	2	3	4
27	…makes me feel energised.	0	1	2	3	4
28	…has enabled me to cope with my problems.	0	1	2	3	4
29	… has meant that I can help to keep the world balanced towards good.	0	1	2	3	4
30	…has prevented the Devil's work.	0	1	2	3	4
31	…means that others respect me.	0	1	2	3	4
32	…has made me a more spiritual person.	0	1	2	3	4
33	…makes it easier to cope with the fact that my relationships with others are not as I would like them to be.	0	1	2	3	4
34	…means that others see me as talented.	0	1	2	3	4
35	… gives me confidence to make my own decisions without being influenced by what everyone else is doing.	0	1	2	3	4
36	…has meant that I can find solutions to my problems.	0	1	2	3	4
37	…has helped me to feel confident about myself.	0	1	2	3	4

Scoring instructions:

Gram
Add together all 17 items to obtain the total experience of meaning score.
Subscale scores may be obtained by adding together the following items:
Coherence – items 3, 9, 10, 14, 15, 17
Significance – items 5, 6, 8, 11, 12, 13
Purpose – items 1, 2, 4, 7, 16

Grams
Add together the items below to obtain subscale scores:
Positive social perceptions – items 14, 17, 18, 22, 31, 34
Spirituality – items 2, 6, 11, 12, 30, 32
Overcoming adversity- items 3, 10, 16, 19, 28, 33
Confidence in self amongst others- items 1, 9, 20, 35, 36
Greater good – items 5, 8, 15, 21, 23, 29,
Supporting loved ones- items 7, 13, 24, 26
Happiness - items 4, 25, 27, 37.

Appendix 1.2. The Subjective Harm from Exceptional Experiences Questionnaire (SHEEQ)

The following questions concern harm or difficulties that might have occurred in relation to your exceptional abilities, identity, role, mission, or wealth. Please answer the following questions on a scale of 0 to 4 where 0=not at all, and 4= all of the time. The first two questions refer to your whole lifetime, and the remaining questions refer to the last 6 months.

		Not at all	Occasionally	Some of the time	Much of the time	All of the time
In relation to your **whole lifetime**:						
L1	Have your special abilities/identity/role/mission/wealth **ever caused any difficulties** for you? *(This could be that they have caused difficulties directly, for example the responsibility has felt stressful, or they could have caused difficulties because of the way others have reacted to them).*	0	1	2	3	4
L2	Is this something you have ever wanted help with?	0	1	2	3	4
In relation to the **last 6 months:** *Have your special abilities/identity/role/mission/wealth:*						
H1	…caused **any difficulties** for you? *(This could be that they have caused difficulties directly, for example the responsibility has felt stressful, or they could have caused difficulties because of the way others have reacted to them).*	0	1	2	3	4
H2	…resulted in **physical harm** occurring to you? *(E.g., getting physically hurt whilst on a mission; being assaulted by a member of the public in response to your exceptional experiences; or putting yourself in another physically dangerous situation etc.)*	0	1	2	3	4
H3	…caused you **emotional distress**? *(E.g., either directly causing you to feel sad, anxious, angry etc. or others' responses to your exceptional experiences making you feel this way.)*	0	1	2	3	4
H4	…resulted in problems or difficulties **socially** for you? *(E.g., problems with friends, family, or strangers, including: causing arguments with family/friends, relationship breakdowns, or others rejecting you or being rude because they didn't understand your exceptional experiences.)*	0	1	2	3	4
H5	…caused problems with your **work**? *(E.g., difficulties with colleagues; having to take time off work; losing a job; complaints from customers etc.)*	0	1	2	3	4
H6	…caused you to be in a situation where you have been **sexually taken advantage of**? *(e.g., having sex with a stranger because they had an important link to your special abilities/role/identity/mission/wealth.)*	0	1	2	3	4
H7	Have you put **yourself** in a **risky** situation due to your special abilities/identity/role/mission/wealth?	0	1	2	3	4
H8	What would a **friend, family member, or someone else who knows you well** say if asked whether *they* think you have put yourself in a risky situation due to your special abilities/identity/role/mission/wealth?	0	1	2	3	4
H9	Have you caused **harm, upset, or distress to others** due to your special abilities/identity/role/mission/wealth?	0	1	2	3	4

Scoring instructions:
The lifetime harm items (L1 and L2) are screening items and should not be used to calculate the total harm score. The total harm score is calculated by adding together items H1 to H9.
Please note the SHEEQ may be freely used without permission of the authors.

Appendix 1.3. Immersions Behaviour Questionnaire – Exceptional Experiences (IBQ-EE)

The following items concern your **actions and behaviours** in relation to your exceptional abilities, identity, role, mission, or wealth. Please answer questions on a scale of 0 to 4, where 0=not at all and 4 = all of the time. All questions refer to the **last month**.

		Not at all	Occasionally	Some of the time	Much of the time	All of the time
In relation to the **last month** how often have you**:**						
B1	**Used** your special abilities, identity, or wealth, or carried out your special role or mission.	0	1	2	3	4
B2	Acted in relation to your special abilities/identity/role/mission/wealth in a **public place.**	0	1	2	3	4
B3	Acted in relation to your special abilities/identity/role/mission/wealth in **private.** *(E.g., at home or another private space where others are unlikely to see you.)*	0	1	2	3	4
B4	**Dressed** in a particular way to fit with your special abilities/identity/role/mission/wealth. *(E.g., wearing a special robe to perform religious actions; going out in disguise to stay undercover on a mission; wearing particular clothes or items (such as a crown) that fit with your special identity etc.)*	0	1	2	3	4
B5	**Directly approached or interacted** with **strangers or people you do not know well** in the context of your special abilities/identity/role/mission /wealth. *(E.g., to tell them something important; using your powers to heal others in person; apprehending or following suspects in relation to your mission; contacting famous people etc.)*	0	1	2	3	4
B6	**Directly approached or interacted** with **friends, family members, or others you know well** in the context of your special abilities/identity/role/mission/wealth. *(E.g., to talk to them about your special abilities/identity/role/mission/wealth; to try to help or save them; to warn them about something important etc.)*	0	1	2	3	4
B7	**Stopped doing, or reduced, your usual activities** to focus on your special abilities/identity/role/mission/wealth. *(E.g., reduced or stopped going to work, engaging in hobbies, social life etc.)*	0	1	2	3	4
B8	**Withdrawn** from others to explore, understand, or immerse yourself in your special abilities/identity/role/mission/wealth. *(E.g., not leaving the house; staying away from others you live with so that you can focus your attention on this.)*	0	1	2	3	4
B9	Spent time **collecting things** to use in relation to your special abilities/identity/role/mission/wealth. *(E.g., collecting religious objects or books; special tools etc.)*	0	1	2	3	4
B10	Spent time **researching or finding out information** that relates to your special abilities/identity/role/mission/wealth. *(This could include looking things up online, reading books/papers, or gathering information in any other way)*	0	1	2	3	4
B11	**Put information** about your special abilities/identity/role/mission/wealth on **social media.** *(E.g., this could include any social media platform such as Facebook, Instagram, Twitter etc.)*	0	1	2	3	4
B12	Spent time **keeping a record or making notes** or information that relates to your special abilities/identity/role/mission/wealth. *(E.g., making written records, diaries, videos, or taking photographs that relate to your special abilities/identity/role/mission/wealth.)*	0	1	2	3	4
B13	Used your abilities/powers to try to heal or bless someone or perform other religious acts *(e.g., preaching).*	0	1	2	3	4
B14	Tried to get into contact with famous, important, or powerful people.	0	1	2	3	4
B15	Gone on an undercover mission.	0	1	2	3	4
B16	Had (or tried to have) a sexual relationship with strangers who have an important role in relation to your special abilities/identity/role/mission/ wealth. *(E.g., this could include being intimate with a stranger who you thought was involved in the same mission as you).*	0	1	2	3	4
B17	Used your special intelligence to solve a highly complex problem. *(E.g., in science, mathematics, music, literature etc.)*	0	1	2	3	4
B18	Performed royal duties or acts.	0	1	2	3	4
B19	Engaged in a spiritual battle *(e.g., with good or evil forces).*	0	1	2	3	4
B20	Used your special abilities to try to save or help others/the world.	0	1	2	3	4
B21	Tried to teach or educate others.	0	1	2	3	4
B22	Spent a lot of your money (or a lot more than usual) on an important project, idea, or cause.	0	1	2	3	4

Scoring instructions:
Add together all 22 items to get an immersion behaviours total score. Please not the IBQ-EE may be freely used without permission of the authors.

Appendix 1.4. Thinking about Exceptional Experiences Questionnaire (TEEQ)

The following items concern your **thoughts and feelings about your experiences of feeling exceptional.** Please circle the number that best describes your experiences over the **last two weeks**.

		Not at all	Rarely	Some of the time	Often	All of the time
In relation to my exceptional abilities/identity/role/mission/wealth:						
1	I've been thinking about it a lot.	0	1	2	3	4
2	It feels important to think about it a lot.	0	1	2	3	4
3	Anything and everything has set my mind to thinking about it.	0	1	2	3	4
4	Images (or pictures) associated with it have come into my mind.	0	1	2	3	4
5	It has been hard to think about anything else.	0	1	2	3	4
6	Thinking about it has stopped me sleeping.	0	1	2	3	4
7	Thoughts about it are hard to control.	0	1	2	3	4

Scoring instructions:

Add together the items below to obtain subscale scores:
- Thinking a lot – items 1, 2, 3, 4
- Difficulty controlling thoughts – items 5, 6, 7

Appendix 1.5. The Qualities of Daydreaming Scale (QuOD)

This questionnaire asks about your experience of daydreaming. Please indicate to what extent you agree/disagree with each of the following statements:

		Do not agree	Agree a little	Agree moderately	Agree very much	Agree totally
1	My daydreams usually provide me with pleasant thoughts	0	1	2	3	4
2	My daydreams are often stimulating and rewarding	0	1	2	3	4
3	My daydreams offer me useful clues to tricky situations I face	0	1	2	3	4
4	My daydreams often leave me with a warm, happy feeling.	0	1	2	3	4
5	I daydream about what I would like to see happen in the future.	0	1	2	3	4
6	I find my daydreams are worthwhile and interesting to me.	0	1	2	3	4
7	Many of my daydreams have a realistic intensity.	0	1	2	3	4
8	Many of my daydreams are often just as lively as a good movie.	0	1	2	3	4
9	I often confuse my daydreams with real memories.	0	1	2	3	4
10	As an adult I (still) occasionally live in a make-believe world.	0	1	2	3	4
11	As an adult I spend a substantial part of my total waking day imagining.	0	1	2	3	4

Scoring
Add together all 11 items to obtain the total daydreaming score.
Subscale scores may be obtained by adding together the following items:

- Pleasantness - items 1, 2, 3, 4, 5, 6
- Realism – items 7, 8, 9
- Frequency – items 10, 11

Appendix 2. Supplementary information for Chapter 2

Appendix 2.1. Qualitative Study Topic Guide - Version 1.0 18.09.2017

This document provides the Topic Guide for the "Experiences of Feeling Exceptional: a Qualitative Study" research study. The following should be noted:

- Wherever <GD> is written, the interviewer will insert the participant's grandiose delusion at this point in the interview. For example, if an individual reports believing that they are a prophet, then where the topic guide says "I am interested in your experiences of <GD>" the interviewer would ask "I am interested in your experiences of being a prophet".

- For each section of the topic guide, two versions of the opening question have been identified. The first version is for those who previously held the grandiose belief but do not do so at the time of the interview, whereas the second version is for those who continue to hold the grandiose delusion. This is in keeping with usual clinical practice and will enable the facilitation of rapport. Where the text differs between the two versions this has been highlighted.

- In accordance with good qualitative interview practice, the topic guide will be tailored to particular individuals. This will include mirroring the participant's language, and encouraging story telling via supportive prompts. As is common within interview studies, the interview process will be reviewed after an initial period. Pilot interviews will be integrated to discover early themes emerging from the data and used to adjust the topic guide to increase the accuracy and acceptability of the questions, as well as the breadth of data gained.

Topic	For those with past (not current) belief	For those with current belief
1. Narrative	Thank you for coming today. I really appreciate you taking the time to meet with me. I am interested in your experiences of believing that <GD> and would like you to listen to your story. Please start wherever you want, going back as far as you want. For the second part of the interview I have some	Thank you for coming today. I really appreciate you taking the time to meet with me. I am interested in your experiences of <GD> and would like you to listen to your story. Please start wherever you want, going back as far as you want. For the second part of the interview I have some

	questions that would help me get a bit more detail about what you've told me. You don't have to answer any questions that you don't want to, and what's important to me is to really understand what things have been like for you – so nothing is irrelevant. I will try and listen as much as possible and not interrupt you, but do ask me any questions you might have as we go along.	questions that would help me get a bit more detail about what you've told me. You don't have to answer any questions that you don't want to, and what's important to me is to really understand what things have been like for you – so nothing is irrelevant. I will try and listen as much as possible and not interrupt you, but do ask me any questions you might have as we go along.
2. Onset – causal factors	How did you come to believe that <*GD*> was true?	How did you come to realise that <*GD*>?
3. Experience of the belief & impact	What was it like when you first started to believe <GD>? What impact did it have on you? How did this (the impact in had on you) change over time?	What was it like when you first realised <GD>? What impact did it have on you? How did this (the impact it had on you) change over time?
4. Belief maintenance/change	How did the belief itself change over time? What kept the belief going? What made you doubt it? What led to change?	Has your understanding of <GD> changed over time? If so how? Did you ever think differently? What did you think? If so what made you think differently? Are there other things that could make you see things differently?
5. Relationship with professionals/Treatment	What has your experience been with mental health professionals in relation to your experience of believing <GD>? Were you offered psychological therapy at all? If so what was your experience of this? If a psychological therapy were to be helpful, what would it involve? What would make you want to engage in it? What would put you off?	What has your experience been with mental health professionals in relation to your experience of <GD>? Have you been offered any psychological therapy at all? If so what was your experience of this? If a psychological therapy were to be helpful, what would it involve? What would make you want to engage in it? What would put you off?

	Are there other types of input you would like or would have liked to have receive from mental health professionals? If you could give advice to professionals about intervening with these types of beliefs what would you say?	Are there other types of input you would like or would have liked to have receive from mental health professionals? If you could give advice to professionals about intervening with these types of beliefs what would you say?
6. Advice to others	What advice would you give others with similar experiences?	What advice would you give others with similar experiences?
7. Ending the session	Is there something you'd like to talk about that we haven't talked about?	Is there something you'd like to talk about that we haven't talked about?

Appendix 2.2. Transcription/transcript review guidelines

The following are guidelines used to mitigate against threats to transcription quality in the qualitative study (chapter 2). These are adapted from: Humble's "Guide to Transcribing" (Humble, 2015); an informal guideline "The Oxford Guide to Transcription" developed by the Health Experiences Research Group (HERG), University of Oxford; and other key sources ((Bazeley, 2013; Poland, 1995)

Formatting

- ☐ On each page of the transcript, insert page number on the "upper outside" corner of each page (header; font size 12)
- ☐ At the bottom of each page in the "footer" put information about the interview in font size 9 (e.g., Experiences of Feeling Exceptional: Interview 1, 'Mark')
- ☐ Title the transcript (e.g., Experiences of Feeling Exceptional: Interview 1, 'Mark')
- ☐ Include the interviewer's questions and comments as they occur – they are essential for providing the context of the responses.
- ☐ Use "P" to indicate participant and "I" to indicate interviewer; type single spaced with a blank line between each comment. E.g.,

  I: Let's begin. Can you tell me what happened yesterday?

  P: Sure, the first thing I did was make an appointment with the doctor.

  I: Okay.

- ☐ However, if a speaker provides a non-intrusive affirmation (e.g., hmmm) then record this by placing it in parentheses/square brackets within the same line rather than starting a new line so that the text isn't broken up. E.g.,

  I: Let's begin (P: Mmmhmm). Can you tell me what happened yesterday?

- ☐ Mark time codes (hours, minutes, and seconds e.g., 00:00:00) at the top of each page of transcript so that they can be seen clearly.
- ☐ Whilst transcribing/reviewing the transcript, add time codes to particularly interesting sections so that they can be found easily on the audio recording at a later stage.
- ☐ Any comments made on the text during transcription/transcript review, must be clearly marked so comments don't get confused with the transcript content (e.g., <<comment>>.)
- ☐ Provide written guidance regarding formatting to the person transcribing
- ☐ No need to include detailed descriptions of breathing, intonation etc. as might be done if using conversation analysis or discourse analysis. However, notes of inflexion or other factors which clearly impact on the meaning may be noted

Pauses

- ☐ Use … (ellipses) at end of sentences to indicate a tailing off (or at beginning of statement if continuing from a previous thought).
- ☐ When using … put a space after it but not before it. E.g.,

  P: He never did finish that up… I think he got tired.

- ☐ Write lengthy pauses as [pause]. If more than 2 second add in the length of time e.g., [pause 3 seconds]

- □ Write brief pauses using a two dots and a comma (i.e., ..,). For example:
  P: He never did .., he didn't finish that.

Non-verbal communication

- □ Identify all nonverbal communication including laughter, crying, sighing, coughing
- □ Identify nonverbal communication with brackets [l] rather than parentheses ( ). E.g.,

  P: My father is so funny. [laughing]

- □ Be cautious re interpreting nonverbal communication (i.e., [nervous laughing]). However, it is appropriate to give some information re emotional tone and use of rhetoric if not doing so would be misleading (for example if something is said sarcastically and recording verbatim would indicate the opposite meaning from that which is intended.)
- □ Be consistent in labels – i.e., do not refer to [laughing] in one place and [laugh] in another.

Inaudible

- □ If material is inaudible, type (inaudible) in parentheses and add the time of the tape (inaudible – 00.34.15)
- □ Use XXXs to denote the number of words that cannot be heard. E.g,
  P: Gina went XXX XXX XXX, (inaudible – 00.23.30) and then came home.

- □ Flag words that are not clear with square brackets and question mark e.g.,
  P: At that, Harry just (inaudible – 00.34.15 [doubled? Glossed?]) over.

Quotations

- □ Use "" if someone says they said something to someone else or if they were thinking something. E.g.,

  P: I was thinking "I don't really want to do that".

Emphases

- □ Italicize words that the respondent emphasizes. E.g.,
  P: I really *really* loved my wedding.

Confidentiality

- □ Recheck all identifying information and remove
  - Participant name
  - People they refer to
  - Towns where they live
  - Hospitals they visit
  - Countries they go on holiday to
- □ Replace with pseudonym (e.g., Jane), a blank line, or a general term in parentheses e.g.,
  - I went to see_____ to see how she was.
  - I went to see Jane to see how she was.
  - I went to see (friend) to see how she was
  - I went to (the local hospital) to see how she was doing.
    - NB: put these in parentheses excepts for pseudonyms

Proof reading

- □ Proofread more than once. This can result in identification of words/phrases previously thought to be inaudible.
- □ Check for errors in transcription (e.g., can versus can't)

Other

- □ When a person trails off a word (doesn't finish it) or changes thought part way through a sentence, use a long dash. For example, write "To comp –" if the word "compensate" is not completed. Do not "correct" incomplete sentences.
- □ Use one space after a full stop.
- □ Don't correct poor grammar. Type [sic] if want to indicate that something is grammatically incorrect
- □ Write numbers in full (nine rather than 9)
- □ Use oxford comma
- □ Include repetitions (ensure transcriber hasn't "tidied up" the text!)
- □ Note events which create interruptions to the flow of the interview (e.g., (tape off); (phone rings) or other things that may influence the interpretation of the text (mother enters room)
- □ Managing digressions: include any digressions in transcript.

Sending to participant for review and storing different version

- □ Use different filenames to indicate the different stages in the process:
    - **EOFE_01_ORIGINAL** (as it comes back from the transcriber)
    - **EOFE_01_CHECKED** (after checking for all errors, confidentiality etc – this is the version that gets sent to the participant for review if applicable, together with a standard letter stating that it is not required to make a small editorial changes. don't make small editorial changes, e.g., grammatical corrections. Include a pre-paid envelope for returns; ask for changes to be marked clearly on the transcript)
    - **EOFE_01_FINAL VERSION, REVISED** (once the participant returns it, make the changes, check again for all the names etc to be removed

Appendix 2.3. Excerpts from the Qualitative Research Diary demonstrating the reflexivity incorporated into the research.

The following entries were made after an initial pilot interview and highlight the author's awareness of the process by which their own position may influence the data collection and interpretation:

"*Met with XX to complete pilot interview (27.11.17). Reflections during/immediately after: incredibly rich narrative; hard to manage loads of ideas/thoughts coming into my mind – difficult decisions re which avenues to follow up on. Glad is recorded. Allow more time to think. […] Reflections on first attempt of coding – I realised I was automatically creating hierarchies as I went but this caused problems because I created categories that later stuff didn't fit into. Ended up deleting it all and starting again"*

"Discussion with LG [supervisor with expertise in qualitative methodology] re pilot 1 (08.12.2017) – coding and interviewing tips. Reviewed pilot tape. Feedback in terms of coding: LG advised [..] okay to go into more details on the areas I know I'm most interested in (both in the interview and in the coding) but need to be open to other ideas also. Agreed that after trying different ways of coding, best way of doing it is to do broad coding first (fine to base the categories on those in the interview guide), and then also add any major themes that come up (i.e. big chunks – such as spirituality/religion). Can then code some of the smaller areas (e.g. admission – might only be 2-3 lines). After this you later develop theoretical codes of top of this (when you are starting to generate theory).

In terms of reviewing my interviewing: Discussed the issue of me summarising in my own language/putting therapy language in the interview. LG identified there are two schools of thought re this. One is that you should just mirror the language the participant uses so as not to bias. However, using your own language also gives the participant a more honest sense of your opinion [..]. So long as you bracket your opinion (saying "I might have got this wrong…" or "this might not apply…" etc) then LG feels it's okay to do.

Also discussed what to do when participant highlights lots of things in one go and you don't know which to follow up (and may not be able to follow up all) – ask: "out of all of that what is the most important part for you to get across?" ; "what do most people not understand?" Key areas where LG felt I could adapt my interviewing technique included: After asking XX to tell her story, follow up more on things that came out of that rather than rushing on to the structured part of the interview. This is where you can ask "what is most important thing to get across" and also "at this stage you said X… what do you mean by that?"

These excerpts demonstrate how the reflexive process during the pilot interview phase of the project helped to identify the potential for the interviewer's experience to influence the categories and structure of codes being generated (immediately trying to 'fit' the data into highly structured hierarchical framework), how her use of language may influence the participant's narrative, and the importance of not rushing too quickly into areas of *a priori* interest and allowing space for the participant to describe what is most important to them.

Appendix 3. Supplementary information for Chapter 3

Appendix 3.1. The Specific Psychotic Experiences Questionnaire – Grandiosity Subscale (SPEQ-G)

The items from the SPEQ-G (Ronald et al., 2014) are given below:

Please read each statement and circle the option which best describes how much you agree with each statement, based on your thoughts and feelings over the last month:

	Not at all	Somewhat	A great deal	Completely
1. I am, or am destined to be, someone very important.	0	1	2	3
2. Everyone is going to know about me because of my greatness.	0	1	2	3
3. I am a very special or unusual person.	0	1	2	3
4. I am much more unique than anyone else.	0	1	2	3
5. I have special abilities that others do not.	0	1	2	3
6. Everything I do is great.	0	1	2	3
7. I have many great ideas.	0	1	2	3
8. I have a special mission.	0	1	2	3

Appendix 3.2. Full list of measures collected during Studies 1, 2, and 3.

Measure	Study 1	Study 2	Study 3
Specific Psychotic Experiences Questionnaire - Grandiosity subscale	X	X	X
Item pool 1 - Grandiosity Meaning Measure	X		
Item pool 1 – Grandiosity Meaning Measure Sources	X		
Revised item pool - Grandiosity Meaning Measure		X	
Revised item pool - Grandiosity Meaning Measure Sources		X	
Grandiosity Meaning Measure (final version)			X
Grandiosity Meaning Measure – Sources (final version)			X
3-item Loneliness Scale (Hughes et al., 2008)	X		
Social Network Index (Cohen et al., 1997)	X		
Short Boredom Proneness Scale (Struk et al., 2017)	X		
EQ-5D-5L (measuring quality of life; Herdman et al. 2011)	X		
The Revised Death Anxiety Inventory (Tomas-Sabado et al., 2005)	X		
Thinking about Exceptional Experiences Questionnaire		X	X
Specific Psychotic Experiences Questionnaire – Anomalous Experiences Subscale		X	X
Černis Felt Sense of Anomaly Scale (measuring dissociation; Černis et al., 2021)		X	X
Internal State Scale (measuring mania; Bauer et al., 1999)		X	X
Qualities of Daydreaming Scale		X	X
Monotheist and Atheist Beliefs Scale (8-item short form; Alsuhibani et al., 2022)		X	
Immersion Behaviours Questionnaire – Exceptional Experiences			X
Subjective Harm from Exceptional Experiences Questionnaire			X
Rational Experiential Inventory - 40 (Pacini & Epstein, 1999)			X
Revised Green et al Paranoid Thought Scale (Freeman et al., 2019)			X
The Cognitive Reflection Test (10-item version; Alsuhibani et al., 2022)			X

References for measures which were administered but not included in the data analyses described in the thesis:

Alsuhibani, A., Shevlin, M., Bentall., R.P. (2022). Atheism is not the absence of religion: development of the monotheist and atheist belief scales and associations with death anxiety and analytic thinking. *Psychology of Religion and Spirituality, 14(3),* 362-370.

Bauer, M.S., Crits-Christoph, P., Ball, W.A., Dewees, E., McAllister, T., Alahi, P., Cacciola, J., Whybrow, P.C. (1999). Independent assessment of manic and depressive symptoms by self-rating. Scale characteristics and implications for the study of mania. *Archives of General Psychiatry, 48(9),* 807-812.

Černis., E., Beierl, E., Molodynski, A., Ehlers, A., & Freeman, D. (2021). A new perspective and assessment measure for common dissociative experiences: 'Felt Sense of Anomaly'. *PLoS One, 16(2),* e0247037.

Cohen., S., Doyle, W.J., Skoner, D.P., Rabin, B.S., & Gwaltney, J.M. (1997). Social ties and susceptibility to the common cold. *JAMA, 277(24),* 1940-1944.

Freeman, D., Loe, B.S., Kingdon, D., Startup, H., Molodynski, A., Rosebrock, L., Brown, P., Sheaves, B., Waite, F., & Bird, J.C. (2019). The revised Green et al. Paranoid Thoughts Scale (R-GPTS): psychometric properties, severity ranges, and clinical cut-offs.

Herdman, M., Gudex, C., Lloyd, A., Janssen, M.F., Kind, P., Parkin, D., Bonsel, G., & Badia,X. (2011). Development and preliminary testing of the new five-level version of the EQ-5D, *Quality of Life Research, 20 (10),* 1727-1736.

Hughes, M.E., Waite, L.J., Hawkely, L.C. & Cacioppo, J.T. (2008). A short scale for measuring loneliness in large surveys. *Research on Aging, 26(2),* 655-672.

Pacini, R., Epstein, S., (1999). The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio-bias phenomenon. *Journal of Personality and Social Psychology, 76*, 972–987.

Struk, A.A., Carriere, J.S.A., Cheyne, J.A., Danckert, J. (2017). A short boredom proneness scale: development and psychometric properties. *Assessment 24(3),* 346-359.

Tomás-Sabádo, J., Gómez-Benito, J., & Limonero, J.T. (2005). The Death Anxiety Inventory: a revision. *Psychological Reports, 97(3),* 793-796.

Appendix 3.3. Item pool for the Grandiosity Meaning Measure (gram) at the start of Study 1

Item name*	Item content
	Knowing that I have these exceptional abilities/identity/mission/wealth helps me....
Item 1	…make sense of what is going on in the world.
Item 2	…understand why particular events have happened in my life.
Item 3	…predict what will happen in certain circumstances.
Item 4	…see how my life fits together into a bigger picture or pattern.
Item 5	…make sense of some odd, strange, or unusual experiences that I have had.
Item 6	…feel less confused about the things that happen around me.
Item 7	…have a clear understanding of the meaning of life.
Item 8	…understand why people behave towards me as they do.
Item 9	…understand why upsetting things have happened.
	Having these exceptional abilities/identity/mission/wealth…..
Item 10	…means that my life is important.
Item 11	…makes my life meaningful.
Item 12	…means that I have future plans that I am looking forward to.
Item 13	…gives me a reason to live.
Item 14	…has given me a purpose and direction in life.
Item 15	…makes my life significant.
Item 16	…means that I know where my life is going in the future.
Item 17	…makes my life worthwhile.
Item 18	…means that my life is directed towards a very important purpose.
Item 19	…gives me something I can be really committed to.
Item 20	…means that I can hold my life in high regard.
Item 21	…means that I have a much better idea of what I want to do in my life than others do.
Item 22	…makes living deeply fulfilling.
Item 23	…has made my life make sense.
Item 24	...means that I still have many things left to do in life.
Item 25	…means that I really value my life.
Item 26	…gives me very clear goals.

*In study 1, items were presented in the order listed above.

Appendix 3.4. Item pool for the Grandiosity Meaning Measure - Sources (grams) at the start of Study 1

Item name*	**Item Content** *Having these exceptional abilities/identity/mission/wealth…*
Item 1	…gives me the courage to face my future.
Item 2	…means that I have a job in which I am needed.
Item 3	…means that I live an honourable life.
Item 4	…makes me feel energised.
Item 5	…means I have someone who loves me.
Item 6	…means that I have someone to confide in.
Item 7	…has made me sure that there is an afterlife.
Item 8	…gives me confidence to voice my opinions, even if they are different to the opinions of other people.
Item 9	…gives me control over my life.
Item 10	…helps me fulfil my responsibilities and commitments to my family and friends
Item 11	…means that I am doing God's will.
Item 12	…means that I have found someone I love deeply.
Item 13	…means that I am contributing to something that has a higher importance or purpose.
Item 14	…has allowed me to be at peace with my past.
Item 15	…gives me a mission or calling in life.
Item 16	…makes me interested in life.
Item 17	…has enabled me to live with suffering and make the best of it.
Item 18	…makes me feel good about who I am, when I compare myself to others.
Item 19	…means that I will attain what I want in life.
Item 20	…means that others respect me.
Item 21	…gives me a feeling of passion.
Item 22	…has allowed me to feel pleased with how things have turned out in my life so far.
Item 23	… gives me confidence to make my own decisions without being influenced by what everyone else is doing.
Item 24	…means that I can fulfil my potential.
Item 25	…makes me feel happy.
Item 26	…means that I am less frightened of death than other people are.
Item 27	…makes me feel content.
Item 28	…means that I am trusted by others.
Item 29	…makes me feel excited.
Item 30	…has helped me to feel confident and positive about myself.
Item 31	…means that I can contribute to the happiness and wellbeing of others.
Item 32	…has enabled me to be good at the activities that are important to me.
Item 33	…makes me feel calm and peaceful.
Item 34	…means that others depend upon and need me.
Item 35	…has helped me to adjust and cope with my problems.
Item 36	…means that I am not concerned about death.
Item 37	…makes me feel satisfied.
Item 38	…gives me confidence in my opinions even if they are different to the opinions of other people.
Item 39	…means that I am liked by others.
Item 40	…gives me pleasure.
Item 41	…has allowed me to develop a lot as a person over time.
Item 42	…has meant that I can like myself.
Item 43	…means that I am dedicating my life to a worthwhile cause.
Item 44	…allows me to live the kind of life I want to live.
Item 45	…means that I belong to, or am part of, something important (e.g., a team, group, or community)
Item 46	…means that I can make a difference in the world.
Item 47	…allows me to live my life in line with my values.
Item 48	…means that I have something valuable to give the world.
Item 49	…means that I am altruistic and helpful.
Item 50	…means that I spend my time doing things that are important to me.
Item 51	…means that I am a good person.
Item 52	…means I am destined to accomplish something important.
Item 53	…has given me a warm and trusting relationship with others.
Item 54	…gives me comfort.
Item 55	…means that I can leave behind a good and lasting legacy.

Item 56	…means that I have something important to contribute to society.
Item 57	…makes me feel hopeful.
Item 58	…has led me to accomplish things in life which I feel good about.
Item 59	…has meant I can find solutions to my problems
Item 60	…makes me feel optimistic about the future.
Item 61	…has given me a personal relationship with God.
Item 62	I have experienced much sadness in my life, but my special abilities/identity/mission/wealth has made this easier to bear.
Item 63	I have not achieved as much as I would have liked in my job/career/professional life, but the fact I have this special ability/identity/mission/wealth makes up for this.
Item 64	There are many things that I have not accomplished in life, but my special identity/ability/mission/wealth makes up for this.
Item 65	My special abilities/identity/mission/wealth help me feel better about not fitting in with the people and community around me.
Item 66	My special identity/ability/mission/wealth has helped stop me feeling boredom.
Item 67	My relationships with others have not been how I would like them to be, but knowing I have special abilities/identity/mission/wealth makes this easier to cope with.
Item 68	I don't have many things in life, but having these special abilities/identity/mission/wealth helps me feel better about their absence.
Item 69	My special abilities/identity/mission/wealth have helped me feel better about the fact I have not experienced many warm or trusting relationships.
Item 70	My special abilities/identity/mission/wealth means that it doesn't matter what others think of me.
Item 71	I have experienced much anxiety and fear in my life, but my special abilities/identity/mission/wealth have helped me cope with this

* In study 1, items were presented in the order as given by the item name.

Appendix 3.5. Revised item pool for the Grandiosity Meaning Measure (gram) at the start of Study 2

Study 2 item name	Related Study 1 item	Study 2 item content	Study 2 order
		Knowing that I have these exceptional abilities/identity/job/mission/wealth…	
C1	Item 1	…helps me to make sense of what is going on in the world.	20
C2	Item 2	…helps me to understand why particular events have happened in my life.	24
C3	Item 3	…helps me to predict what will happen in certain circumstances.	13
C4	Item 4	…helps me to see how my life fits together into a bigger picture or pattern.	21
C5	Item 5 (A)	…helps me to make sense of odd, strange, or unusual experiences that I have had.	10
C6	Item 6	…helps me to feel less confused about the things that happen around me.	2
C7	Item 7 (A)	…helps me to have a clear understanding of the meaning of my life.	7
C8	Item 8	…helps me to understand why people behave towards me as they do.	23
C9	Item 9	…helps me to understand why upsetting things have happened.	1
		Having these exceptional abilities/identity/job/mission/wealth…	
P1	Item 12	…means that I have future plans that I am looking forward to.	3
P2	Item 16	…means that I know where my life is going in the future.	11
P3	Item 19 (A)	…gives me something I can be really committed to in the future.	22
P4	Item 21	…means that I have a much better idea of what I want to do in my life than others do.	5
P5	Item 26 (A)	…gives me very clear goals for the future.	6
P6	Item 14 (A)	... gives me a clear direction to follow in life.	12
P7	Item 18 (A)	…gives me a purpose for the future.	17
P8	-	…gives me a reason to keep going.	18
S1	Item 10	…means that my life is important.	16
S2	Item 11	…makes my life meaningful.	14
S3	Item 15	…makes my life significant.	4
S4	Item 17	…makes my life worthwhile.	19
S5	Item 20	…means that I can hold my life in high regard.	8
S6	Item 22	…makes living deeply fulfilling.	9
S7	Item 25	…means that I really value my life.	25
S8	Item 13	… gives me a reason to live.	15

NB: Letters at the beginning of each study 2 item indicate the factor that the item was predicted to measure; C = coherence, P = purpose, S = significance. (A) indicates study 1 items which were adapted before being included in study 2.

Appendix 3.6. Revised item pool for the Grandiosity Meaning Measure – Sources (grams) at the start of Study 2

Study 2 item name	Related study 1 item	Study 2 item content *Having these exceptional abilities/identity/job/mission/wealth…*	Study 2 order
H1	33	…makes me feel calm and peaceful.	68
H2	25, 27(A), 37(A)	…makes me feel happy.	19
H3	29	…makes me feel excited.	46
H4	21	…gives me a feeling of passion.	67
H5	4	…makes me feel energised.	11
H6	57, 60(A)	…makes me feel hopeful.	28
H7	16(A), 66(A)	…makes my life interesting.	80
H8	-	…makes me feel powerful.	40
H9	-	…make me an interesting person.	57
H10	-	…makes me attractive.	24
H11	-	…means that I do brave things.	12
H12	51, 3(A), 18(A), 49(A)	…means that I am a good person	22
H13	30(A)	…has helped me to feel confident about myself.	4
H14	19(A), 58(A), 24(A)	…means that I am successful.	14
O1	17	…has enabled me to live with suffering and make the best of it.	34
O2	35(A)	…has enabled me to cope with my problems.	39
O3	14	…has allowed me to be at peace with my past.	77
O4	59	…has meant that I can find solutions to my problems.	61
O5	1	…gives me the courage to face my future.	15
O6	62(A)	…has made it easier to bear much sadness.	74
O7	42(A)	…has meant I can like myself more than I otherwise would.	33
O8	-	…has allowed me to deal with difficulties in my life.	2
O9	71(A)	…has helped me cope with the anxiety and fear that I have experienced in my life.	56
Co1	69	…helps me to feel better about the fact that I have not experienced many warm or trusting relationships.	47
Co2	63	…makes up for not having achieved as much as I would have liked in my job/career/professional role.	21
Co3	64	…makes up for the things that I have not accomplished in life.	6
Co4	65	…helps me to feel better about not fitting with the people around me.	1
Co5	68	…helps me feel better about the things that I don't have in life.	63
Co6	67	…makes it easier to cope with the fact that my relationships with others are not as I would like them to be.	42
PSP1	39	…means that I am liked by others.	16
PSP2	20	…means that others respect me.	69
PSP3	-	…means that others see me as powerful.	48
PSP4	-	…means that others see me as talented.	31
PSP5	-	…means that others find me interesting.	54
PSP6	-	…means that others see me as successful.	55
PSP7	-	…leads to others being attracted to me.	37
PSP8	-	…means that others see me as brave.	79
PSP9	-	…means that other see me as a good person.	51
PSP10	-	…means that others see that I care.	29
L1	5(A)	… has led to me finding someone who loves me.	5
L2	12(A)	…has led to me finding someone that I love deeply.	26
L3	53(A)	…has led to me finding someone that I feel close to.	75
L4	-	…has led to me finding someone who looks out for and protects me.	13
L5	6(A)	…has led to me finding someone to turn to when things are tough.	72
L6	28(A)	…means that I can protect my loved ones from harm.	62
L7	34(A)	…means that I can support those I care about.	10

L8	10(A)	…means that I can help my family and friends.	65
L9	31(A)	…means that I can make the people I love happy.	3
CSO1	8	…gives me confidence to voice my opinions, even if they are different to the opinions of other people.	41
CSO2	9(A)	…allows me to be in control of my life.	76
CSO3	23	…gives me confidence to make my own decisions without being influenced by what everyone else is doing.	30
CSO4	38	…gives me confidence in my opinions even if they are different to the opinions of other people.	44
CSO5	-	…gives me the confidence to stand up for myself.	49
CSO6	-	…gives me the confidence to be around other people.	32
CSO7	-	…gives me the confidence to leave the house.	20
CSO8	--	…makes me feel confident to do what I think is right, even if others don't agree.	78
CSO9	44(A)	…gives me the confidence to be me.	9
GG1	2	…means that I have a job in which I am needed.	23
GG2	15(A)	…gives me a mission in life.	58
GG3	43	…means that I am dedicating my life to a worthwhile cause.	50
GG4	45	…means that I belong to, or am part of, something important (e.g., a team, group, or community).	7
GG5	48(A)	…means that I have something valuable to give to the world.	64
GG6	55(A)	…means that I can leave behind something good when I'm gone.	8
GG7	56	…means that I have something important to contribute to society.	53
GG8	52	…means I am destined to accomplish something important.	17
Sp1	7	…has made me sure that there is an afterlife.	38
Sp2	26(A)	…means I am less frightened of death.	45
Sp3	61	…has given me a personal relationship with God.	36
Sp4	11(A)	…means that I have a special religious mission to carry out.	52
Sp5	-	… has strengthened my religious faith.	59
Sp6	-	…has made me a more spiritual person.	71
Sp7	13(A)	…has given me a profound purpose in the world.	70
Sp8	-	…has prevented the Devil's work.	66
Sp9	-	…has helped me to stop evil forces.	73
Sp10	-	…has helped me to stop evil from happening in the world.	27
Sp11	-	… has meant that I can help to keep the world balanced towards good.	35
Sp12	36(A)	…gives me comfort when I think about my own death.	43
Sp13	-	…helps me feel less sad or anxious about the death of loved ones.	25
Sp14	-	…makes me think that the next life will be better than this one.	60
Sp15	-	…gives me faith that I will be reunited with loved ones in the next life.	18

At the start of study 2 it was hypothesised there may be a potential 8 factors and items were labelled according to the factor that it was anticipated that they would relate to:* H = happiness; O= overcoming adversity; Co = compensation for difficulties; PSP = positive social perceptions; L = close relationships with loved ones, CSO = confidence in self amongst others, GG = greater good; Sp = spirituality.

Appendix 3.7. Socio-demographic data and descriptive statistic for all participants

		Study 1 (n=8805)	Study 2 (n=4518)	Study 3 (n=798)
Age *				
Mean(SD)		37.11 (17.86)	44.34(19.08)	43.35 (13.83)
Range (years)		18-90	18-93	16-81
Gender	Female	7286 (82.75)	2848 (63.04)	313 (39.27)
n (%)	Male	1282 (14.56)	1539 (34.06)	475 (59.52)
	Non-binary	155 (1.76)	94 (2.08)	5 (0.63)
	Other/Prefer not to say	82 (0.93)	37 (0.82)	5 (0.63)
Ethnicity	White (any)	7970 (90.52)	4004 (88.62)	614 (76.94)
n (%)	Black (any)	57 (0.65)	37 (0.82)	76 (9.52)
	Asian (any)	252 (2.86)	152 (3.36)	52 (6.52)
	Multiple Ethnic Group/Other	406 (4.61)	253 (5.60)	55 (6.89)
	Prefer not to say	120 (1.36)	72 (1.59)	1 (0.13)
Marital status	Single	4262 (48.40)	1717 (38.00)	544 (68.17)
n (%)	Cohabiting	1228 (13.95)	556 (12.31)	36 (4.51)
	Married/civil partnership	2434 (27.64)	1666 (36.87)	111 (13.91)
	Separated/divorced	551 (6.46)	367 (8.12)	92 (11.53)
	Widowed	187 (2.12)	131 (2.90)	15 (1.88)
	Prefer not to say	143 (1.62)	81 (1.79)	0
Employment	Employed FT	2429 (27.59)	1175 (26.00)	76 (9.55)
n (%)	Employed PT	1291 (14.66)	570 (12.62)	56 (7.04)
	Housewife/husband	192 (0.22)	76 (1.68)	10 (1.26)
	Retired	1002 (11.38)	888 (19.65)	68 (8.54)
	Student	2490 (28.28)	947 (20.96)	35 (4.40)
	Self-employed	609 (6.92)	434 (9.61)	17 (2.14)
	Unemployed	678 (7.70)	350 (7.75)	485 (60.93)
	Voluntary work (Study 3 option only)	-	-	49 (6.16)
	Prefer not to say	114 (1.29)	78 (1.73)	0
SPEQ-G total *				
Mean (SD)		4.39 (4.06)	4.72 (4.37)	6.26 (6.29)
Range		0-24	0-24	0-24
Hours per day spent thinking about the grandiose belief (where present)	0-4 hours	-	1931 (42.7)	176 (22.1)
	5-8 hours	-	171 (3.8)	70 (8.8)
	9-12 hours	-	61 (1.4)	36 (4.5)
	13-16 hours	-	27 (0.6)	18 (2.3)
	17-20 hours	-	16 (0.4)	16 (2.0)
n (%)	21-24 hours	-	32 (0.7)	58 (7.3)
	Not applicable (no grandiose belief)		2280 (50.5)	424 (53.1)
Grandiose belief conviction (0-100%)		-		
Mean (SD)		-	58.0 (30.5)	67.4 (31.5)
Range			0-100%	0-100%
History of mental health difficulties?	Yes	5580 (63.37)	2273 (50.31)	-
	No	3115 (35.38)	2140 (47.37)	-
n (%)	Prefer not to say	110 (1.25)	105 (2.32)	-
If yes are these ongoing?	Yes	3829 (68.62)	1474 (64.85)	-
	No	1588 (28.46)	745 (32.78)	-
n (%)	Prefer not to say	163 (2.92)	54 (2.38)	-
Diagnosis	Schizophrenia			279 (34.96)
n (%)	Schizoaffective disorder			125 (15.66)
	Delusional disorder			18 (2.26)
	Brief psychotic disorder			14 (1.75)
	Psychotic disorder NOS	-	-	157 (19.67)
	Bipolar affective disorder			192 (24.06)
	Psychotic depression			8 (1.00)
	Other			3 (0.38)
Mental health service recruited from	Inpatient unit			156 (19.55)
	Forensic inpatient			27 (3.39)
	EIP service	-	-	141 (17.67)
n (%)	Adult CMHT			434 (54.39)
	Forensic adult CMHT			5 (0.63)
	Other			35 (4.39)

* Most, but not all, participants in Studies 1 and 2 provided their age. Descriptive statistics for age were calculated with data from 8781 participants in Study 1, and 4341 participants in Study 2. Similarly, not all participants provided SPEQ-G total data. Descriptive statistics for SPEQ-G total were calculated with data from 8787 participants in Study 1, 4518 in Study 2, and 791 in Study 3.

Appendix 3.8. Factor loadings for the final 17-item higher order factor model of the Grandiosity Meaning Measure (gram) after confirmatory factor analysis in Studies 2 (non-clinical) and 3 (clinical group)

Latent variable	Item	Item Content *	Standardised factor loadings	
			Study 2	Study 3
Coherence, C	C1	…helps me to make sense of what is going on in the world.	0.79	0.84
	C2	…helps me understand why particular events have happened in my life.	0.85	0.78
	C3	…helps me to predict what will happen in certain circumstances.	0.68	0.70
	C5	…makes sense of odd, strange or unusual experiences that I have had.	0.78	0.68
	C8	…helps me to understand why people behave towards me as they do.	0.75	0.73
	C9	…helps me to understand why upsetting things have happened.	0.73	0.74
Significance, S	S1	…means that my life is important.	0.84	0.83
	S2	…makes my life meaningful.	0.90	0.87
	S4	…makes my life worthwhile.	0.91	0.85
	S6	…makes living deeply fulfilling.	0.81	0.81
	S7	…means that I really value my life.	0.80	0.88
	S8	…gives me a reason to live.	0.88	0.87
Purpose, P	P1	…means that I have future plans that I am looking forward to.	0.78	0.87
	P2	…means that I know where my life is going in the future.	0.86	0.82
	P3	…gives me something I can be really committed to in the future.	0.88	0.79
	P4	…means that I have a much better idea of what I want to do in my life than others do.	0.82	0.80
	P6	…gives me a clear direction to follow in life.	0.92	0.80

* Items are preceded by '*Knowing that I have these exceptional abilities/identity/job/mission/wealth….'* or *'Having these exceptional abilities/identity/job/mission/wealth….'*

Higher order factor	Latent variable	Standardised covariances	
		Study 2	Study 3
Meaning in life (General Factor), MIL	Coherence	0.44	0.68
	Significance	0.92	0.89
	Purpose	0.84	0.99

$p<0.0001$ for all factor loadings and covariances.

Appendix 3.9. Pearson's correlation coefficient between raw scores and factor scores for the Grandiosity Meaning Measure (gram) and Grandiosity Meaning Measure – Sources (grams)

Measure	Construct	Correlation coefficient between raw score and factor score Study 2 (non-clinical)	Correlation coefficient between raw score and factor score Study 3 (clinical)
Grandiosity Meaning Measure (gram)	Coherence	0.99	0.97
	Purpose	0.98	0.96
	Significance	0.99	0.96
	Meaning in life (higher order factor)	0.93	0.95
Grandiosity Meaning Measure – Sources (grams)	Positive social perception	0.98	0.97
	Spirituality	0.90	0.96
	Overcoming adversity	0.97	0.94
	Confidence in self amongst others	0.97	0.94
	Greater good	0.97	0.95
	Supporting loved ones	0.95	0.93
	Happiness	0.97	0.92

P<0.0001 for all correlations. For study 2: n=1577 in the gram analysis, n=1406 in the grams analysis; For study 3: n=348 in the gram analysis, and n=333 in the grams analysis.

Appendix 3.10. Internal consistency and test-retest reliability for the Grandiosity Meaning Measure (gram) and the Grandiosity Meaning Measure – Sources (grams)

Measure	Factor	Internal Consistency (ordinal alpha)		Test retest reliability (ICC)	
		Study 2 (non-clinical)	Study 3 (clinical)	Study 2 (non-clinical))	Study 3 (clinical)
Grandiosity Meaning Measure (gram)	Coherence	0.89	0.88	-	-
	Purpose	0.93	0.90	-	-
	Significance	0.94	0.94	-	-
	Meaning in life (higher order factor)	0.93	0.95	0.82	0.82
Grandiosity Meaning Measure – Sources (grams)	Positive social perception	0.89	0.91	0.81	0.83
	Spirituality	0.93	0.90	0.89	0.85
	Overcoming adversity	0.88	0.87	0.78	0.77
	Confidence in self amongst others	0.87	0.89	0.79	0.79
	Greater good	0.89	0.92	0.84	0.72
	Supporting loved ones	0.81	0.86	0.77	0.79
	Happiness	0.85	0.87	0.79	0.71

Internal consistency was assessed with a non-clinical group of n=798 (gram) and n=559 (grams) in study 2, and a clinical sample of n=348 (gram) and n=333 (grams) in study 3; Test-retest reliability was assessed with a non-clinical of n=235 (gram) and n=223 (grams) in study 2, and a clinical sample of n=103 (gram) and n=100 (grams) in study 3.

Appendix 3.11 Factor loadings and covariances for the final 37-item correlated factor model of the Grandiosity Meaning Measure - Sources (grams) after confirmatory factor analysis in Study 2 (non-clinical group) and Study 3 (clinical group)

Latent variable	Item	Item content* *Having these exceptional abilities/identity/job/mission/wealth…*	Standardised factor loading Study 2	Study 3
Positive social perceptions (PSP)	PSP2	…means that others respect me.	0.85	0.81
	PSP3	…means that others see me as powerful.	0.73	0.76
	PSP4	…means that others see me as talented.	0.74	0.76
	PSP5	…means that others find me interesting.	0.80	0.79
	PSP6	…means that others see me as successful.	0.86	0.84
	H10	…makes me attractive.	0.63	0.77
Spirituality (Sp)	Sp1	…has made me sure that there is an afterlife.	0.84	0.78
	Sp3	…has given me a personal relationship with God.	0.92	0.80
	Sp4	…means that I have a special religious mission to carry out.	0.87	0.69
	Sp6	…has made me a more spiritual person.	0.81	0.81
	Sp8	…has prevented the Devil's work.	0.90	0.80
	Sp9	…has helped me to stop evil forces.	0.84	0.86
Overcoming adversity (O)	O2	…has enabled me to cope with my problems.	0.82	0.77
	O3	…has allowed me to be at peace with my past.	0.80	0.72
	O6	…has made it easier to bear much sadness.	0.74	0.71
	O9	…has helped me cope with the anxiety and fear that I have experienced in my life.	0.73	0.75
	Co5	…helps me feel better about the things that I don't have in life.	0.78	0.76
	Co6	…makes it easier to cope with the fact that my relationships with others are not as I would like them to be.	0.62	0.69
Confidence in self amongst others (CSO)	CSO3	..gives me confidence to make my own decisions without being influenced by what everyone else is doing.	0.76	0.82
	CSO4	…gives me confidence in my opinions even if they are different to the opinions of other people.	0.76	0.78
	CSO5	…gives me the confidence to stand up for myself.	0.80	0.78
	CSO8	…makes me feel confident to do what I think is right, even if others don't agree.	0.81	0.81
	O4	…has meant that I can find solutions to my problems.	0.73	0.81
Greater good (GG)	GG2	….gives me a mission in life	0.80	0.79
	GG3	…means that I am dedicating my life to a worthwhile cause.	0.78	0.84
	GG5	…means that I have something valuable to give to the world.	0.85	0.81
	GG6	…means that I can leave behind something good when I'm gone.	0.78	0.85
	GG8	…means that I am destined to accomplish something important.	0.73	0.79
	Sp11	… has meant that I can help to keep the world balanced towards good.	0.70	0.79
Supporting loved ones (L)	L1	… has led to me finding someone who loves me.	0.62	0.68
	L6	…means that I can protect my loved ones from harm.	0.71	0.78
	L7	…means that I can support those I care about.	0.86	0.81
	L9	…means that I can make the people I love happy.	0.71	0.87
Happiness (H)	H2	…makes me feel happy.	0.79	0.78
	H3	…makes me feel excited.	0.79	0.77
	H5	…makes me feel energised.	0.78	0.81
	H13	…has helped me to feel confident about myself.	0.78	0.86

Latent variable 1	Latent variable 2	Standardised covariances Study 2	Study 3
Positive social perceptions	Spirituality	*0.06*[a]	0.50
Positive social perceptions	Overcoming adversity	0.43	0.71
Positive social perceptions	Confidence in self amongst others	0.55	0.76
Positive social perceptions	Greater good	0.59	0.74
Positive social perceptions	Supporting loved ones	0.56	0.82
Positive social perceptions	Happiness	0.60	0.80
Spirituality	Overcoming adversity	0.48	0.66
Spirituality	Confidence in self amongst others	0.23	0.54
Spirituality	Greater good	0.42	0.75
Spirituality	Supporting loved ones	0.28	0.64
Spirituality	Happiness	0.24	0.52
Overcoming adversity	Confidence in self amongst others	0.76	0.88
Overcoming adversity	Greater good	0.65	0.82
Overcoming adversity	Supporting loved ones	0.64	0.82
Overcoming adversity	Happiness	0.63	0.90
Confidence in self amongst others	Greater good	0.63	0.77
Confidence in self amongst others	Supporting loved ones	0.69	0.78
Confidence in self amongst others	Happiness	0.62	0.87
Greater good	Supporting loved ones	0.58	0.79
Greater good	Happiness	0.76	0.79
Supporting loved ones	Happiness	0.60	0.80

[a]p<0.0001 for all factor loadings and covariances except for the association between positive social perception and spirituality for which p=0.206 and hence not significant.

Appendix 3.12. Frequencies of endorsement for the Grandiosity Meaning Measure (gram) items within the clinical sample (Study 3, n=348)

Experience of meaning factor	Item	Item content*	Frequency of endorsement of items at each response level, n (%)				
			Do not agree 0	Agree a little 1	Agree moderately 2	Agree very much 3	Agree totally 4
Coherence	C1	…helps me to make sense of what is going on in the world.	48 (13.8%)	44 (12.6%)	83 (23.9%)	65 (18.7%)	108 (31.0%)
	C2	…helps me understand why particular events have happened in my life.	38 (10.9%)	40 (11.5%)	79 (22.7%)	76 (21.8%)	115 (33.0%)
	C3	…helps me to predict what will happen in certain circumstances.	59 (17.0%)	44 (12.6%)	72 (20.7%)	79 (22.7%)	94 (27.0%)
	C5	…makes sense of odd, strange or unusual experiences that I have had.	37 (10.6%)	42 (12.1%)	54 (15.5%)	93 (26.7%)	122 (35.1%)
	C8	…helps me to understand why people behave towards me as they do.	53 (15.2%)	51 (14.7%)	73 (21.0%)	73 (21.0%)	98 (28.2%)
	C9	…helps me to understand why upsetting things have happened.	59 (17.0%)	47 (13.5%)	74 (21.3%)	64 (18.4%)	104 (29.9%)
Significance	S1	…means that my life is important.	46 (13.2%)	36 (10.3%)	63 (18.1%)	82 (23.6%)	121 (34.8%)
	S2	…makes my life meaningful.	31 (8.9%)	44 (12.6%)	61 (17.5%)	88 (25.3%)	124 (35.6%)
	S4	…makes my life worthwhile.	39 (11.2%)	51 (14.7%)	67 (19.3%)	78 (22.4%)	113 (32.5%)
	S6	…makes living deeply fulfilling.	65 (18.7%)	60 (17.2%)	56 (16.1%)	70 (20.1%)	97 (27.9%)
	S7	…means that I really value my life.	52 (14.9%)	33 (9.5%)	67 (19.3%)	74 (21.3%)	122 (35.1%)
	S8	…gives me a reason to live.	57 (16.4%)	50 (14.4%)	45 (12.9%)	70 (20.1%)	126 (36.2%)
Purpose	P1	…means that I have future plans that I am looking forward to.	49 (14.1%)	37 (10.6%)	70 (20.1%)	82 (23.6%)	110 (31.6%)
	P2	…means that I know where my life is going in the future.	74 (21.3%)	47 (13.5%)	81 (23.3%)	61 (17.5%)	85 (24.4%)
	P3	…gives me something I can be really committed to in the future.	32 (9.2%)	43 (12.4%)	83 (23.9%)	70 (20.1%)	120 (34.5%)
	P4	…means that I have a much better idea of what I want to do in my life than others do.	62 (17.8%)	46 (13.2%)	75 (21.6%)	65 (18.7%)	100 (28.7%)
	P6	…gives me a clear direction to follow in life.	51 (14.7%)	49 (14.1%)	88 (25.3%)	61 (17.5%)	99 (28.4%)

*Items are preceded with either '*Knowing that I have these exceptional abilities/identity/job/mission/wealth….'* or *'Having these exceptional abilities/identity/job/mission/wealth….'*.

Cells shaded in grey indicate the most commonly endorsed level for each specific item.

Appendix 3.13. Frequencies of endorsement on the Grandiosity Meaning Measure – Sources (grams) items within the clinical sample (Study 3, n=333)

Source of meaning factor	Item	Item content* *'Having these exceptional abilities/identity/job/mission/wealth…'*	Frequency of endorsement of items at each response level, n (%) Do not agree 0	Agree a little 1	Agree moderately 2	Agree very much 3	Agree totally 4
Positive social perceptions (PSP)	PSP2	…means that others respect me.	87 (26.1%)	53 (15.9%)	82 (24.6%)	48 (14.4%)	63 (18.9%)
	PSP3	…means that others see me as powerful.	88 (26.4%)	59 (17.7%)	72 (21.6%)	53 (15.9%)	61 (18.3%)
	PSP4	…means that others see me as talented.	64 (19.2%)	46 (13.8%)	72 (21.6%)	67 (20.1%)	84 (25.2%)
	PSP5	…means that others find me interesting.	37 (11.1%)	47 (14.1%)	91 (27.3%)	68 (20.4%)	90 (27.0%)
	PSP6	…means that others see me as successful.	86 (25.8%)	61 (18.3%)	68 (20.4%)	51 (15.3%)	67 (20.1%)
	H10	…makes me attractive.	119 (35.7%)	50 (15.0%)	76 (22.8%)	31 (9.3%)	57 (17.1%)
Spirituality (Sp)	Sp1	…has made me sure that there is an afterlife.	99 (29.7%)	32 (9.6%)	38 (11.4%)	33 (9.9%)	131 (39.3%)
	Sp3	…has given me a personal relationship with God.	138 (41.4%)	25 (7.5%)	34 (10.2%)	28 (8.4%)	108 (32.4%)
	Sp4	…means that I have a special religious mission to carry out.	157 (47.1%)	36 (10.8%)	40 (12.0%)	32 (9.6%)	68 (20.4%)
	Sp6	…has made me a more spiritual person.	66 (19.8%)	37 (11.1%)	39 (11.7%)	60 (18.0%)	131 (39.3%)
	Sp8	…has prevented the Devil's work.	157 (47.1%)	31 (9.3%)	40 (12.0%)	42 (12.6%)	63 (18.9%)
	Sp9	…has helped me to stop evil forces.	114 (34.2%)	44 (13.2%)	51 (15.3%)	45 (13.5%)	79 (23.7%)
Overcoming adversity (O)	O2	…has enabled me to cope with my problems.	47 (14.1%)	56 (16.8%)	66 (19.8%)	62 (18.6%)	102 (30.6%)
	O3	…has allowed me to be at peace with my past.	77 (23.1%)	52 (15.6%)	63 (18.9%)	60 (18.0%)	81 (24.3%)
	O6	…has made it easier to bear much sadness.	66 (19.8%)	42 (12.6%)	68 (20.4%)	69 (20.7%)	88 (26.4%)
	O9	…has helped me cope with the anxiety and fear that I have experienced in my life.	64 (19.2%)	33 (9.9%)	76 (22.8%)	68 (20.4%)	92 (27.6%)
	Co5	…helps me feel better about the things that I don't have in life.	57 (17.1%)	41 (12.3%)	77 (23.1%)	60 (18.0%)	98 (29.4%)
	Co6	…makes it easier to cope with the fact that my relationships with others are not as I would like them to be.	64 (19.2%)	44 (13.2%)	80 (24.0%)	60 (18.0%)	85 (25.5%)
Confidence in self amongst others (CSO)	CSO3	...gives me confidence to make my own decisions without being influenced by what everyone else is doing.	33 (9.9%)	37 (11.1%)	61 (18.3%)	75 (22.5%)	127 (38.1%)
	CSO4	…gives me confidence in my opinions even if they are different to the opinions of other people.	22 (6.6%)	33 (9.9%)	66 (19.8%)	76 (22.8%)	136 (40.8%)
	CSO5	…gives me the confidence to stand up for myself.	43 (12.9%)	44 (13.2%)	67 (20.1%)	76 (22.8%)	103 (30.9%)
	CSO8	…makes me feel confident to do what I think is right, even if others don't agree.	22 (6.6%)	38 (11.4%)	56 (16.8%)	84 (25.2%)	133 (39.9%)
	O4	…has meant that I can find solutions to my problems.	39 (11.7%)	42 (12.6%)	71 (21.3%)	71 (21.3%)	110 (33.0%)
Greater good (GG)	GG2	…gives me a mission in life.	41 (12.3%)	46 (13.8%)	61 (18.3%)	61 (18.3%)	124 (37.2%)
	GG3	…means that I am dedicating my life to a worthwhile cause.	51 (15.3%)	49 (14.7%)	56 (16.8%)	54 (16.2%)	123 (36.9%)
	GG5	…means that I have something valuable to give to the world.	32 (9.6%)	35 (10.5%)	67 (20.1%)	68 (20.4%)	131 (39.3%)
	GG6	…means that I can leave behind something good when I'm gone.	57 (17.1%)	39 (11.7%)	58 (17.4%)	56 (16.8%)	123 (36.9%)
	GG8	…means that I am destined to accomplish something important.	40 (12.0%)	36 (10.8%)	70 (21.0%)	66 (19.8%)	121 (36.3%)
	Sp11	… has meant that I can help to keep the world balanced towards good.	68 (20.4%)	44 (13.2%)	62 (18.6%)	67 (20.1%)	92 (27.6%)
Supporting loved ones (L)	L1	… has led to me finding someone who loves me.	135 (40.5%)	45 (13.5%)	35 (10.5%)	25 (7.5%)	93 (27.9%)
	L6	…means that I can protect my loved ones from harm.	70 (21.0%)	42 (12.6%)	58 (17.4%)	52 (15.6%)	111 (33.3%)
	L7	…means that I can support those I care about.	50 (15.0%)	50 (15.0%)	52 (15.6%)	61 (18.3%)	120 (36.0%)
	L9	…means that I can make the people I love happy.	54 (16.2%)	51 (15.3%)	70 (21.0%)	51 (15.3%)	107 (32.1%)
Happiness (H)	H2	…makes me feel happy.	58 (17.4%)	39 (11.7%)	74 (22.2%)	65 (19.5%)	97 (29.1%)
	H3	…makes me feel excited.	50 (15.0%)	45 (13.5%)	57 (17.1%)	61 (18.3%)	120 (36.0%)
	H5	…makes me feel energised.	52 (15.6%)	39 (11.7%)	74 (22.2%)	56 (16.8%)	112 (33.6%)
	H13	…has helped me to feel confident about myself.	40 (12.0%)	33 (9.9%)	72 (21.6%)	60 (18.0%)	128 (38.4%)

Cells shaded in grey indicate the most commonly endorsed level for each item.

Appendix 4. Supplementary information for Chapter 4

Appendix 4.1. Initial item pool for the Subjective Harm from Exceptional Experiences Questionnaire (SHEEQ)

Lifetime harm or difficulties (not included in factor analysis)

Item	Item content *Please answer the next two questions in relation to your* ***whole lifetime****:*
L1	Have your special abilities/identity/role/mission/wealth ***ever*** caused any difficulties for you? (T*his could be that they have caused difficulties directly, for example, the responsibility has felt stressful, or they could have caused difficulties because of the way others have reacted to them.)*
L2	Is this something you have ever wanted help for?

Recent harm or difficulties (items included in factor analysis)

Item	Item content *Please answer the next set of questions in relation to the* ***last six months****:*
H1	Have your special abilities/identity/role/mission/wealth caused any difficulties for you? (T*his could be that they have caused difficulties directly, for example, the responsibility has felt stressful, or they could have caused difficulties because of the way others have reacted to them.)*
H2	Have your special abilities/identity/role/mission/wealth resulted in **physical** harm occurring to you? *(E.g., getting physically hurt whilst on a mission; being assaulted by a member of the public in response to your exceptional experiences; or putting yourself in another physically dangerous situation etc.)*
H3	Have your special abilities/identity/role/mission/wealth caused you **emotional** distress? *(E.g., either directly causing you to feel sad, anxious, angry etc. or others' responses to your exceptional experiences making you feel this way.)*
H4	Have your special abilities/identity/role/mission/wealth resulted in problems or difficulties **socially** for you? *(E.g., problems with friends, family, or strangers, including: causing arguments with family/friends, relationship breakdowns, or others rejecting you or being rude because they didn't understand your exceptional experiences.)*
H5	Have your special abilities/identity/role/mission/wealth caused problems with your **work**? *(E.g., difficulties with colleagues; having to take time off work; losing a job; complaints from customers etc.)*
H6	Have your special abilities/identity/role/mission/wealth caused you to be in a situation where you have been **sexually** taken advantage of? *(E.g., having sex with a stranger because they had an important link to your special abilities/role/identity/mission/wealth).*
H7	Have you put **yourself** in a **risky** situation, due to your special abilities/identity/role/mission/wealth?
H8	What would **a friend, family member, or someone else who knows you well**, say if asked whether *they* think you have put yourself in a risky situation due to your special abilities/identity/role/mission/wealth?
H9	Have you caused harm, upset, or distress **to others,** due to your special abilities/identity/role/mission/wealth?

Respondents were asked to rate the above items concerning their actions and behaviours in relation to their exceptional abilities, identity, role, mission or wealth in the last month. A five-point Likert scale was used (0=not at all, 1=occasionally, 2=some of the time, 3=much of the time, 4=all of the time).

Appendix 4.2. Initial item pool for the Immersion Behaviours Questionnaire – Experiences of Feeling Exceptional (IBQ-EE)

Item	Item content *Please rate how often in the last month you have:*
B1	**Used** your special abilities, identity, or wealth, or carried out your special role or mission.
B2	Acted in relation to your special abilities/identity/role/mission/wealth in a **public place.**
B3	Acted in relation to your special abilities/identity/role/mission/wealth in **private** *(e.g., at home or another private space where others are unlikely to see you).*
B4	**Dressed** in a particular way to fit with your special abilities/identity/role/mission/wealth *(e.g., wearing a special robe to perform religious actions; going out in disguise to stay undercover on a mission; wearing particular clothes or items (such as a crown) that fit with your special identity etc).*
B5	**Directly approached or interacted** with **strangers or people you do not know well** in the context of your special abilities/identity/role/mission /wealth *(e.g., to tell them something important; using your powers to heal others in person; apprehending or following suspects in relation to your mission; contacting famous people).*
B6	**Directly approached or interacted** with **friends, family members, or others you know well** in the context of your special abilities/identity/role/mission/wealth *(e.g., to talk to them about your special abilities/identity/role/mission/wealth; to try to help or save them; to warn them about something important etc.).*
B7	**Stopped doing, or reduced, your usual activities** to focus on your special abilities/identity/role/mission/wealth *(e.g., reduced or stopped going to work, engaging in hobbies, social life etc.).*
B8	**Withdrawn** from others to explore, understand, or immerse yourself in your special abilities/identity/role/mission/wealth *(e.g., not leaving the house; staying away from others you live with so that you can focus your attention on this).*
B9	Spent time **collecting things** to use in relation to your special abilities/identity/role/mission/wealth (*e.g., collecting religious objects or books; special tools; etc.).*
B10	Spent time **researching or finding out information** that relates to your special abilities/identity/role/mission/wealth *(this could include looking things up online, reading books/papers, or gathering information in any other way).*
B11	**Put information** about your special abilities/identity/role/mission/wealth on **social media** *(this could include any social media platform such as Facebook, Instagram, Twitter etc).*
B12	Spent time **keeping a record or making notes** or information that relates to your special abilities/identity/role/mission/wealth *(e.g., making written records, diaries, videos, or taking photographs that relate to your special abilities/identity/role/mission/wealth*).
B13	Used your abilities/powers to try to heal or bless someone or perform other religious acts *(e.g., preaching).*
B14	Tried to get into contact with famous, important or powerful people.
B15	Gone on an undercover mission.
B16	Had (or tried to have) a sexual relationship with strangers who have an important role in relation to your special abilities/identity/role/mission/ wealth *(e.g., this could include being intimate with a stranger who you thought was involved in the same mission as you).*
B17	Used your special intelligence to solve a highly complex problem (*e.g., in science, mathematics, music, literature etc.)*
B18	Performed royal duties or acts.
B19	Engaged in a spiritual battle *(e.g., with good or evil forces).*
B20	Used your special abilities to try to save or help others/the world.
B21	Tried to teach or educate others.
B22	Spent a lot of your money (or a lot more than usual) on an important project, idea, or cause.

Respondents were asked to rate the above items concerning their actions and behaviours in relation to their exceptional abilities, identity, role, mission or wealth in the last month. A five-point Likert scale was used (0=not at all, 1=occasionally, 2=some of the time, 3=much of the time, 4=all of the time)

Appendix 4.3. Item pool for the Thinking about Exceptional Experiences Questionnaire (TEEQ)

Item	Item content *In relation to my exceptional abilities/identity/role/mission/wealth…*
Q1	I've been thinking about it a lot.
Q2	It feels important to think about it a lot.
Q3	Anything and everything has set my mind to thinking about it.
Q4	Images (or pictures) associated with it have come into my mind.
Q5	It has been hard to think about anything else.
Q6	Thinking about it has stopped me sleeping.
Q7	Thoughts about it are hard to control.

Respondents were asked to rate the above items in relation to the last two weeks. A five-point Likert scale was used (0=none of the time, 1=rarely, 2=some of the time, 3=often, 4=all of the time)

Appendix 4.4. Frequencies of endorsement on SHEEQ items, clinical group with grandiose delusions(n=361)

Item	Item content	Frequency of endorsement of items at each response level, n(%) Not at all 0	Occasion-ally 1	Some of the time 2	Much of the time 3	All of the time 4	Missing data NA
In relation to your whole lifetime:							
L1	Have your special abilities/…/wealth ***ever*** caused any difficulties for you?	68 (18.8)	47 (13.0)	87 (24.1)	82 (22.7)	77 (21.3)	(0.0)
L2	Is this something you have ever wanted help with?	107 (29.6)	51 (14.1)	78 (21.6)	47 (13.0)	74 (20.5)	4 (1.1)
In relation to the last 6 months:							
Have your special abilities/identity/role/mission/wealth:							
H1	…caused any difficulties for you?	104 (28.8)	53 (14.7)	72 (19.9)	73 (20.2)	59 (16.3)	0 (0.0)
H2	…resulted in physical harm occurring to you?	223 (61.8)	47 (13.0)	41 (11.4)	20 (5.5)	30 (8.3)	0 (0.0)
H3	…caused you emotional distress?	98 (27.1)	51 (14.1)	69 (19.1)	69 (19.1)	74 (20.5)	0 (0.0)
H4	…resulted in problems or difficulties socially for you?	113 (31.3)	55 (15.2)	73 (20.2)	51 (14.1)	68 (18.8)	1 (0.3)
H5	…caused problems with your work?	204 (56.5)	35 (9.7)	40 (11.1)	28 (7.8)	50 (13.9)	4 (1.1)
H6	…caused you to be in a situation where you have been sexually taken advantage of?	281 (77.8)	42 (11.6)	17 (4.7)	7 (1.9)	13 (3.6)	1 (0.3)
H7	Have you put yourself in a risky situation, due to your special abilities/--/wealth?	172 (47.6)	57 (15.8)	62 (17.2)	39 (10.8)	29 (8.0)	2 (0.6)
H8	What would a friend, family member, or someone else who knows you well say if asked whether they think you have put yourself in a risky situation due to your special abilities/…/wealth?	148 (41.0)	61 (16.9)	60 (16.6)	43 (11.9)	44 (12.2)	5 (1.4)
H9	Have you caused harm, upset, or distress to others due to your special abilities/…/wealth?	189 (52.4)	69 (19.1)	51 (14.1)	21 (5.8)	29 (8.0)	2 (0.6)

Appendix 4.5. Frequencies of endorsement on IBQ-EE items, clinical group with grandiose delusions (n=361)

Item	Item content	Frequency of endorsement of items at each response level, n(%)					
		Not at all	Occasionally	Some of the time	Much of the time	All of the time	Missing data
		0	1	2	3	4	NA
B1	**Used** your special abilities, identity, or wealth, or carried out your special role or mission.	97 (26.9)	74 (20.5)	73 (20.2)	56 (15.5)	60 (16.6)	1 (0.3)
B2	Acted in relation to your special abilities/identity/role/mission/wealth in a **public place.**	150 (41.6)	62 (17.2)	63 (17.5)	36 (10.0)	50 (13.9)	0
B3	Acted in relation to your special abilities/identity/role/mission/wealth in **private**	74 (20.5)	57 (15.8)	86 (23.8)	61 (16.9)	82 (22.7)	1 (0.3)
B4	**Dressed** in a particular way to fit with your special abilities/identity/role/mission/wealth	201 (55.7)	43 (11.9)	38 (10.5)	28 (7.8)	51 (14.1)	0
B5	**Directly approached or interacted** with **strangers or people you do not know well** in the context of your special abilities/identity/role/mission /wealth	175 (48.5)	58 (16.1)	54 (15.0)	29 (8.0)	45 (12.5)	0
B6	**Directly approached or interacted** with **friends, family members, or others you know well** in the context of your special abilities/identity/role/mission/wealth	112 (31.0)	69 (19.1)	83 (23.0)	40 (11.1)	57 (15.8)	0
B7	**Stopped doing, or reduced, your usual activities** to focus on your special abilities/identity/role/mission/wealth	141 (39.1)	70 (19.4)	66 (18.3)	47 (13.0)	37 (10.2)	0
B8	**Withdrawn** from others to explore, understand, or immerse yourself in your special abilities/identity/role/mission/wealth	103 (28.5)	62 (17.2)	84 (23.3)	61 (16.9)	51 (14.1)	0
B9	Spent time **collecting things** to use in relation to your special abilities/identity/role/mission/wealth	153 (42.4)	67 (18.6)	59 (16.3)	36 (10.0)	46 (12.7)	0
B10	Spent time **researching or finding out information** that relates to your special abilities/identity/role/mission/wealth	104 (28.8)	67 (18.6)	69 (19.1)	51 (14.1)	70 (19.4)	0
B11	**Put information** about your special abilities/identity/role/mission/wealth on **social media**	252 (69.8)	37 (10.2)	31 (8.6)	15 (4.2)	26 (7.2)	0
B12	Spent time **keeping a record or making notes** or information that relates to your special abilities/identity/role/mission/wealth	164 (45.4)	61 (16.9)	48 (13.3)	34 (9.4)	52 (14.4)	2 (0.6)
B13	Used your abilities/powers to try to heal or bless someone or perform other religious acts	223 (61.8)	50 (13.9)	35 (9.7)	23 (6.4)	30 (8.3)	0
B14	Tried to get into contact with famous, important or powerful people.	254 (70.4)	36 (10.0)	27 (7.5)	19 (5.3)	25 (6.9)	0
B15	Gone on an undercover mission.	263 (72.9)	28 (7.8)	39 (10.8)	14 (3.9)	16 (4.4)	1 (0.3)
B16	Had (or tried to have) a sexual relationship with strangers who have an important role in relation to your special abilities/identity/role/mission/ wealth	313 (86.7)	20 (5.5)	13 (3.6)	6 (1.7)	7 (1.9)	2 (0.6)
B17	Used your special intelligence to solve a highly complex problem	144 (39.9)	63 (17.5)	48 (13.3)	44 (12.2)	62 (17.2)	0
B18	Performed royal duties or acts.	300 (83.1)	24 (6.6)	11 (3.0)	10 (2.8)	16 (4.4)	0
B19	Engaged in a spiritual battle	184 (51.0)	42 (11.6)	50 (13.9)	42 (11.6)	42 (11.6)	1 (0.3)
B20	Used your special abilities to try to save or help others/the world.	132 (36.6)	55 (15.2)	51 (14.1)	50 (13.9)	72 (19.9)	1 (0.3)
B21	Tried to teach or educate others.	119 (33.0)	65 (18.0)	65 (18.0)	41 (11.4)	70 (19.4)	1 (0.3)
B22	Spent a lot of your money (or a lot more than usual) on an important project, idea, or cause.	179 (49.6)	42 (11.6)	48 (13.3)	27 (7.5)	65 (18.0)	0

Appendix 4.6. Frequencies of TEEQ item endorsement across each response level in the clinical group with grandiose delusions (n=358).

Item	Item content	Frequencies of endorsement of items at each response level, n (%)				
		0 None of the time	**1** Rarely	**2** Some of the time	**3** Often	**4** All of the time
Q1	I've been thinking about it a lot	42 (11.73)	38 (10.61)	83 (23.18)	105 (29.33)	90 (25.14)
Q2	It feels important to think about it a lot	56 (15.64)	38 (10.61)	90 (25.14)	64 (17.88)	110 (30.73)
Q3	Anything and everything has set my mind to thinking about it	78 (21.79)	35 (9.78)	89 (24.86)	72 (20.11)	84 (23.46)
Q4	Images (or pictures) associated with it have come into my mind	79 (22.07)	42 (11.73)	68 (18.99)	84 (23.46)	85 (23.74)
Q5	It has been hard to think about anything else	104 (29.05)	69 (19.27)	66 (18.44)	59 (16.48)	60 (16.76)
Q6	Thinking about it has stopped me sleeping	150 (41.90)	47 (13.13)	61 (17.04)	50 (13.97)	50 (13.97)
Q7	Thoughts about it are hard to control	100 (27.93)	56 (15.64)	77 (21.51)	61 (17.04)	64 (17.88)

Appendix 4.7. *Post hoc* t-tests comparing mean factor scores for key outcome variables by diagnostic group in the clinical group with grandiose delusions

Measure	t	DF	p-value	Mean in non-affective psychosis group (n=82)	Mean in affective psychosis group (n=270)
Harm (SHEEQ)	-1.86	130.52	0.06	-0.04	0.14
'Thinking a lot' (TEEQ factor 1)	1.72	131.79	0.09	0.05	-0.12
'Difficulty controlling thoughts' (TEEQ factor 2)	1.39	138.85	0.17	0.04	-0.10
Immersion behaviours (IBQ)	0.50	125.17	0.61	0.03	-0.02
Grandiosity (SPEQ-G)	1.26	120.91	0.21	0.05	-0.07

Appendix 4.8. *Post hoc* results for internal consistency of measures within diagnostic subgroups.

Measure	Cohort	Diagnostic category	n	Factor	Internal consistency (ordinal alpha)
TEEQ	Clinical	Affective psychosis	83	Thinking a lot	0.93
				Control	0.82
		Non-affective	275	Thinking a lot	0.91
				Control	0.86
	Clinical and non-clinical groups	Affective psychosis	114	Thinking a lot	0.93
				Control	0.85
		Non-affective	323	Thinking a lot	0.92
				Control	0.87
IBQ	Clinical	Affective psychosis	83	Immersion behaviours	0.95
		Non-affective	278	Immersion behaviours	0.94
SHEEQ	Clinical	Affective psychosis	83	Subjective Harm	0.91
		Non-affective	278	Subjective Harm	0.92

Appendix 4.9. *Post hoc* test-retest analysis within diagnostic category

Measure	Cohort	Diagnostic category	n	Mean number of days to follow-up (SD)	Factor	Intraclass correlation coefficient
TEEQ	Clinical	Affective psychosis	28	6.79 (1.52)	Thinking a lot Control	0.73 0.67
		Non-affective	124	7.39 (1.17)	Thinking a lot Control	0.58 0.61
	Clinical and non-clinical groups	Affective psychosis	45	7.29 (2.03)	Thinking a lot Control	0.70 0.62
		Non-affective	140	7.79 (1.17)	Thinking a lot Control	0.64 0.66
IBQ	Clinical	Affective psychosis	28	6.82 (1.52)	Immersion behaviours	0.83
		Non-affective	105	7.42 (1.20)	Immersion behaviours	0.74
SHEEQ	Clinical	Affective psychosis	28	6.82 (1.52)	Subjective Harm	0.54
		Non-affective	105	7.42 (1.20)	Subjective Harm	0.74

Appendix 4.10. *Post hoc* model comparison to determine measurement invariance across diagnostic categories for the TEEQ

Measure	Models	Model Comparison	K	χ2	DF	RMSEA	SRMR	CFI
TEEQ	Configural	-	68	72.442	22	0.103	0.037	0.991
	Weak - Threshold	Threshold vs Configural	78	69.854	32	0.074 (Δ = -0.029)	0.037 (Δ =0.000)	0.993 (Δ = +0.002)
	Weak - Metric	Metric vs Threshold	92	54.664	37	0.047 (Δ =-0.027)	0.039 (Δ =+0.002)	0.997 (Δ =+0.004)
	Strong – Scalar	Scalar vs Metric	77	60.203	42	0.045 (Δ =-0.002)	0.039 (Δ = 0.000)	0.997 (Δ = 0.000)

Total n=434. This comprised 303 participants with non-affective psychosis (275 from the clinical group, 48 from the non-clinical group) and 131 with bipolar diagnosis (83 from the clinical group, 31 from non-clinical group).

Appendix 5. Supplementary information for Chapter 5

Appendix 5.1. Frequencies of endorsement at all levels for the Qualities of Daydreaming Scale (QuOD) items in the clinical group with and without grandiose delusions

			Frequencies of endorsement of items at each response level; n (%)									
Factor	**Item**	**Item content**	**Clinical group with grandiose delusions (n=360)**					**Clinical group without grandiose delusions (n=406)**				
			0	**1**	**2**	**3**	**4**	**0**	**1**	**2**	**3**	**4**
Pleasantness	Q8	My daydreams usually provide me with pleasant thoughts	108 (30.00)	75 (20.83)	77 (21.39)	46 (12.78)	54 (15.00)	173 (42.61)	90 (22.17)	78 (19.21)	34 (8.37)	31 (7.64)
	Q9	My daydreams are often stimulating and rewarding	112 (31.11)	74 (20.56)	72 (20.00)	42 (11.67)	60 (16.67)	223 (54.93)	76 (18.72)	59 (14.53)	28 (6.90)	20 (4.93)
	Q10	My daydreams offer me useful clues to tricky situations I face	118 (32.78)	55 (15.28)	63 (17.50)	55 (15.28)	69 (19.17)	234 (57.64)	75 (18.47)	56 (13.79)	21 (5.17)	20 (4.93)
	Q11	My daydreams often leave me with a warm, happy feeling.	99 (27.50)	79 (21.94)	75 (20.83)	45 (12.50)	62 (17.22)	208 (51.23)	95 (23.40)	50 (12.32)	27 (6.65)	26 (6.40)
	Q12	I daydream about what I would like to see happen in the future.	74 (20.56)	49 (13.61)	68 (18.89)	67 (18.61)	102 (28.33)	137 (33.74)	95 (23.40)	74 (18.23)	48 (11.82)	52 (12.81)
	Q13	I find my daydreams are worthwhile and interesting to me.	75 (20.83)	55 (15.28)	70 (19.44)	65 (18.06)	95 (26.39)	161 (39.66)	98 (24.14)	57 (14.04)	45 (11.08)	45 (11.08)
Realism	Q2	Many of my daydreams have a realistic intensity.	100 (27.78)	51 (14.17)	51 (14.17)	59 (16.39)	99 (27.50)	184 (45.32)	58 (14.29)	55 (13.55)	47 (11.58)	62 (15.27)
	Q3	Many of my daydreams are often just as lively as a good movie.	116 (32.22)	46 (12.78)	51 (14.17)	55 (15.28)	92 (25.56)	216 (53.20)	49 (12.07)	50 (12.32)	39 (9.61)	52 (12.81)
	Q4	I often confuse my daydreams with real memories.	159 (44.17)	74 (20.56)	35 (9.72)	34 (9.44)	58 (16.11)	260 (64.04)	51 (12.56)	35 (8.62)	24 (5.91)	36 (8.87)
Frequency	Q6	As an adult I (still) occasionally live in a make-believe world.	146 (40.56)	61 (16.94)	55 (15.28)	39 (10.83)	59 (16.39)	249 (61.33)	56 (13.79)	43 (10.59)	27 (6.65)	31 (7.64)
	Q7	As an adult I spend a substantial part of my total waking day imagining.	130 (36.11)	66 (18.33)	61 (16.94)	58 (16.11)	45 (12.50)	223 (54.93)	74 (18.23)	59 (14.53)	25 (6.16)	25 (6.16)

Appendix 5.2. Frequencies of endorsement at all levels for the Qualities of Daydreaming Scale (QuOD) items in the non-clinical group with high versus low grandiosity.

			Frequencies of endorsement of items at each response level; n (%)									
Factor	**Item**	**Item content**	**Non-clinical group with high grandiosity (n=1374)**					**Non-clinical group with low grandiosity (n=2393)**				
			0	**1**	**2**	**3**	**4**	**0**	**1**	**2**	**3**	**4**
Pleasantness	Q8	My daydreams usually provide me with pleasant thoughts	312 (22.71)	389 (28.31)	272 (19.80)	255 (18.56)	146 (10.63)	636 (26.58)	844 (35.27)	498 (20.81)	309 (12.91)	106 (4.43)
	Q9	My daydreams are often stimulating and rewarding	385 (28.02)	346 (25.18)	295 (21.47)	202 (14.70)	146 (10.63)	863 (36.06)	864 (36.11)	407 (17.01)	183 (7.65)	76 (3.18)
	Q10	My daydreams offer me useful clues to tricky situations I face	511 (37.19)	331 (24.09)	249 (18.12)	179 (13.03)	104 (7.57)	1228 (51.32)	657 (27.46)	332 (13.87)	139 (5.81)	37 (1.55)
	Q11	My daydreams often leave me with a warm, happy feeling.	366 (26.64)	455 (33.11)	277 (20.16)	185 (13.46)	91 (6.62)	797 (33.31)	951 (39.74)	420 (17.55)	173 (7.23)	52 (2.17)
	Q12	I daydream about what I would like to see happen in the future.	254 (18.49)	308 (22.42)	273 (19.87)	324 (23.58)	215 (15.65)	544 (22.73)	809 (33.81)	505 (21.10)	404 (16.88)	131 (5.47)
	Q13	I find my daydreams are worthwhile and interesting to me.	268 (19.51)	387 (28.17)	290 (21.11)	262 (19.07)	167 (12.15)	623 (26.03)	908 (37.94)	506 (21.15)	257 (10.74)	99 (4.14)
Realism	Q2	Many of my daydreams have a realistic intensity.	418 (30.42)	276 (20.09)	236 (17.18)	246 (17.90)	198 (14.41)	1029 (43.00)	566 (23.65)	397 (16.59)	255 (10.66)	146 (6.10)
	Q3	Many of my daydreams are often just as lively as a good movie.	541 (39.37)	252 (18.34)	181 (13.17)	199 (14.48)	201 (14.63)	1267 (52.95)	470 (19.64)	298 (12.45)	219 (9.15)	139 (5.81)
	Q4	I often confuse my daydreams with real memories.	942 (68.56)	209 (15.21)	102 (7.42)	56 (4.08)	65 (4.73)	1858 (77.64)	334 (13.96)	110 (4.60)	64 (2.67)	27 (1.13)
Frequency	Q6	As an adult I (still) occasionally live in a make-believe world.	573 (41.70)	376 (27.37)	195 (14.19)	126 (9.17)	104 (7.57)	1163 (48.60)	729 (30.46)	287 (11.99)	127 (5.31)	87 (3.64)
	Q7	As an adult I spend a substantial part of my total waking day imagining.	495 (36.03)	401 (29.18)	234 (17.03)	(144 10.48)	100 (7.28)	1102 (46.05)	747 (31.22)	331 (13.83)	152 (6.35)	61 (2.55)

Appendix 6. Papers published from the thesis

Isham, L., Griffith, L., Boylan, A., Hicks, A., Wilson, N., Byrne, R., Sheaves, B., Bentall, R.P., & Freeman, D. (2021). Understanding, treating, and renaming grandiose delusions: a qualitative study. Psychology and Psychotherapy: Theory, Research, and Practice, 94, 119-140.

Isham, L., Loe, B.S., Hicks, A., Wilson, N., Bird, J.C., Bentall, R.P., & Freeman, D. (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. Lancet Psychiatry, 9, 792-803.

Isham, L., Loe, B.S., Hicks, A., Wilson, N., Bentall, R.P., & Freeman, D. (2023). The difficulties of grandiose delusions: harms, challenges, and implications for treatment. Schizophrenia Bulletin. sbad016. doi: 10.1093/schbul/sbad016. Epub ahead of print.

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Understanding, treating, and renaming grandiose delusions: A qualitative study

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Background. Grandiose delusions are arguably the most neglected psychotic experience in research.

Objectives. We aimed to discover from patients: whether grandiose delusions have harmful consequences; the psychological mechanisms that maintain them; and what help patients may want from clinical services.

Design. A qualitative interview design was used to explore patients' experiences of grandiose delusions.

Method. Fifteen patients with past or present experiences of grandiose delusions who were attending psychiatric services were interviewed. Thematic analysis and grounded theory were used to analyse the data.

Results. Participants reported physical, sexual, social, occupational, and emotional harms from grandiose delusions. All patients described the grandiose belief as highly meaningful: it provided a sense of purpose, belonging, or self-identity, or it made sense of unusual or difficult events. The meaning from the belief was not synonymous with extreme superiority or arrogance. The meaning obtained appeared to be a key driver of the persistence of the beliefs. Other maintenance factors were subjectively anomalous experiences (e.g., voices), symptoms of mania, fantasy elaboration, reasoning biases, and immersive behaviours. Participants described insufficient opportunities to talk about their

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grandiose beliefs and related experiences and were generally positive about the possibility of a psychological therapy.

Conclusions. We conclude that grandiosity is a psychologically rich experience, with a number of maintenance factors that may be amenable to a targeted psychological intervention. Importantly, the term 'grandiose delusion' is an imprecise description of the experience; we suggest 'delusions of exceptionality' may be a credible alternative.

Practitioner points

- Harm from grandiose delusions can occur across multiple domains (including physical, sexual, social, occupational, and emotional) and practitioners should assess accordingly.
- However, grandiose delusions are experienced by patients as highly meaningful: they provide a sense of purpose, belonging, or self-identity, or make sense of unusual or difficult events.
- Possible psychological maintenance mechanisms that could be a target for intervention include the meaning of the belief, anomalous experiences, mania, fantasy elaboration, reasoning biases, and immersive behaviours.
- Patients are keen to have the opportunity to access talking therapies for this experience. Taking extra time to talk at times of distress, 'going the extra mile', and listening carefully can help to facilitate trust.

Grandiose delusions are unfounded beliefs that one has special powers, wealth, mission, or identity (Leff, Fischer, & Bertelsen, 1976). Despite being a common type of delusion (Appelbaum, Robbins, & Roth, 1999; Goodwin & Jamison, 2007) – occurring in about half of patients diagnosed with schizophrenia and two thirds of patients with bipolar disorder (Knowles, McCarthy-Jones, & Rowse, 2011) – they have been remarkably neglected as a specific focus of research and clinical practice. Indeed, although theoretical discussions about grandiose beliefs date back more than 100 years (Bleuler, 1950; Freud, 1911), very little in the way of empirical research has been conducted (Knowles *et al.*, 2011), and only a handful of studies test hypotheses regarding causal or maintenance mechanisms. This dearth of research activity is particularly apparent when compared to the extensive literature focusing on other psychotic experiences such as persecutory delusions and auditory hallucinations.

This apparent disparity may have arisen for several reasons. There may be a perception that grandiose delusions represent a more benign presentation in non-affective psychosis and that they will not be distressing or harmful given the focus of the belief. Alternatively, they may be viewed simply as a symptom of mania in affective psychosis, and therefore, it is presumed that research and clinical focus should be on the manic episode rather than the belief *per se*. These assumptions, however, may be erroneous. Both harm and distress can occur with grandiose delusions (e.g., believing one is invincible and stepping into traffic, or believing one is Jesus and will therefore be crucified). Potential maintenance mechanisms (e.g., reasoning biases) beyond mania have been identified (Bortolon, Yazbek, Norton, Capdevielle, & Raffard, 2019; Garety *et al.*, 2012) and others hypothesized (Knowles *et al.*, 2011). Furthermore, factor analytic symptom studies and twin design genetic studies suggest that there are distinct aetiological influences for different psychotic experiences, including grandiosity (Ronald *et al.*, 2014; Zavos *et al.*, 2014), and there is therefore a rationale for the development of experience-specific models and intervention (Freeman, 2016). Our view is that grandiose delusions require specific research scrutiny.

Our aim was to further understanding directly from patients. Three key areas were examined: the harmful consequences of grandiose delusions, why the beliefs persist, and what patients may want from services. The rationale to intervene is inextricably linked to

whether grandiose delusions cause harm, and therefore, we wanted to detail the types of harmful consequences that may occur. If intervention is indicated, then the mechanisms to target to effect change must be known. Preliminary evidence suggests possible roles for reasoning biases, hallucinations, and self-esteem (Ben-Zeev, Morris, Swendsen, & Granholm, 2011; Bortolon *et al.*, 2019; Garety *et al.*, 2012) but our understanding of the factors maintaining grandiose delusions is currently very limited. We therefore wanted to generate hypotheses for maintenance factors directly from patient reports. Finally, grandiose delusions increase the risk of a patient being unmotivated to engage in standard treatment (Mulder, Koopmans, & Hengeveld, 2005) but little is known about why this is. Patients may feel that treatments are irrelevant or unhelpful, and such perspectives must be understood in order for an acceptable intervention to be developed. We therefore wanted to learn from patients what they would, and would not, want from clinical services.

Methods

The study was approved by the NHS Health Research Authority (REC reference: 17/SC/0515).

Research team

The study was designed and conducted by a team with a range of expertise. This included those with personal experience of grandiose delusions, as well as experts in the development and delivery of psychological models and treatments for psychotic experiences, and in qualitative methodology. This ensured that multiple perspectives were obtained at all stages of the research process, which was invaluable in maximizing the credibility and dependability (or validity and reliability) of the study (Guest, MacQueen, & Namey, 2012a).

Participants

Participants were sought from clinical teams in Oxford Health NHS Foundation Trust. Inclusion criteria were as follows: aged 16+ years; current/past experience of grandiose delusions held for at least 1 month with at least 50% conviction; and a primary diagnosis of schizophrenia-spectrum psychosis or bipolar affective disorder. Individuals without capacity to consent, with insufficient comprehension of English, or with primary diagnoses of drug/alcohol/personality disorder, learning disability, or organic syndrome were excluded. Potential participants were identified by their clinical teams and, if consent was given to do so, approached by the lead author who provided information about the study and screened for suitability. The Schedules for Clinical Assessment in Neuropsychiatry (Wing *et al.*, 1990) (items 19.029 delusions of grandiose abilities and 19.030 delusions of grandiose identity) was used to assess grandiose delusions. All participants gave written informed consent.

Purposive sampling

Representation across those with (1) current and past grandiose delusions, and (2) affective and non-affective diagnoses, was prioritized (Richie, Lewis, & Elam, 2014). This

was due to anticipated differences in views on harm, treatment, and maintenance factors. Some harms (such as social embarrassment) were anticipated as being potentially more apparent to those with past beliefs, whereas some maintenance factors might be more readily identified in those currently holding a grandiose delusion. Ensuring participants with affective and non-affective diagnoses were included allowed us to consider these experiences both within and outside of the context of mania. Variation across gender, age, and service experience was also sought where possible.

Data saturation

Data saturation was considered to have been achieved when no new themes emerged from additional interviews (Fusch & Ness, 2015). In practice, it was felt that this had occurred by the thirteenth participant but a further two participants were recruited to test and confirm this. This resulted in a final sample of 15 participants. Sample extraction details (Figure 1) and participant characteristics (Tables 1 and 2) are provided.

Procedure

Interview guide evolution

Consensus meetings and pilot interviews (conducted with those who had personal experience of grandiose delusions) facilitated the development of a preliminary interview guide. Decisions made at this stage included starting the interview with an open unstructured question inviting participants to tell their story about their experience of the identified belief. This ensured that the participant could talk about the issues most important to them. It was also decided to have two versions of the interview questions to ensure that experiences related to both past and current beliefs could be discussed sensitively (e.g., asking 'How did you come to **believe** you were God?' or 'How did you come to **realise** that you were God?'). Emergent themes were incorporated into the

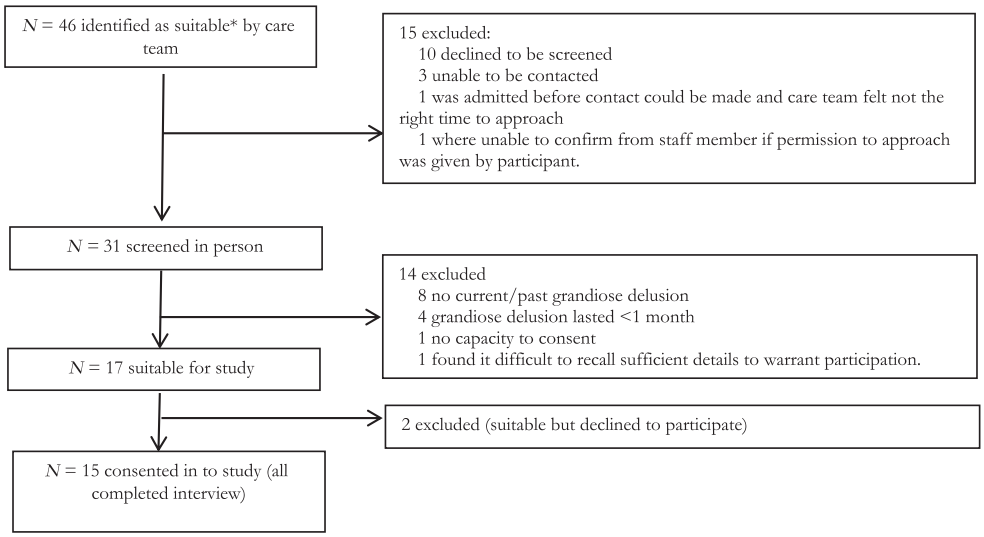

Figure 1. Sample extraction. *NB: A heterogeneous sample was pursued by purposive sampling to include those with current and past grandiose delusions, and affective and non-affective diagnoses.

Table 1. Sample characteristics (n = 15)

Demographic characteristic	Frequency
Age (years)	
16–25	2
26–35	3
36–45	5
46–55	1
56–65	4
Gender	
Male	7
Female	8
Ethnicity	
White British	12
Indian	1
Black British Caribbean	1
Mixed White and Black British	1
Marital status	
Single	8
Engaged	1
Married	3
Divorced	3
Employment	
Employed full time	1
Employed part time	2
Student and part-time employment	1
Unemployed	11
Diagnoses	
Schizophrenia	4
Schizoaffective disorder	4
Bipolar affective disorder	6
Non-organic psychotic disorder (working diagnosis due to first presentation)	1
Current/past grandiose belief	
Current belief about current abilities/identity	8
Current belief about past abilities (doesn't believe currently has abilities)	2
Past belief not currently subscribed to	5
Service context at the time of interview	
Community mental health team (CMHT)	11[a]
Early intervention in psychosis (EIP) team	2
Acute psychiatric inpatient setting	2
Experience of psychiatric admission	
At least one psychiatric admission	13
No	2
Self-reported experience of any talking therapy (not necessarily for grandiose belief)	
No	4
Yes (incl. GP counselling, individual psychotherapy or counselling (private), individual CBT (NHS), mindfulness group therapy (NHS), ward-based psychosis group (NHS))	11

Note. Demographic details were provided by participants except for diagnosis and service context (identified at point of referral).

[a]One participant was open to CMHT at the time of interview but had been discharged from hospital the previous day.

Table 2. Content of grandiose beliefs discussed during interview

Pseudonym	Marital status	Employment	Diagnosis	Current service	Past or current belief	Belief(s)
Bob	Single	Student and Employed-PT	BD	EIP	Past	I have the capacity to become the next Messiah and am on a special pathway towards achieving this.
Mark	Divorced	Unemployed	SzA	AMHT[a]	Current	I am working undercover for the security services.
Mandy	Married	Unemployed	SzA	AMHT	Current	I am a Goddess and the daughter of God with whom I have a special relationship. In the next world, I will be married to Jesus, will have special powers to help people, and will bring peace to the world.
Kit	Single	Employed-PT	BD	Inpatient	Current	I am Jesus. I am the one son of God. I have special spiritual and mystical abilities which allow me to get very close to God and to make the world more peaceful. (At times, I also wonder if I can walk on water or float but am less certain about this.)
Annabelle	Single	Unemployed	SzA	AMHT	Past	I have been chosen by God to be the only one he speaks to because I am special, his favourite, and his daughter. People will build temples dedicated to me.
Sophie	Engaged	Employed-PT	BD	EIP	Past	I am God. I have the power to walk on water and bless people. I will save the world.
Stephen	Single	Unemployed	S	AMHT	Current (regarding past abilities)	I have special powers (to read minds, levitate objects, and travel through time). I am God. I have slept with billions of women and fathered children by them. I created and starred in the Avengers (who are real).
Max	Single		SzA	AMHT	Past	I am on an MI7 training programme; I am in the SAS; I am 007.
Sonja	Married	Unemployed	BD	AMHT	Current	I have special abilities to access and transfer information via telepathy (including with the spiritual realm). I can read others' minds extremely quickly (much more quickly than others.)
Jessica	Divorced	Unemployed	BD	AMHT	Current (regarding past abilities)	I am able to do telepathy. I have special knowledge (the ability to predict the future) and abilities (knowing codes to enter and exit locked buildings). I am on a special mission of great importance.

Continued

Table 2. (*Continued*)

Pseudonym	Marital status	Employment	Diagnosis	Current service	Past or current belief	Belief(s)
Fred	Single	Unemployed	S	AMHT	Current	I am a messiah, God-like figure for the world. I have superior consciousness compared to other people.
Sarah	Divorced	Unemployed	S	Inpatient	Current	I receive visions from God which allow me to predict the future. God has given me this ability because I am the Holy Spirit and his representative on earth. God kills those who harm me because I am special.
Brian	Single	Unemployed	Non-organic psychotic disorder	EIP	Current	I am the reincarnation of Albert Einstein and have advanced mathematical abilities.
Polly	Single	Unemployed	S	AMHT	Current	I have been chosen by God to have a special role in saving the world. I will do this by marrying a person identified to me by God (either a current friend, or Jesus himself).
Mildred	Married	Employed-FT	BD	AMHT	Past	I have special powers to predict the future; I have been chosen by God to save the world from evil forces because I am special.

Note. AMHT = Adult Mental Health Team; BD = bipolar affective disorder; EIP = early intervention for psychosis service; FT = full-time; PT = part-time; S = schizophrenia; SzA = schizoaffective disorder.

[a]One participant was open to AMHT at the time of interview but had been recruited during his admission to hospital, and the interview took place 1 day after discharge.

interview guide as they arose. For example, after the first five interviews, it became apparent that the experience of grandiose beliefs was not synonymous with feelings of superiority or arrogance and therefore an additional question was added to elicit additional information about this (Question: 'I'm interested in how this experience impacts on your view of yourself in relation to others. Do you see yourself as different or the same as others?' If difference was suggested, optional further probes included: 'How are you different? Is this in a good way or a negative way? Do you see yourself as better or worse than others? Or superior or inferior to others?').

Interview process

Semi-structured, in-depth, audio-recorded interviews were conducted by the lead author in accordance with relevant guidelines (Byrne, 2011; Yeo *et al.*, 2014). They were open-ended (59–187 min). After the initial open question, subsequent focused questions facilitated discussion about belief onset, possible maintenance factors, impact on the individual, and experiences of mental health services. Follow-up questions and probes were used as appropriate. Interviews were transcribed, anonymized, checked for accuracy, and offered to participants for review (Bazeley, 2013; Poland, 1995).

Almost all participants were unknown to the interviewer (a clinical psychologist in the Trust) before the study. One participant had completed a course of therapy with the interviewer 2 years prior to the present study. Where possible, steps were taken to minimize potential power imbalances between the interviewer and the participants (Gilburt, Rose, & Slade, 2008; Hoffmann, 2007). These included the interviewer emphasizing their viewpoint that the participant's perspective was paramount and that our intention was to learn from them. Care was also taken to schedule the interview at a time and location of the participant's choice and to remind participants that they could choose not to answer questions. It was also emphasized that information given by the participant in the interview would only be shared with care teams in the presence of significant risk.

Method of analysis

Transcribed data were read and re-read to ensure familiarity with the data. All interviews were coded by the lead author, however in line with recommendations (Barbour, 2001), multiple coding for a number of interviews, team reviews of the coding framework, and regular team consultation, including where uncertainty arose during coding, aimed to increase reliability.

Two early transcripts were considered in their entirety by two members of the research team (LI and LG) who each independently recorded ideas for possible codes before discussing. Suggested codes were further discussed with a third team member (DF) who had also reviewed these early transcripts. A preliminary coding framework which therefore incorporated multiple perspectives on the data was subsequently agreed. This framework largely corresponded to overarching topics on the interview guide but evolved in line with emerging ideas.

Details regarding each code (including the specific data and coder it had originated from, and whether it was an *a priori* or '*in vivo*' code) were recorded, using memos in Nvivo, to form a codebook. The coding framework was regularly reviewed by the research team and adjusted accordingly. For example, after coding of the first five transcripts, the coding framework for the potential maintenance mechanisms of grandiose beliefs was

very 'fine-grained', with 62 different codes. Team discussion regarding the relative costs and benefits of broad ('lumping') versus fine-grained ('splitting') coding (Guest, MacQueen, & Namey, 2012b; Weller & Romney, 1988) yielded a refined framework (30 codes), where codes that turned out to be similar were merged together. For example, the code 'positive impact of the grandiose belief on beliefs about the self' initially had 11 associated sub-codes describing different sub-categories (e.g., 'it makes me normal', 'I will have a better job than before'). In the revised framework, the sub-codes were dropped, and their associated data subsumed into the broader code. Details of the original sub-codes were recorded in the codebook, however, so that ideas were not lost and could be considered during analysis. Other coding reviews found that the codes 'rang true' with team members' own experiences of grandiose beliefs, who felt key information was being captured helpfully within the framework.

In addition to the first two interviews being double-coded (as described earlier), coding of an early interview was reviewed in its entirety by an additional coder (BS) to increase reliability. This yielded additional codes such as 'behavioural enaction' (capturing behaviours resulting from the grandiose belief) that were incorporated into the coding framework. An iterative approach was adopted in the coding phase. As the coding framework evolved, earlier interviews were reviewed to ensure information relevant to emerging codes was captured. For example, the 'behavioural enaction' code was added after the first five interviews had been coded and therefore these interviews were reviewed again to ensure that pertinent data from these transcripts was captured. After all interviews were completed, 'coding checks' of each transcript were conducted. This involved the primary coder reviewing their initial codes with 'fresh eyes' after a period of time which has been recommended as a strategy to mitigate against 'distorting effects immersion in the data can cause' (Guest *et al.*, 2012a).

Interviews were explored using inductive and deductive thematic analysis (Braun & Clarke, 2006), and drawing on grounded theory whereby the detailed investigation of initially unstructured narratives was compared to the research question under investigation. This offered a high degree of flexibility and fidelity to the data. As indicated, this approach generated initial codes, which were constantly compared and modified as new interviews were added and analysed. This allowed for the initial formation of conceptual themes which were constantly re-examined by the addition of new data in a dialectical process (Hutchison, Johnston, & Breckon, 2010). NVivo version 12 was used to support the coding, organization, and analysis of data.

Results

Harm

> *Interviewer:* 'I wondered whether you'd be able to tell your story [. . .] of your experience of being Jesus?'
>
> *Kit:* 'Well, first off, it's ten years of being sad'.

Harmful or potentially harmful situations were identified by all participants and had arisen in multiple life domains as a direct consequence of their grandiose beliefs. Trying to fly or walk on water (physical harm), going home with strangers they believed to be God (sexual harm), being rejected or ridiculed by others for their beliefs or associated behaviours (social harm), dropping out of university because of preoccupation with

Box 1: Further examples of harm across domains

Physical harm

Sophie: "In some cases I wouldn't think through where I tried [walking on water]. So maybe it will incidentally be shallow [. . .] but also in deeper places, and [. . .] places where getting out might have been challenging"; "It could've gone very very wrong if things had been slightly different [. . .]. I could've got seriously hurt."

Sophie: "Trying to fly off various heighted objects"; "[I] stepped off things and expected to fly." Interviewer: "What's the highest thing you've stepped off?" Sophie: [deep exhale, 10s pause]"I can't entirely remember. And I don't want to remember if that makes sense."

Max (describing an altercation at a nightclub whilst believing he had secret services training and protection from 'other' officers): "Normally I would've just left it but [. . .] because I felt that I was in some sort of training scheme, some organisation I felt a lot more confident so that added to the conflict. [. . .] I felt that people were looking out for me."

Jessica: "I was on a mission [. . .] I walked across fields, I took my shoes off and put them as markers [. . .]. I ended up walking, I've never seen it before but there was a caravan and I knocked on the caravan and this man was startled, as you would be at 11, 10 at night. But he wouldn't let me in. And it was absolutely chucking it down, and maybe I wouldn't, but bearing in mind I've got not shoes and socks."

Brian (talking about being Einstein): "I needed to get to the highest point, so I could see, like, the horizon line [. . .]. And that's when they sectioned me because they thought I was going to commit suicide because I was over like loads of electric wires [. . .]. I was on the lamp post on the bridge, sitting on top of it. [. . .] I just wanted to see the horizon line. I was literally just obsessed with space and that."

Sexual harm

Kit: "I have met with my Father [God] twice in human form. [. . .] first one was Arthur* and Arthur* was a bit confusing [. . .]. What he does he tries to give me like life lessons [. . .] but then he also wanked off to gay porn when I was in the room and I felt a bit violated."

Polly's description of sexual harm is presented in the text. The example given however was not an isolated incident and Polly described several similar occurrences including one when she ended up spending the night on the streets with a homeless man who she described as being high on narcotics.

Social harm

Stephen: "I was talking to her, I was gonna offer her a drink, and this other girl pulled her away and said ' I just thought I would pull you away from that situation' [. . .]" Interviewer: "Why do you think she did that?" Stephen: "I don't know. It's just what people think I am isn't it [. . .]. People think I'm a weirdo. Some people think I'm not right in the head."

Mildred (describing a previous boyfriend ending their relationship when she believed she was in a battle of good vs. evil with one of his relatives): "He was just like, 'I can't. . . I just can't do this anymore.'" Interviewer: "And what impact did that have on you at the time?" Mildred: "Erm. . .. my world fell to pieces."

Emotional harm

Fred (describing feeling different to others as a Messiah): "In my 30s I wanted to die; I wanted to commit suicide [. . .] For anyone in that position I thought it would be ordinary to commit suicide, it was just hopeless"; "I was certainly depressed for a long time, and I came to this

momentous decision, 'oh, to hell with it all, I'm not playing this game of being a human being anymore'."

Jessica: "There were fireworks going off but to me they weren't fireworks, they were gunshot rings and I remember, although I was scared and that, I was on a mission, I had to do it."

Bob: "The messiah is completely devoid off all sin [. . .]. So I would not allow myself [. . .] to feel any greed, [. . .], any sort of desire, without feeling guilt for it, without feeling self-hatred."

*pseudonym.

experiences (occupational harm), and feeling depressed, frightened, angry, under pressure, and suicidal (emotional harm) were all described (Box 1 provides additional quotes).

Harm was sometimes the direct consequence of the participant's behaviour (Jessica: 'I drove faster than I normally would') but frequently the risk came from others. Some, especially the male participants, knowingly entered dangerous situations feeling themselves to be invulnerable (Max described confidence during an altercation at a nightclub because 'I felt that people were looking out for me'). Others demonstrated a lack of awareness of the risks posed by others:

> *Polly:* 'This elderly gentleman came up to me [. . .]. I thought "you're God". I went to his house [. . .]. We had some kisses and cuddles and I said "can we be married?". He said "no". [. . .] "we can be partners" and from that I thought he meant not literally romantic partners but business partners; partners in the process of saving people'.

Often the participant was adversely affected but there were examples of significant harm to others, with evidence of family, friends, and strangers experiencing distress, neglect, embarrassment, or fear:

> *Max:* 'I saw two guys [. . .] and said "stop, I want to speak to you". [. . .] [They] started walking away. I don't know if they were doing something dodg-, but then I opened my jacket and went like [motions reaching inside inner jacket pocket]. They started running [. . .]. I said "stop armed police!" or something and they just ran off'.
>
> *Sarah:* 'I was going to heaven, [. . .] spending time with God [. . .]. Always in visions [dreams]. My days would be perfectly normal, but my nights would be just magical. And this is where we get to my daughter because. . . I just wanted to go to bed. She was a teenager and wanted to be out with her friends and I would just ignore her. Go to sleep and leave her. I didn't even know what time she was coming in. [. . .] It did impact our relationship. [. . .] I would go to bed early [. . .]. say seven o'clock, [. . .] because that was more exciting than my daily life and I didn't realise that I neglected her'.

Harms were evident both when the belief was present but also afterwards. Participants recalled feeling embarrassment or a sense of loss once the belief receded (Max: 'you slip into quite a deep depression after you realise [. . .] it's not like you go from a feeling of being really important back to where you were before, you go from really important to really unimportant'.). Others described encountering practical difficulties, such as Sophie who described the impact of taking time off work due to a hospital admission that was directly related to her belief:

> *Sophie:* 'It's practically hugely damaging. Seven weeks off work – big problem. After seven weeks I missed out on the chance to do my [job specific] certificate [. . .]. I was just getting the management to agree to support me, getting my mentor, I'd done all the work, they just needed to sign it off, and then I was in [hospital city] for seven weeks. [. . .] Actually no [. . .] there's like a three, four week gap, then another five weeks where I'm not working, then two or three weeks of day hospital afterwards. Suddenly it's been that long, you go back [to work] but not all the same staff are there, it was a different manager. I was no longer so regular and valued that they wanted to do it, and I was still impaired. I don't know why I was still impaired, I don't know why everything's harder but after that everything was so much harder'.

Harm was not solely caused by the belief *per se*, but sometimes due to the degree of preoccupation with it (Mandy described accidentally scalding herself whilst caught up thinking about the belief) or by others' responses:

> *Mandy:* 'My brother's partner said "can Mandy come up?" and- . . .I was very upset once because my cousin said "No. I can't cope with what she's saying [about being the Goddess], it's stressful for me [. . .]". So I couldn't sometimes go up'.

Disbelief by others was prominent and experienced negatively by most participants, especially those currently hospitalized:

> *Kit:* 'I was going to kill myself on New Year's Eve [. . .] It was linked to breaking up with my girlfriend and ten years of just people ignoring me [Jesus] [. . ..], I even went to the Evensong, you know, in a church, stood next to everyone, they were all singing to Jesus, and no one fucking talked to me. No one really does want me [Jesus] because, you know, it lasts a lot longer if I'm just dead and people just don't know'.

Maintenance mechanisms

Six potential psychological maintenance factors were identified. Box 2 provides further illustrative quotes.

Meaning-making

All narratives emphasized that grandiose beliefs were 'meaning-making' experiences. Participants reported the beliefs as highly significant and they appeared to provide a sense of purpose, belonging, or self-identity, or make sense of unusual or difficult events.

The types of meaning inherent in the belief differed between participants. Power and self-efficacy, helping others, and making a valuable contribution to society were common themes. Social meanings were also prevalent and participants described that they were (or would be) 'part of a team', respected by others, or involved in intimate relationships with the promise of comfort, protection, marriage, sex, or children.

Frequently grandiose beliefs occurred in the face of negative circumstances and, as such, appeared to be protective. Accounts of the belief providing respite from paranoia, low mood, self-loathing, and rejection, and as a means to make sense of suffering, achieve retribution for past wrongs, and retain hope for a better future were all described.

Box 2: Illustrations of possible maintenance mechanisms and service-related experiences

Meaning-making experiences

Helping others and hope for the future: *Mandy:* "I was telling me parents I could help 'em [. . .]. They're suffering now but it will come out alright."; "[God] says 'hang on in there' [. . .] I know you suffer sometimes but suffering's for a reason, and you will come out of it.'"
Power and achieving potential: *Max:* "[It made] me feel strong and powerful and sort of able to do anything. The sort of feeling you get, it makes you feel like you become the person you've always wanted to be or better."
Being useful and helping society: *Mark:* "I feel I am useful to society."
Social meaning: *Stephen:* "I just feel part of a team"; *Mandy*: "I'm gonna have children in the new life."

Anomalous experiences

Anomalous experiences powerful and intense, increasing sense of their significance: *Kit:* "The actual powerful voice of God spoke to me and said 'Do it right this time.' I fell into a bush [. . .] like it came out of kind of sunlight clouds which was on the righthand side of me. And it was so powerful I fell over."
Anomalous experiences being sought due to their meaning in the context of the grandiose belief: *Kit:* "God reveals himself to people in dreams. So my dreams have always been the most interesting thing that I spend a lot of time asleep dreaming and I force myself to sleep to dream because God shows himself in that way."

Mania

Mania preceding development of grandiose belief: *Mildred:* "For that particular episode, [. . .] I know exactly where the trigger came from. My mood had started to go up and I was reading these books[. . .] I think I managed to get through all ten within about two weeks. [. . .] I was sleeping less than I normally do, but [. . .] I wasn't worried about it. [. . .] I think my mood went up before the sleep reduced".
The grandiose belief changing when the mania recedes: *Mildred:* "I think I just came out of my episode, basically. I think natural. . . I go up and down. I literally naturally came out of the other side and my focus just ever so slightly shifted".

Fantasy elaboration

Thinking about the belief (in imagery form) feels good: *Mandy:* "Well it can feel good, yeah, looking like that [giggles]. I could see err-, see myself, err the eyes they are not just err. . . they're like that! [gesturing large eyes]".

Reasoning biases

Confirmation bias: *Bob:* "I had the ideas. . .. It became a reciprocating system in that I would then feel this reinforcement with this information stream. [. . .] As my perception would change, the information stream would change. In much the same way, if you are ice skating and you start looking one way you will start drifting that way."
"There was a pathway which I followed of my own logic, which was potentially fallible [. . .]. But I didn't take the time to try to fail myself [. . .] because failing myself would mean the past

few months I had done had gone to waste and I'd destroyed myself and the whole post negative implications which I did not want to face."
Negative social information being misinterpreted positively: *Polly:* "An elderly gentleman [. . .] walked past me [. . .]. I thought 'he looks like God'. [. . .] I said, 'Hello, Daddy', and he said something like 'what do you want?' [hostile tone]. I said, 'What can I do to please you?' [. . .] He said, 'Nothing.' I said, "What can I do for you?" And he said, 'nothing!'" Interviewer: "What was that like?" Polly: "Well, it was nice to meet him." Interviewer: "When he said, 'there's nothing', what did you take from that?" Polly: "That Jesus has done it all, we don't have to".
Advice/feedback from others rejected: *Bob:* "Anyone who tried to come and sort of say 'No, sorry your reality's false**,** you are completely psychotic' had no effect on me, except just to sort of aggravate. . . umm. . . and to push me further away."

Immersive behaviours

Sophie: "I was completely convinced I was God. I needed to go out and bless via libraries. Why libraries I don't know, but I was convinced that libraries were an effective way to bless and was just going around. . . yeah."

Service-experience

Positive techniques used to help manage the grandiose delusion: *Participant:* "my CPN was amazing [. . .] thinking about thinking patterns and cycles of behaviour [. . .] ways to challenge it, looking a bit at the evidence and like noticing reinforcing patterns."
Participant: "If you want to approach this problem for grandiosity [. . .] you need to approach many other things in life. You may find that [. . .] you still have that grandiosity at the end of it, but it wouldn't be a problem. [. . .] It's more about making a person a more well-rounded individual. The problem isn't grandiosity, the problem is how they view themselves, how they interact with the world."

> *Bob:* 'I hated who I was.'; 'I tried to seek some sort of route to escape this depression, which was to again fall into this fantasy world in which I would try to elevate myself, and you can elevate yourself as far as you want in your own fantasy, you can be the next messiah [. . .].'

Such a 'meaning-making' function could lead to belief persistence:

> *Bob:* '[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'.

The inherent meaning was not typically synonymous with feeling highly superior, arrogant, or overly entitled. When superiority was evident, it was often not totally unwarranted (e.g., the participant having above average intelligence), or it was accompanied by humility or uncertainty:

> *Fred:* 'I feel superior to other people, definitely, yes. I don't go around saying that, [. . .] but that's how I feel inside'.
>
> *Interviewer:* 'Having these abilities, do you see yourself as different to others in some way, or the same, or. . .?' Jessica: 'No, no. No, not at all.'; Interviewer: 'So when you felt you were on a mission, [. . .] in that moment have you felt better or worse than others, or superior or inferior to others? [. . .]' Jessica: 'No. Probably the same'.

> *Interviewer:* 'Does [being the Goddess] make you feel better than other people?' Mandy: 'No no. 'Cause we all come from-. In fact they-, everybody comes from me in the first place, flesh was took away from me, but umm. . .no no. I would be over [them] in a way, but no, all people are people. They should all be treated the same'.
>
> *Polly:* 'I **know** I'm not better than anybody else. . ., but it does make me feel special'. [. . .]. Interviewer: 'Do you feel superior to others?' Polly: 'I do but that's rubbish, I shouldn't feel like that'.

Anomalous experiences

Anomalous experiences (AEs) were described by all but one participant. Most common were auditory hallucinations (reported by eight participants) and a felt sense of salience (reported by six participants) but other hallucinations (somatic, olfactory and visual), dissociative experiences (out of body experiences and déjà vu), and vivid dreams were also evident.

Anomalous experiences were implicated in belief maintenance in several ways. First, the content of the AE could cause or confirm the belief. Mandy described realizing she was the Goddess when 'He [God] was in my head and telling me.'; 'A voice was telling me'. Similarly, Sophie described a referential belief ('the sunset told me stuff, it had meaning'), underpinned by a felt sense of salience, which fed into her belief about having special abilities. The presence of an AE was often described as the defining moment at which the person 'knew' their belief was true, and some indicated that the belief receded when the AEs did.

Anomalous experiences were described as powerful and intense, making them potentially more likely to be appraised as significant. For some, the grandiose belief was the most plausible explanation for AEs that felt strange and profound:

> *Fred:* 'I had an immense shift of consciousness, rather like suddenly being able to see, whereas previously I couldn't see.'; 'I felt that something momentous had happened [. . .] I attributed it to being the second coming of Christ, because that was the only framework that I had to put it in'.

A reciprocal relationship was also evident with some participants deliberately seeking out AEs because they were seen as important or pleasurable in the context of the grandiose belief (Kit, Sarah).

Mania

Where grandiose beliefs co-occurred with mania, interactions were sometimes apparent. Max said '[The grandiose beliefs] have always been after elevated mood.', and 'It's a really good feeling, feeling that you're in the SAS' suggesting a bi-directional interaction with elevated mood. Brian described racing thoughts ('the numbers started coming really fast') contributing to his realization that he was Einstein reincarnated, and several participants described sleep disturbance preceding or accompanying their grandiose beliefs.

Mania was not a necessary condition for the maintenance of grandiose delusions, however, and several participants (including those with affective diagnoses) presented at interview with current grandiose beliefs in the absence of elevated mood/mania. Mildred noted that of two occasions when she believed she was chosen by God to battle evil, one

was clearly preceded by 'mania' (elevated mood, poor sleep, increased energy) and resolved when she 'came out of my episode' but that mania was not present on the other occasion:

> 'I don't know what triggered that, only that my Dad had left, [. . .] my Mum had a nervous breakdown, so I was left in charge of my two younger sisters'; 'I suppose it was obviously very heightened emotionally, so it must have. . . it can only have come from that, but I don't remember having a particularly high mood'; '[the other experience] was different. There was a lot of energy behind that that there wasn't with this'.

Fantasy elaboration

Participants described thinking about their grandiose beliefs 'all the time' (Mark; Polly), that 'it took over my whole life' (Brian), and that it was only possible to stop thinking about them when significantly distracted (e.g., helping someone in trouble (Bob) or starting a new company (Mildred)). Such thoughts were not always verbal; compelling images were also present:

> *Mandy (describing an image of being the Goddess):* 'I'm blonde hair, big brown eyes, and they're massive [. . .]. I felt these huge eyes and long blonde hair, and then a figure'.

Whilst we anticipated that repetitive thinking would occur because it was pleasurable, the wider meaning, which typically went beyond simple hedonic pleasure, also drove repetitive thinking:

> *Mark:* 'It fills my time. I'm always busy [. . .]. In the past without doing that I'd be just feeling bored, sitting in my flat, listening to the radio, watching TV, sitting on my computer, bored, drinking alcohol. [. . .]. But with this situation I am busy thinking all the time'.

Reasoning biases

Participants' descriptions were consistent with a range of biases being present, most commonly confirmation bias:

> *Interviewer:* 'If someone had said "we don't think that is happening" [. . .] how would you have reacted?' *Mildred*: 'Well. . .. That [would be] just another sign than I'm on the right path. That's a test'.

Jumping to conclusions (an absence of data-gathering) also occurred:

> *Max:* 'I spent a lot of time thinking about it, not that much time like researching about it. Just thinking, thinking about it and feeling I would get the right answers myself without actually looking it up'.

Negative social information was misinterpreted as positive, and there were descriptions of discrediting advice or feedback:

> *Stephen:* 'People just kept staring at me wherever I went [. . .]'. *Interviewer:* 'What did you conclude from that?' *Stephen:* 'That I was something powerful'.

> *Interviewer:* 'When you're in that mode of being God, how do you respond to advice or feedback from others?' *Sophie:* 'Completely dismiss and ignore it'.

Although reasoning biases were frequently evident, there were counter-examples including altering belief conviction with disconfirmatory evidence:

> *Max:* 'I was convinced that I was in the SAS [. . .], I thought the police were gonna raid the place and get me out. And obviously that didn't happen, so I think when I came out I felt a bit less convinced'.

Immersion behaviours

Participants described behaviours where they immersed themselves in a world consistent with the delusion. This included acting according to their perceived role or identity (Sophie: 'I was God. I needed to go out blessing'; Max: 'I was in the SAS [. . .] I was sort of patrolling the town'), or withdrawing and becoming engrossed in information that fitted with their belief (Bob: 'I shut myself off from the world [. . .] I was sort of in my brain with videos online, articles, and on the internet there's no filter, you can literally get anything. I was [. . .] trying to get in touch with what I thought reality was').

Participants described engaging in these 'immersion behaviours' for several reasons. Some wanted information to understand how to achieve their 'mission' or evidence to prove to themselves or others that their belief was true. Others acted because it felt good or important. Sophie described trying to walk on water with differing rationales. When uncertain if she was a demi-God, she 'did some experiments to test [it] out', but when she 'knew' she could do it she acted because 'it could be fun'.

Experience of service-use and help-seeking

> *Participant:* 'Nobody talked to me. I wanted to talk to them [. . .] I was alone and isolated'.

Participants unanimously reported difficulty talking to mental health services about their experience of grandiose delusions, despite the majority thinking that it might be helpful. Experiences were reported as hard to articulate (Fred: 'it's very hard to [. . .] know what to say to describe it') or secrecy was inherent in the belief (Max: 'I won't speak to them about it, thinking it's something that needs to be kept secret'). The lack of discussion was primarily attributed to staff- or service-related factors. Staff not knowing how to talk about grandiose beliefs, speaking to family members rather than the participant, or simply not listening or understanding were described. Insufficient time in appointments or previous aversive experiences (e.g., compulsory admission, or feeling 'browbeaten', 'ignored', or 'dismissed') were further barriers to opening up:

> *Participant:* 'You tell care staff, the medical staff and then they say, "right, you have to go into hospital" and "we're taking your driving licence away"'.

Talking about the grandiose belief was considered important to enable risk monitoring, facilitate belief change, or offer support:

> *Participant:* 'Even if you can't change my beliefs I really appreciate being listened to and talked to 'cause it's really upsetting [. . .]. You can do that human support even if you can't change the situation'.

In terms of what would be helpful, taking time to develop trust was repeatedly reiterated. Other recommendations included asking specifically about the experiences (without being pushy) and listening carefully to the participant's perspective:

> *Participant:* 'If people don't take the time to get to know, and don't ask questions [. . .] it's a big problem. Because if I'm having these ideas I think it's obvious. [. . .] It's quite unhelpful when people assume you'll tell them stuff. [. . .] So actually try to talk about it and interact with it, rather than just assuming you'll tell people everything.'

Participants particularly appreciated staff who had 'gone the extra mile' (e.g., buying the participant a coffee or taking extra time to talk when distressed).

Few participants had been offered therapy for their grandiose beliefs. Unhelpful experiences of therapy more generally included too great a focus on the past or the participant feeling blamed ('[it's] your thought processes that were wrong, [. . .] there's something wrong in you'). However, descriptions of helpful therapy experiences suggested that looking at evidence for and against the belief, considering alternative explanations, and looking at aspects identified as possible maintenance cycles may be beneficial:

> *Bob:* '[Good therapy would be] something that makes them feel good, [. . .] makes them want to be in reality. Getting up every day, going for a morning run, having some good breakfast [. . .] having projects to work on, having skills you learn. [. . .] What's your lovelife like?[. . .] You need to look at all aspects of the person's life.'; 'You've also got to have a sense of belonging [. . .] a place within your society, a sense you have some worth'.

Discussion

This is the first qualitative study focussed upon the experience of grandiose delusions. The patient accounts were extraordinarily rich, with most participants never having spoken in depth before about these experiences. Harm from grandiose delusions – across multiple domains – was evident for all the participants, and occurred as a direct consequence of the belief, from preoccupation, and from the responses of others. The limited literature on harm associated with grandiose delusions focuses almost exclusively on offending (van Dongen, Buck, & Van Marle, 2015; Ullrich, Keers, & Coid, 2014) but clearly a wider perspective is needed.

A number of potential maintenance factors were identified (see Figure 2). Foremost, the beliefs provided a sense of purpose, belonging, or positive identity, often in difficult circumstances, creating a motivation for belief retention. Second, grandiose beliefs offered a plausible explanation for anomalous experiences, which, in some cases, resulted in these experiences being actively sought. Third, a mood-elevating bi-directional relationship between symptoms of mania and grandiosity appeared to occur for some patients. Fourth, positive rumination or 'fantasy elaboration' may act in a way akin to that of worry in persecutory delusions (Freeman *et al.*, 2015), whereby repetitively thinking (or having imagery) about the belief brings it to mind, elaborates details, and increases conviction. Fifth, reasoning biases were also prominent,

consistent with evidence that they are heightened in grandiose delusions (Garety *et al.*, 2012). Negative social feedback appeared to be disregarded or interpreted in an overly positive manner, similar to findings in hypomania (Devlin, Zaki, Ong, & Gruber, 2015; Mansell & Lam, 2006). Finally, immersive behaviours reinforced the belief. Memories for self-performed actions may be stronger compared to imagined actions (Engelkamp, 1989), so that 'being in role' may provide particularly accessible or compelling memories.

These findings from patient interviews were consistent with hypotheses considered by other researchers who have suggested that grandiose beliefs may compensate for negative self-beliefs (Beck & Rector, 2005; Ben-Zeev *et al.*, 2011; Knowles *et al.*, 2011; Smith, Freeman, & Kuipers, 2005), and be associated with anomalous experiences (Bortolon *et al.*, 2019; Knowles *et al.*, 2011), reasoning biases (Garety *et al.*, 2012; Knowles *et al.*, 2011), and repetitive, imagery-based thinking (Knowles *et al.*, 2011). Further research empirically testing the hypothesized maintenance model, and determining the extent to which specific maintenance factors are unique to delusion subtypes, is clearly required.

The qualitative nature of our investigation enabled a hypothesized maintenance model for grandiose delusions to be generated; however, there were some limitations. Obviously, our findings are not representative, and we did not include those with subclinical grandiosity or older adults, nor gain viewpoints from other key groups (e.g., family members or mental health professionals). The sample were predominantly White British and although this represents the demographic structure of the capture area of the NHS Trust in which the study took place, the transferability of the findings may therefore be limited. There may be other potential maintenance factors that we did not identify within this study. Additionally, although we took multiple steps to minimize the potential

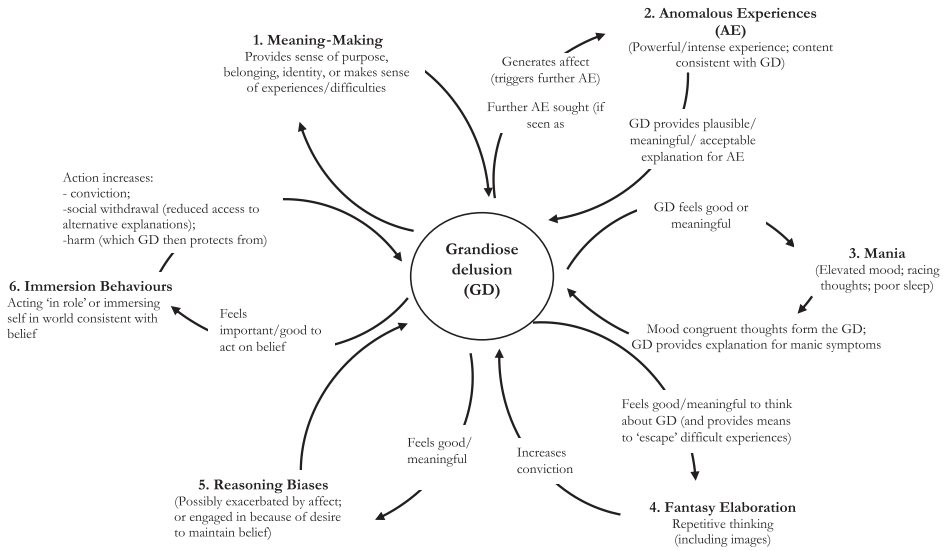

Figure 2. Hypothesized maintenance model of grandiose delusions. NB: Not all maintenance factors were evident in all participants. As such, we suggest that no maintenance factor is either necessary or sufficient for the persistence of grandiose delusions, and idiosyncratic combinations of factors will be relevant to different individuals.

for bias as much as possible, our own experiences (as clinical psychologists, qualitative methodologists, and those with personal experience of grandiose delusions), and the fact that only a small subgroup of interviews were coded in full by multiple coders, mean that data were viewed through a particular lens. Further research investigating different populations and viewpoints would be of value.

Despite these limitations, such models have the potential to drive clinical interventions in the future, and there were several key implications from the participant interviews that should be considered. The level of harm evident highlights the need for a targeted treatment specifically for grandiose delusions. Patient recognition of some forms of harm indicates a possible route for engagement, and participants were largely positive about the possibility of receiving psychological therapy. Any decision to intervene, however, should only be made after careful consideration of the meaning and associated benefits of the belief. Trying to alter the belief without first compensating for the benefit or function of the belief is likely to prove both difficult and potentially iatrogenic. Direct belief change may not always be the most advantageous option. If harm is limited to negative responses from others, addressing behavioural responses to the grandiose belief (e.g., discerning who can be talked to about the experiences) and taking steps to address stigma more broadly might be more appropriate.

Notably, grandiosity was not synonymous with high levels of superiority, arrogance, or entitlement. This is significant because 'grandiose' is often used as a derogatory term to indicate such traits. It may be that grandiose beliefs enhance self-esteem, but do not necessarily cause it to become excessively exaggerated. Alternatively, as suggested by one participant, such traits, when apparent, may be more closely connected to mania. Since actually having exceptional abilities or identity is not synonymous with viewing oneself as being inherently better than others, then superiority should not be assumed to occur in the context of grandiose delusions. Consequently, we suggest that if this finding is replicated in future studies, grandiose delusions should be better termed: 'delusions of exceptionality'. This may be a more accurate reflection of the experience and, as such, a better way to think about administering care.

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Conflicts of interest

All authors declare no conflict of interest.

Data availability statement

Given the confidential nature of the data, it would not be ethically appropriate to share the entire data set (i.e., whole transcripts). Selected quotes to support claims made in the paper however are available on request to the first author.

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

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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.

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Introduction

Grandiose delusions are unfounded or inaccurate beliefs that one has special powers, wealth, mission, or identity.[1] These beliefs are relatively common—representing approximately a third of delusions experienced by patients diagnosed with non-affective psychosis[2] and up to 60% of those in bipolar mania.[3] Grandiose delusions can potentially cause harm across multiple life domains, including physical, sexual, social, occupational, and emotional.[4] However, such beliefs can hold significant positive meaning for the individual. In an earlier study,[4] 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 belief* 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.[4] 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."[4] 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.[4] 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[5] 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.[6,7] 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.[5,8] 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.[9–17] The concept of meaning in life has been applied to delusions more broadly[18,19] 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.

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

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[4] 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.[20] 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 α of 0·72 and in the clinical population (study 3) was α 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 α 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

	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.

Table 1: **Sociodemographic data and descriptive statistics for participants included in the analyses**

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 (χ^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, χ^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 (χ^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.[21] This produced the final 17-item, three-factor model, which fitted the data well (χ^2 [116 df] 401·86, CFI 0·99, TLI 0·99, RMSEA 0·056, sRMR 0·035).

The pattern of factor correlations supported a meaning-in-life 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[22] (ordinal α 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 (χ^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 (χ^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 (χ^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 (χ^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 α 0·81–0·93). 223 participants provided follow-up data within 7–10 days

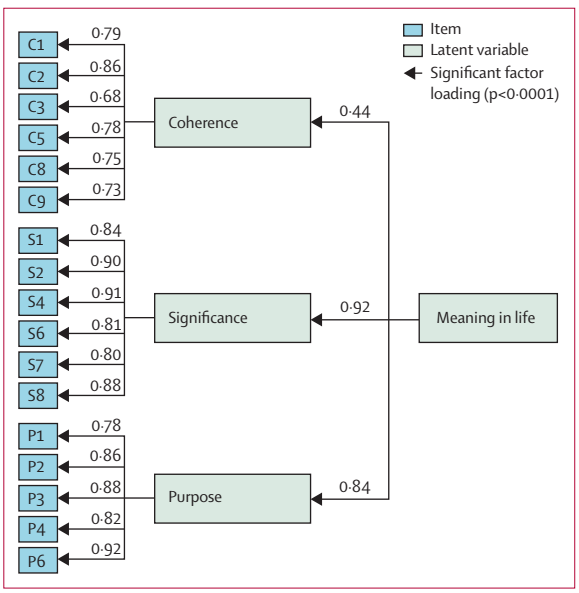

Figure 1: **The Grandiosity Meaning Measure final 17-item higher-order factor model**

(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 (χ^2 [116 df] 445·26, CFI 0·96, TLI 0·96, RMSEA 0·090, sRMR 0·055; appendix p 23).[23,24] 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 α 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

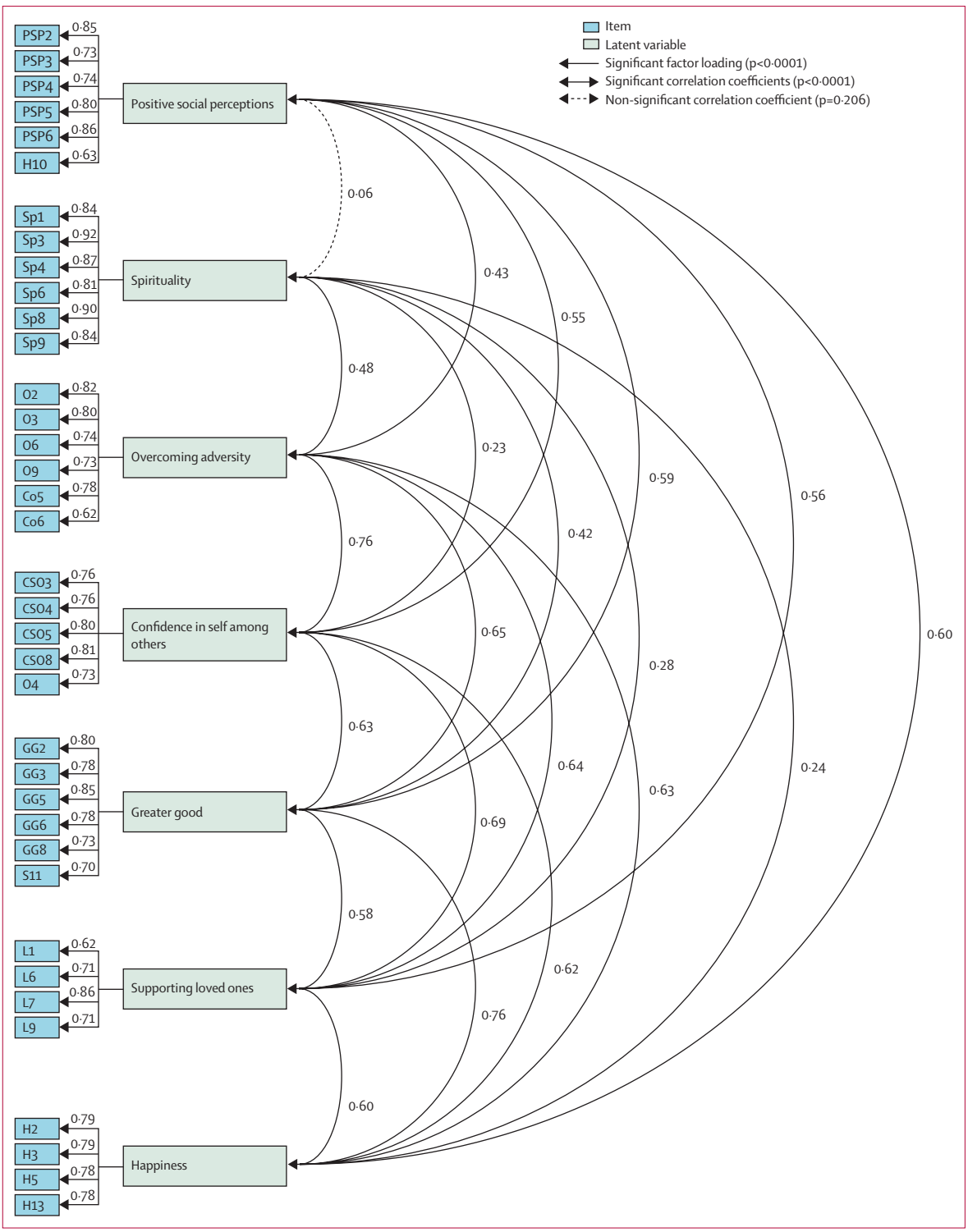

Figure 2: **The Grandiosity Meaning Measure–Sources final 37-item correlated-factor model**

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
Grandiosity Meaning Measure (n=348)			
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%)
Grandiosity Meaning Measure–Sources (n=333)			
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)

(Continued from previous column)

	Item content*	Endorsement level†	
		0	1
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.

Table 2: **Frequencies of endorsement for Grandiosity Meaning Measure and Grandiosity Meaning Measure–Sources items within the clinical sample (study 3, n=348)**

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 (χ^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 α 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 experience factors on 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 (χ^2 [1346 df] 2276·47, CFI 0·96, TLI 0·96, RMSEA 0·046, sRMR 0·052) and acceptable in the general population group (χ^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 (χ^2 [1856 df] 2969·99, CFI 0·96, TL 0·95, RMSEA 0·043, sRMR 0·057) and acceptable in the general population group (χ^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
Clinical population (study 3, n=324)													
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
General population (study 2, n=1386)													
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 meanisng 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
Clinical population (n=324)				
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
General population (n=1386)				
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.[4]

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.[2,4] 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.

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The Difficulties of Grandiose Delusions: Harms, Challenges, and Implications for Treatment Engagement

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***Background and Hypothesis*: Grandiose delusions may entail difficult responsibilities and detrimental actions for patients. Recognition of these consequences by patients may provide an avenue for engagement in treatment. Furthermore, when patients carry out actions within the delusional system ("immersion behaviors") or spend considerable time thinking about their grandiose beliefs this may contribute to the persistence of the grandiosity and further harmful consequences. We, therefore, investigated grandiose-related subjective harm, immersion behaviors, and perseverative thinking. *Study Design*: A cross-sectional study with 798 patients with psychosis (375 of whom had grandiose delusions) and 4518 nonclinical adults. Factor analyses using data from participants scoring highly on grandiosity were used to form 3 scales: subjective harm from exceptional experiences questionnaire; immersion behaviors questionnaire; and thinking about exceptional experiences questionnaire. Associations with grandiosity were tested using structural equation modeling. *Study Results*: A total of 268 (77.9%) patients with grandiose delusions identified grandiose-related harms in the past 6 months and 199 (55.1%) wanted help. Immersion behaviors and perseverative thinking were highly prevalent, and explained 39.5% and 20.4% of the variance in grandiosity, respectively. Immersion behaviors and perseverative thinking were significantly associated with subjective harm, even when severity of grandiosity was controlled. Requests for help were associated with higher levels of subjective harm, use of immersion behaviors, and perseverative thinking but not severity of grandiosity. *Conclusions*: Acting on grandiose delusions, including harmful behaviors and excessive thinking about grandiose delusions, may be routes for clinicians to engage patients in treatment. This could be a starting point for targeted psychological interventions for grandiose delusions.**

Key words: grandiosity/immersion behaviors/repetitive thinking

Introduction

There is no evidence-based, theoretically driven, and psychological intervention specifically for harmful grandiose delusions. Indeed, grandiose delusions are often overlooked in the treatment of psychosis. Partly this may be because the belief content can seem benign compared to other psychotic experiences. However, qualitative interviews with patients with these beliefs indicate that problematic burdens, responsibilities, and behaviors are often inherent in the belief systems (eg, believing one is Jesus and feeling under pressure to save humanity).[1] Shared recognition by patients and clinicians of such difficulties could form the basis of engagement in treatment. Recently, we outlined how the multiple meanings obtained from grandiose delusions may be a key reason why the beliefs persist despite the associated difficulties.[2] Yet there are also other plausible factors—for instance, immersion within the grandiose identity and too much time thinking about the beliefs—that may help explain why grandiosity endures and problems result. In this article, we aim to develop an understanding of the types and prevalence of difficulties following grandiose delusions; why the delusions may persist and harmful consequences result; and the factors associated with patients wanting help.

Grandiosity is associated with lower patient motivation to engage in standard mental health treatment.[3]

This likely results from interactions with services that do not provide patients with a suitable rationale for engagement. Engagement might be enhanced if clinicians are able to ask knowledgeably about the different types of problems—often fairly subtle—that grandiose delusions bring in their wake. In a qualitative study,[1] patients with experience of grandiose delusions described difficulties occurring across multiple domains including physical (eg, trying to fly), sexual (eg, going home with strangers believing them to be God), social (eg, rejection by others), emotional (eg, feeling suicidal), and occupational (eg, dropping out of university). We, therefore, wanted to develop a measure that could capture these harms.

Several factor analytic studies of psychotic experiences show that there is a single dimension of grandiosity in the general population.[4–7] This suggests that there are unlikely to be different types of grandiose delusions in clinical presentations. Indeed, factor analyses cutting across diagnostic categories demonstrate grandiosity continuing to load on a single dimension.[8] Furthermore, characteristics of grandiose delusions (conviction, pervasiveness, preoccupation, action, inaction, an negative affect) have been found to load onto the same factor structure across bipolar and schizophrenia diagnostic categories.[9] The understanding of factors that maintain grandiose delusions specifically is in its infancy. The meaning of the delusions, reasoning biases, and associated hallucination content are possible maintenance factors.[2,10,11] We highlight 2 further potential factors that patients have reported to us. Immersion behaviors are when individuals take actions in line with their grandiose beliefs,[1] which includes acting according to the perceived identity (eg, blessing people believing that one is Jesus). Such behaviors might provide compelling memories that provide confirmatory evidence for the belief. Furthermore, individuals may withdraw from others and become engrossed in information linked to their belief (eg, researching the second coming of Christ online) potentially reducing access to disconfirmatory evidence and providing further confirmatory evidence. A second potential driver is an excessive time spent thinking about the belief. Patients describe thinking about their grandiose beliefs "all the time", having difficulty stopping such thoughts, and experiencing verbal and imagery-based repetitive thinking.[1] Such thoughts are often pleasurable which may partially explain their perseverative nature, but they may also be driven by the belief's meaning (eg, it might feel important to focus on how one will save humanity, even if it is stressful rather than pleasurable to do so). It seems probable—akin to worry in persecutory delusions[12]—that such repetitive thinking can drive grandiose beliefs by bringing the belief to mind, elaborating its details, and increasing conviction. Consistent with this hypothesis, a study with 109 nonclinical participants found that compared to distraction, rumination on a positive memory was associated with the maintenance of grandiose ideation.[13] Additionally in both groups with a bipolar I diagnosis (n = 27) and nonclinical individuals (n = 27), compared to "distanced reflection", an immersive rumination on a positive memory was associated with increased number of positive thoughts.[14] It has yet to be investigated in a clinical population whether repetitive thinking specifically about grandiose beliefs is associated with higher levels of grandiosity and degree of conviction.

The study aims were to: (1) determine the extent to which patients identify difficulties arising from their grandiose delusions, (2) assess the extent to which they engage in immersion behaviors and repetitive thinking about their grandiose delusions, and whether these processes are associated with higher levels of grandiosity and subjective harm, and (3) determine factors associated with patients wanting help.

Methods

Study Design and Participants

The NHS Health Research Authority South Central Oxford C Research Ethics Committee (20/SC/0430) and University of Oxford Central University Research Ethics Committee (R69315/RE001) provided ethical approval. We conducted a cross-sectional questionnaire study with 2 cohorts. In the clinical cohort, participants were recruited from 39 NHS mental health trusts across England and Wales. Inclusion criteria were: Aged 16+ years, accessing adult secondary care NHS mental health services, and being diagnosed with non-affective or affective psychosis. Exclusion criteria were insufficient English language to participate or primary diagnosis of alcohol/drug disorder, personality disorder, or organic syndrome. Participants provided informed consent and data were collected in person or online via Qualtrics.[15] The nonclinical cohort was recruited via social media advertisements. Inclusion criteria were: Aged 18+ years, having internet access, and UK/ROI nationality/residence. There were no exclusion criteria. Participants provided informed consent online. Data were collected using Qualtrics.

Assessment Measures

Grandiosity. The specific psychotic experiences questionnaire-grandiosity subscale (SPEQ-G) is a self-report measure of grandiosity with good psychometric properties.[7] Respondents indicate how much they agree with eight statements (eg, "I am or am destined to be someone very important") for the last month on a 4-point Likert scale (0–3). Higher scores indicate higher levels of grandiosity. The internal reliability of the scale was satisfactory (Cronbach's α = .72) and good (Cronbach's α = .81) in the nonclinical and clinical cohorts, respectively.

The SPEQ-G was used to identify participants scoring highly enough in grandiosity for administration of the

item pools. The cutoff was ≥5, consistent with Isham et al[2] (corresponding to the top 15th percentile scores in a nonclinical sample[16]). To identify the grandiose belief explicitly, those scoring above the threshold were asked for a brief description of their specific experience of having exceptional abilities, identity, role, mission, or wealth (eg, "I am on a special mission from God to save the world") and to rate belief conviction (0–100%). Instructions specified that subsequent measures should be answered in relation to this content. In the clinical group, participants were supported by clinical studies officers who had received training on eliciting grandiose delusions.

Subjective Harm, Immersion Behaviors, and Repetitive Thinking. We developed item pools for the subjective harm from exceptional experiences questionnaire (SHEEQ), immersion behaviors questionnaire-exceptional experiences (IBQ-EE), and thinking about exceptional experiences questionnaire (TEEQ). Items were generated using deductive and inductive methods via revisiting patient descriptions from our previous qualitative study,[1] review of the wider relevant literature, and consultation with experts in the field including our patient advisory group with lived experience of grandiose delusions, and clinical psychologists and psychiatrists specializing in psychosis. The initial item pools had 9, 22, and 7 items, respectively, with answers given on a 5-point Likert scale (0 = not at all/none of the time and 4 = all of the time; Supplementary tables S1–S3). The 9 SHEEQ items asked about harm in the last 6 months, but participants were also asked 2 lifetime harm questions. These items did not contribute to the SHEEQ total score, but the latter ("Is this something you have ever wanted help with?") was used to measure wanting help. The TEEQ was administered in clinical and nonclinical groups. The SHEEQ and IBQ-EE were only administered to the clinical group as these required a clearly specified grandiose delusion.

Analysis

Analyses were conducted in R version 4.0.3[17] (packages: "psych" version 2.0.9,[18] "lavaan" version 0.6-9[19]). For measure development, prior to factor analysis, Bartlett's Test of Sphericity[20] and the Kaiser–Meyer Olkin[21] Measure of Sampling Adequacy (KMO) were used to assess the feasibility of factor recovery based on the observed dataset. Parallel analysis based on polychoric correlations (assuming ordinal data) were used to identify the number of factors to retain. Retention of factors was based on comparisons between the eigenvalues of the observed data and random data.[22]

Cohorts were randomly split into 2 subsamples, enabling item pool refinement using exploratory factor analysis (EFA) and a test of the factor structure using confirmatory factor analysis (CFA). For the SHEEQ and IBQ-EE analyses, the first and second subsamples had 151 and 211 clinical participants, respectively. For the TEEQ analysis, data from the nonclinical and clinical cohorts were combined. The first subsample comprised 699 nonclinical and 122 clinical participants and the second comprised 700 nonclinical and 236 clinical participants. More clinical participants were included in the second subsample to ensure sufficient numbers for measurement invariance analysis (used to assess whether the measure performed similarly across the nonclinical and clinical groups).

Psychometric properties were assessed using ordinal alpha for internal consistency[23,24] and intraclass correlations for 1-week test–retest reliability.

We assessed the extent to which immersion behaviors and thinking about exceptional experiences were associated with the degree of grandiosity, grandiose belief conviction, and subjective harm, and which factors were associated with wanting help. Pair-wise associations were tested using Pearson's correlations, using factor scores for latent variables and raw scores for grandiose belief conviction and wanting help. Structural equation modeling delivered prediction models incorporating multiple predictors. For the tests of association, 352 participants provide >95% power to detect a Pearson's correlation coefficient of 0.2 at a 5% significance level. Supplementary materials provide further methodological details.

Results

Sociodemographic information for participants included in the measure development analyses (ie, those with high grandiosity) is summarized in table 1. Supplementary tables S4 and S5 provide information for the full sample.

Part 1: Measure Development

Subjective Harm (SHEEQ): Bartlett's test of sphericity and KMO tests indicated that factor analysis was appropriate for the first subsample [$\chi^2(36) = 870.13$, $P < .0001$; KMO = 0.83]. Following parallel analysis and model comparison, a one-factor solution was determined best. No items were removed, and all had a factor loading of >0.4. The 9-item one-factor model after EFA explained 49.7% of the variance. Supplementary table S6 provides factor loadings. CFA in the second subsample showed that the 9-item one-factor model had fit indices: Robust-$\chi^2(27) = 80.993$, CFI = 0.973, TLI = 0.964, RMSEA = 0.098, SRMR = 0.059. Whilst these were predominantly good, the RMSEA was above the acceptable threshold, so post hoc analysis was conducted evaluating model adequacy based on the modification index.[25] This indicated that the residuals of items H7 and H8 were correlated (see Supplementary materials). After incorporating this correlation into the model, the final 9-item one-factor model had acceptable fit indices: Robust-$\chi^2(26) = 53.535$, CFI = 0.986, TLI = 0.981, RMSEA = 0.071, SRMR = 0.054. Supplementary table

Table 1. Sociodemographic and Clinical Data for Participants in the Measure Development Analyses

	Subjective Harm and Immersion Behavior Questionnaires (SHEEQ; IBQ-EE)	Thinking About Exceptional Experiences Questionnaire (TEEQ)	
	Clinical Group (n = 361)	Clinical Group (n = 358)	Nonclinical Group (n = 1399)
Age			
Mean (*SD*)	41.5 (12.9)	41.5 (12.9)	40.2 (18.6)
Range (years)	16–77	16–77	18–89
Gender *n* (%)			
Female	132 (36.6)	132 (36.9)	812 (58.0)
Male	222 (61.5)	219 (61.2)	531 (38.0)
Non-binary	3 (0.8)	3 (0.8)	45 (3.2)
Other/prefer not to say	4 (1.1)	4 (1.1)	11 (0.8)
Ethnicity *n* (%)			
White (any)	259 (71.7)	257 (71.8)	1208 (86.3)
Black (any)	40 (11.1)	39 (10.9)	13 (0.9)
Asian (any)	27 (7.5)	27 (7.5)	51 (3.6)
Mixed or multiple ethnic group/other	34 (9.4)	34 (9.5)	109 (7.8)
Prefer not to say	1 (0.3)	1 (0.3)	18 (1.3)
Marital status *n* (%)			
Single	260 (72.0)	257 (71.2)	633 (45.2)
Cohabiting	18 (5.0)	18 (5.0)	172 (12.3)
Married/civil partnership	31 (8.6)	31 (8.7)	419 (29.9)
Separated/divorced	43 (11.9)	43 (12.0)	118 (8.4)
Widowed	9 (2.5)	9 (2.5)	28 (2.0)
Prefer not to say	0	0	29 (2.1)
Employment *n* (%)			
Employed FT	30 (8.3)	31 (8.7)	357 (25.5)
Employed PT	25 (6.9)	25 (7.0)	158 (11.3)
Housewife/husband	5 (1.4)	5 (1.4)	19 (1.4)
Retired	22 (6.1)	22 (6.1)	178 (12.7)
Student	19 (5.3)	19 (5.3)	359 (25.7)
Self-employed	9 (2.5)	9 (2.5)	168 (12.0)
Unemployed	235 (65.1)	231 (64.5)	130 (9.3)
Voluntary work (option in clinical group only)	16 (4.4)	16 (4.5)	–
Prefer not to say	0	0	30 (2.1)
SPEQ-G total[a]			
Mean (SD)	11.5 (5.3)	11.5 (5.4)	8.9 (3.9)
Range	5–24	5–24	5–24
Grandiose belief conviction (%)			
Mean (SD)	67.0 (31.4)	67.1 (31.3)	66.0 (25.6)
Range	0–100	0–100	0–100
History of mental health difficulties? *n* (%)			
Yes	–	–	762 (54.5)
No	–	–	614 (43.9)
Prefer not to say	–	–	23 (1.6)
If yes are these ongoing? *n* (%)			
Yes	–	–	510 (66.9)
No	–	–	232 (30.4)
Prefer not to say	–	–	20 (2.6)
Diagnosis *n* (%)			
Schizophrenia	126 (34.9)	124 (34.6)	–
Schizoaffective disorder	70 (19.4)	70 (19.6)	–
Delusional disorder	6 (1.7)	6 (1.7)	–
Brief psychotic disorder	4 (1.1)	4 (1.1)	–
Psychotic disorder NOS	67 (18.6)	67 (18.7)	–
Bipolar affective disorder	83 (23.0)	83 (23.2)	–
Psychotic depression	2 (0.6)	2 (0.6)	–
Other	3 (0.8)	2 (0.6)	–

Table 1. Continued

	Subjective Harm and Immersion Behavior Questionnaires (SHEEQ; IBQ-EE)	Thinking About Exceptional Experiences Questionnaire (TEEQ)	
	Clinical Group (n = 361)	Clinical Group (n = 358)	Nonclinical Group (n = 1399)
MH service recruited from n (%)			
Inpatient unit	89 (24.7)	87 (24.3)	–
Forensic inpatient	16 (4.4)	16 (4.5)	–
EIP service	57 (15.8)	57 (15.9)	–
Adult CMHT	183 (50.7)	182 (50.8)	–
Forensic adult CMHT	1 (0.3)	1 (0.3)	–
Other	15 (4.2)	15 (4.2)	–

Note: SPEQ-G, The specific psychotic experiences questionnaire-grandiosity subscale. [a]Only participants with high grandiosity (scoring ≥5 on the SPEQ-G) were included in the measure development analyses. Sociodemographic and clinical data for this subgroup are provided here. Sociodemographic and clinical data for all participants are provided in (Supplementary materials tables S4 and S5).

S7 provides factor loadings. The SHEEQ had excellent internal consistency (ordinal α = 0.92). One hundred and thirty-three participants provided follow-up data within 3 to 10 days (mean = 7.29, SD = 1.29). The intraclass correlation was 0.68 indicating good test–retest reliability.

Immersion Behaviors (IBQ-EE): Bartlett's test of sphericity and KMO tests indicated that factor analysis was appropriate for the first subsample [$\chi^2(231) = 2422.826$, $P < .0001$; KMO = 0.88]. Parallel analysis indicated that a multiple-factor model may be appropriate but as the largest eigenvalue was 7.5 times the size of the next largest, the possibility of a simple one-factor solution was also considered. We conducted a model comparison to determine the most appropriate solution and, given that our a priori intention was to provide a uni-dimensional measure that could capture any potential variances at a factor level, we compared exploratory bifactor models based on 2-, 3-, and 4-factor solutions (rather than simple correlated factor models) to the one-factor solution. Ultimately, the simple one-factor solution was considered the most appropriate. Although the more complex bifactor models explained slightly more of the variance in the data, there was substantial cross-loading of items which would have necessitated removing several clinically valuable items. In the one-factor solution, all items loaded with a value >0.4. The 22-item one-factor solution explained 40.8% of the variance (Supplementary table S6 provides factor loadings).

CFA in the second subsample showed that the 22-item one-factor model derived from the EFA had fit indices: Robust-$\chi^2(209) = 527.514$; CFI = 0.911, TLI = 0.901; RMSEA = 0.085; SRMR = 0.087. These were on the boundary of acceptability. To improve fit further we conducted a post hoc analysis evaluating model adequacy based on the modification index. This indicated that residuals from 2 pairs of items were correlated and these associations were added to the model. This final model had a marginally high SRMR but as all other fit indices were comfortably in the acceptable range, and we report robust rather than standard indices, it was considered the model had an acceptable fit: Robust-$\chi^2(207) = 467.536$; CFI = 0.927, TLI = 0.919; RMSEA = 0.078; SRMR = 0.082 (Supplementary table S7 provides factor loadings). The IBQ-EE had excellent internal consistency (ordinal α = 0.95). 133 participants provided follow-up data within 3 to 10 days (mean = 7.29, SD = 1.29) and the intraclass correlation (ICC = 0.76) indicated good test–retest reliability.

Perseverative Thinking (TEEQ): Bartlett's test of sphericity and KMO tests indicated that factor analysis was appropriate for the first subsample [$\chi^2(21) = 5100.51$, $P < .0001$; KMO = 0.90]. Parallel analysis and model comparison indicated that 1- or 2-factor solutions were viable, but the 2-factor solution ("thinking a lot" and "difficulty controlling thoughts") was considered the most appropriate theoretically. These are arguably related but not synonymous constructs (a person might think about their perceived role as a SAS operative repetitively, not because they cannot control the thoughts, but because it feels important to do so). The factor correlation between the 2 factors was 0.71, supporting the idea of these as distinct albeit strongly related constructs. Following the criteria for item removal, one item was considered for removal (Q5 "It has been hard to think about anything else") due to cross-loading. We decided to retain it, however, as theoretically it matched well with the "difficulty controlling thoughts" factor, had clinical utility, and could be removed at CFA stage if still problematic. Therefore, all items remained following EFA and the final 7-item 2-factor model explained 78.0% of the variance in the data (Supplementary table S6 shows factor loadings).

CFA in the second subsample showed that the 7-item, 2-factor model derived from the EFA had fit

indices: Robust-$\chi^2(13)$ = 304.367; CFI = 0.980, TLI = 0.968; RMSEA = 0.155; SRMR = 0.045. The high RMSEA indicated poor fit so we conducted post hoc analysis, evaluating model adequacy based on the modification index. This demonstrated that the residuals of Q6 and Q7, and Q1 and Q2 were correlated. When these associations were added to the model, the fit indices indicated an excellent fit to the data (robust-$\chi^2(11)$ = 48.051; CFI = 0.997, TLI = 0.995, RMSEA = 0.060, SRMR = 0.018; Supplementary table S7 provides factor loadings). The factor correlations in the CFA sample were very high (0.94), and therefore we ran the CFA again post hoc, first with a one-factor model and then with a bifactor model with one general and 2 specific factors to see whether either provided a better solution. The one-factor model had a poor fit to the data as the RMSEA was very high [robust-$\chi^2(14)$ = 548.215, CFI = 0.964, TLI = 0.946, RMSEA = 0.202, SRMR = 0.071] and to achieve an adequate fit many pairs of residuals had to be correlated. The bifactor model failed to converge. Therefore, we retained the original 2-factor solution.

We tested across 4 levels of measurement invariance. Changes in CFI and RMSEA were within the acceptable threshold, indicating that the TEEQ performs similarly in the nonclinical and clinical groups (Supplementary table S8). Comparisons of latent factor mean between these groups are therefore valid, and these were significantly higher in the clinical group than the nonclinical group.

The TEEQ had good internal consistency (ordinal alphas were 0.91 and 0.88 for "thinking a lot" and "difficulty controlling thoughts"). A total of 338 participants (227 from the nonclinical group and 111 from the clinical group) provided follow-up data within 7 to 10 days (mean = 7.58, SD = 0.86). Test–retest reliability was good (ICCs were: 0.76 for "thinking a lot" and 0.72 for "difficulty controlling thoughts").

Part 2: Item Endorsement in the Grandiose Delusion Clinical Group

To describe how frequently clinical participants endorsed items on each measure, we dichotomized responses to "not endorsed" or "endorsed" (see table 2, and for non-dichotomized responses Supplementary tables S9–S11). 77.9% (268/344) of patients endorsed at least 1 item of harm as occurring in the past 6 months. This rose to 84.6% (291/344) for lifetime occurrence. Even when removing item H8, which asks about whether others think the person has put themselves at risk, endorsement rates remained high: 75.6% (260/344) endorsed at least 1 item for the past 6 months, and 83.7% (288/344) for lifetime occurrence. Participants typically endorsed 5 of the 11 harm items (mean = 4.67, *SD* = 3.28). The most endorsed domains were emotional distress (58.7%, 212/361) and social problems (53.2%, 192/361). 28.0% (101/361) of patients thought that their experience had caused harm to others.

Table 2. Frequencies of Item Endorsement (Clinical Cohort)

				Frequencies of endorsement, *n* (%)		
Measure	Factor	Item		No	Yes	Missing Data
SHEEQ	In relation to your whole lifetime:					
	NA (not included in factor analysis)	L1	Have your special abilities/…/wealth *ever* caused any difficulties for you?	115 (31.9)	246 (68.1)	0
(*n* = 361)		L2	Is this something you have ever wanted help with?	158 (43.8)	199 (55.1)	4 (1.1)
		In relation to the last 6 months				
		Have your special abilities/identity/role/mission/wealth:				
	Harm	H1	…caused any difficulties for you?	157 (43.5)	204 (56.5)	0
		H2	…resulted in physical harm occurring to you?	270 (74.8)	91 (25.2)	0
		H3	…caused you emotional distress?	149 (41.3)	212 (58.7)	0
		H4	…resulted in problems or difficulties socially for you?	168 (46.5)	192 (53.2)	1 (0.3)
		H5	…caused problems with your work?	239 (66.2)	118 (32.7)	4 (1.1)
		H6	…caused you to be in a situation where you have been sexually taken advantage of?	323 (89.5)	37 (10.2)	1 (0.3)
		H7	Have you put yourself in a risky situation, due to your special abilities/--/wealth?	229 (63.4)	130 (36.0)	2 (0.6)
		H8	What would a friend, family member, or someone else who knows you well say if asked whether they think you have put yourself in a risky situation due to your special abilities/…/wealth?	209 (57.9)	147 (40.9)	5 (1.4)
		H9	Have you caused harm, upset, or distress to others due to your special abilities/…/wealth?	258 (71.5)	101 (28.0)	2 (0.6)

Table 2. Continued

				Frequencies of endorsement, *n* (%)		
Measure	Factor	Item		No	Yes	Missing Data
			In relation to the last month how often have you:			
IBQ-EE	Immersion behaviors	B1	Used your special abilities, identity, or wealth, or carried out your special role or mission.	171 (47.4)	189 (52.4)	1 (0.3)
(*n* = 361)		B2	Acted in relation to your special abilities/identity/role/mission/wealth in a public place.	212 (58.7)	149 (41.3)	0
		B3	Acted in relation to your special abilities/identity/role/mission/wealth in private.	131 (36.3)	229 (63.4)	1 (0.3)
		B4	Dressed in a particular way to fit with your special abilities/identity/role/mission/wealth.	244 (67.6)	117 (32.4)	0
		B5	Directly approached or interacted with strangers or people you do not know well in the context of your special abilities/identity/role/mission/wealth.	233 (64.5)	128 (35.5)	0
		B6	Directly approached or interacted with friends, family members, or others you know well in the context of your special abilities/identity/role/mission/wealth.	181 (50.1)	180 (49.9)	0
		B7	Stopped doing, or reduced, your usual activities to focus on your special abilities/identity/role/mission/wealth.	211 (58.4)	150 (41.6)	0
		B8	Withdrawn from others to explore, understand, or immerse yourself in your special abilities/identity/role/mission/wealth.	165 (45.7)	196 (54.3)	0
		B9	Spent time collecting things to use in relation to your special abilities/identity/role/mission/wealth.	220 (60.9)	141 (39.1)	0
		B10	Spent time researching or finding out information that relates to your special abilities/identity/role/mission/wealth.	171 (47.4)	190 (52.6)	0
		B11	Put information about your special abilities/identity/role/mission/wealth on social media.	289 (80.1)	72 (19.9)	0
		B12	Spent time keeping a record or making notes or information that relates to your special abilities/identity/role/mission/wealth.	225 (62.3)	134 (37.1)	2 (0.6)
		B13	Used your abilities/powers to try to heal or bless someone or perform other religious acts.	273 (75.6)	88 (24.4)	0
		B14	Tried to get into contact with famous, important, or powerful people.	290 (80.3)	71 (19.7)	0
		B15	Gone on an undercover mission.	291 (80.6)	69 (19.1)	1 (0.3)
		B16	Had (or tried to have) a sexual relationship with strangers who have an important role in relation to your special abilities/identity/role/mission/ wealth.	333 (92.2)	26 (7.2)	2(0.6)
		B17	Used your special intelligence to solve a highly complex problem.	207 (57.3)	154 (42.7)	0
		B18	Performed royal duties or acts.	324 (89.8)	37(10.2)	0
		B19	Engaged in a spiritual battle.	226 (62.6)	134 (37.1)	1 (0.3)
		B20	Used your special abilities to try to save or help others/the world.	187 (51.8)	173 (47.9)	1 (0.3)
		B21	Tried to teach or educate others.	184 (51.0)	176 (48.8)	1 (0.3)
		B22	Spent a lot of your money (or a lot more than usual) on an important project, idea, or cause.	221 (61.2)	140 (38.8)	0
			In relation to my exceptional abilities/identity/role/mission/wealth			
TEEQ	Thinking a lot	Q1	I've been thinking about it a lot.	80 (22.3)	278 (77.7)	NA
(*n* = 358)						
		Q2	It feels important to think about it a lot.	94 (26.3)	264 (73.7)	NA
		Q3	Anything and everything has set my mind to thinking about it.	113 (31.6)	245 (68.4)	NA
		Q4	Images (or pictures) associated with it have come into my mind.	121 (33.8)	237 (66.2)	NA
	Difficulty controlling thoughts	Q5	It has been hard to think about anything else.	173(48.3)	185 (51.7)	NA
		Q6	Thinking about it has stopped me sleeping.	197(55.0)	161 (45.0)	NA
		Q7	Thoughts about it are hard to control.	156 (43.6)	202 (56.4)	NA

55.1% (199/361) said they had wanted help with difficulties arising from their grandiose belief.

In total, 92.6% (326/352) of participants endorsed using at least one immersion behavior in the past month, with the average number being 8 of 22 items (mean = 8.21, SD = 5.66). The 3 most commonly endorsed items were: "acted in relation to your special abilities/identity/role/mission/wealth in private" (63.4%, 229/361); "withdrawn from others to explore, understand, or immerse yourself in your special abilities/identity/role/mission/wealth" (54.3%, 196/361); and "spent time researching or finding information that relates to your special abilities/identity/role/mission/wealth" (52.6%, 190/361).

In total, 89.1% (319/358) of patients endorsed at least one of the thinking about exceptional experiences items. Participants endorsed a mean of 2.86 of the 4 "thinking a lot" items (*SD* = 1.46) and 1.53 of the 3 "difficult to control" items (*SD* = 1.20). Endorsement rates for "thinking a lot" items (66.2–77.7%) were higher than for "difficulty controlling thoughts" items (45.0–56.4%).

Part 3: Tests of Associations With Grandiosity in the Clinical Group

Pair-wise correlations tested whether immersion behaviors and repetitive thinking were associated with grandiosity and harm (table 3). Immersion behaviors (IBQ-EE total) were significantly associated with grandiosity and grandiose delusion conviction, explaining 39.5% and 13.8% of the variance, respectively. TEEQ factors "thinking a lot" and "difficulty controlling thoughts" explained 28.4% and 19.3% of the variance in grandiosity and 19.4% and 11.4% of the variance in grandiose delusion conviction, respectively. The TEEQ factors were strongly correlated and when entered into structural equation models (with grandiosity and grandiose delusion conviction as outcome variables), only "thinking a lot" remained in the models, explaining 20.4% of the variance in grandiosity and 29.6% of the variance in grandiose delusion conviction.

Significant associations were found between immersion behaviors and harm, and the TEEQ factors and harm (table 3). Structural equation models indicated that these associations remained when controlling for grandiosity (table 4).

Pair-wise correlations were used to test the associations between wanting help and grandiosity, grandiose delusion conviction, harm, immersion behaviors, and grandiosity-related repetitive thinking. Wanting help was not significantly associated with grandiosity severity (Spearman's $\rho = 0.04$, $P = .404$) or grandiose belief conviction ($\rho = 0.006$, $P = .914$), but was significantly related to harm ($\rho = 0.48$, $P < .0001$), immersion behaviors ($\rho = 0.25$, $P < .0001$), and grandiosity-related repetitive thinking ("thinking a lot": $\rho = 0.16$, $P = .002$; "difficulty controlling thoughts": $\rho = 0.24$, $P < .0001$).

Post hoc analyses investigated whether the new measures performed similarly in affective and non-affective psychosis diagnoses (Supplementary materials provide full details). There were no statistically significant differences by diagnostic groups for the questionnaire scores. Test–retest and internal reliability scores were similar across diagnostic groups. It was possible to conduct measurement invariance analysis for the TEEQ which demonstrated invariance at the scalar level across diagnoses.

Discussion

Patients frequently reported harm from grandiose beliefs: Over three-quarters reported at least one grandiose-related harmful effect over the past 6 months. Patients identified difficulties across physical, sexual, occupational, social, and emotional domains, the latter two being the most common. Over half of patients wanted help. Therefore, there is a clear route to engagement related to the range of difficulties that grandiose delusions bring in their wake. Notably, awareness of harm and wanting help were independent of the severity of grandiose delusions.

Table 3. Pairwise Pearson's Correlations (Clinical Group, $n = 352$)

	Grandiosity (SPEQ-G)	Grandiose delusion conviction	Subjective harm (SHEEQ)	Immersion behaviors (IBQ-EE)	Thinking a lot (TEEQ factor 1)
Grandiose delusion conviction	0.43 $P < .0001$	1.00			
Subjective harm (SHEEQ)	0.18 $P = .0006$	0.05 $P = .355$	1.00		
Immersion behaviors (IBQ-EE)	0.63 $P < .0001$	0.38 $P < .0001$	0.54 $P < .0001$	1.00	
Thinking a lot (TEEQ factor 1)	0.53 $P < .0001$	0.44 $P < .0001$	0.34 $P < .0001$	0.72 $P < .0001$	1.00
Difficulty controlling thoughts (TEEQ factor 2)	0.44 $P < .0001$	0.34 $P < .0001$	0.51 $P < .001$	0.72 $P < .0001$	0.94 $P < .0001$

Note: SPEQ, The specific psychotic experiences questionnaire-grandiosity subscale.

Table 4. Structural Equation Models (Clinical Group, $n = 352$)

SEM regression step	Response variable	Explanatory variable	Estimate	Std. error	*P*-value	Std. Est
(1)*Harm regressed on immersion behaviors and grandiosity*						
Step 1: all predictors included	Harm	Grandiosity	−0.190	0.067	.004	−0.184
		Immersion behaviors	0.694	0.081	<.0001	0.603
Step 2: Grandiosity removed (suppressor effect)	Harm	Immersion behaviors	0.549	0.066	<.0001	0.478
(2)*Harm regressed on TEEQ factor 1 (thinking a lot) and grandiosity*						
Step 1: all predictors included	Harm	Grandiosity	0.405	0.061	<.0001	0.410
		Thinking a lot	−0.048	0.069	.486	−0.046
Step 2: Grandiosity removed (nonsignificant predictor)	Harm	Thinking a lot	0.375	0.051	<.0001	0.381
(3) *Harm regressed on TEEQ factor 2 (difficulty controlling thoughts) and grandiosity*						
Step 1: all predictors included	Harm	Grandiosity	0.348	0.051	<.0001	0.417
		Difficulty controlling thoughts	0.001	0.061	.992	0.001
Step 2: Grandiosity removed (nonsignificant predictor)	Harm	Difficulty controlling thoughts	0.349	0.048	<.0001	0.417
(4) *Harm regressed on TEEQ factors (both) and grandiosity*						
Step 1: all predictors included	Harm	Grandiosity	0.066	0.081	.412	0.064
		Thinking a lot	−0.489	0.213	.022	−0.507
		Difficulty controlling thoughts	0.781	0.189	<.0001	0.897
Step 2: removing "thinking a lot" (suppressor effect)	Harm	Grandiosity	0.001	0.061	.992	0.001
		Difficulty controlling thoughts	0.348	0.051	<.0001	0.417
Step 3: removing grandiosity (nonsignificant predictor)	Harm	Difficulty controlling thoughts	0.349	0.048	<.0001	0.417

Note: Std.Est, Standardized estimate.

Severity of the presentation may well not forestall the successful uptake of treatment.

The majority of patients reported immersion behaviors and grandiosity-related repetitive thinking. Each may plausibly contribute to the persistence of grandiose delusions. Memories of self-performed actions may be stronger compared to imagined actions[26] and thus acting "in role" may provide particularly compelling memories that are perceived as confirmatory evidence for the belief. Alternatively, immersion behaviors may involve withdrawal from others and becoming engrossed in belief-related information, potentially reducing access to disconfirmatory evidence and providing further confirmatory evidence. Repetitive thinking about the grandiose delusion is likely to act by bringing the belief to mind, elaborating the details, and increasing conviction.

Immersion behaviors and grandiosity-related repetitive thinking may also contribute to the occurrence of grandiose-related harm. Why might this be the case? Clearly, in some instances, the immersion behavior is harmful in its own right (eg, trying to fly). Immersion behaviors (eg, blessing people believing one is Jesus) could also lead to social rejection. Being unable to control overwhelming thoughts about one's responsibility for saving the world could lead to emotional distress. Immersion behaviors and repetitive thinking were each associated with wanting help, independent of the severity of grandiosity, providing a further route for engagement in treatment.

The results indicate that many patients would like help, and therefore may well engage with treatments that address their concerns. It will be important for the development of targeted treatments to set out clearly how they will achieve the desired change for patients. Clinicians often anticipate those with the strongest grandiose delusions may be the most difficult to engage in therapy, but this study indicates there should be caution about this assumption. A clear route to engagement is via discussion about the difficulties of grandiose delusions, but there may be a discrepancy between initial clinician and patient perspectives. Clinicians may focus on readily observable and potentially life-threatening forms of harm and physical harm may be the easiest to observe. Indeed, existing research on acting on grandiose delusions focuses almost exclusively on physical harm (typically to others).[27–29] This, of course, is important but patients endorse this type of harm at relatively low rates. They report social and emotional harms far more frequently, yet these may be less obvious to clinicians. Patients are likely to experience distressing harms that may only be apparent on careful assessment. Similarly, immersion behaviors like "acting in private" and repetitive internal thinking are both difficult for clinicians to directly observe. The questionnaires

developed could help facilitate shared awareness between patients and clinicians.

The study has limitations. Primarily, the cross-sectional design means that causal relationships cannot be determined, although the measures developed will enable future longitudinal and interventionist designs to be conducted. Another limitation was the recruitment of the nonclinical group via social media (potentially unrepresentative of the general population) and the representativeness of the participant group (who were predominantly White-British) impacting on the potential generalisability of findings. Our clinical group comprised people who were typically in established contact with mental health services. Many were supported by adult community mental health teams and were likely to have had long-term support from services. Engagement in treatment for grandiose delusions may differ across stages of difficulties and points of contact with services. This would be a relevant area to consider in future research.

The measures had good psychometric properties, although whether the TEEQ factors, "thinking a lot" and "difficulty controlling thoughts", are truly distinct or may be better considered as a single factor was not entirely clear. Furthermore, it is possible that we did not have an exhaustive set of items for each measure, and aspects of variance may therefore have been missed. The number of participants with a bipolar diagnosis was small, meaning that the factor structure for each questionnaire could not be separately examined by diagnosis. However, total scores on the questionnaires did not differ by diagnosis, although there was an indication that levels of subjective harm associated with grandiose delusions might be higher in the context of bipolar disorder. Measurement invariance across diagnoses was found for the one questionnaire that could be tested in such a way. Although there was no clear evidence of differences in these measures across diagnostic groups, it is still plausible that the influence of different maintenance mechanisms may vary across clinical presentations or across differing belief content. Finally, in this study, we assessed two putative maintenance mechanisms for grandiose delusions, but causation will likely be multi-factorial. Future studies should assess the contributions of multiple factors.

Supplementary Material

Supplementary material is available at https://academic.oup.com/schizophreniabulletin/.

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