

Negative self-evaluation, suicidality and internal threat: Exploring the Suicidal Drive Hypothesis for psychosis

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I confirm that the word count of this thesis is less than 100,000 words excluding the title page, contents, acknowledgements, summary or abstract, abbreviations, footnotes, diagrams, maps, illustrations, tables, appendices, and references or bibliography.

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Summary

The recently proposed Suicidal Drive Hypothesis challenges traditional perspectives regarding the relationship between suicidality and psychosis. It proposes a bidirectional framework in which suicidality may operate as a risk factor for, as well as an outcome of psychosis. Rooted within a context of threat responsiveness, the hypothesis considers suicidality as an internally generated and self-directed threat and psychosis as an adaptive strategy which externalises this threat. Given encouraging preliminary evidence demonstrating suicidality – psychosis directionality the current thesis sought to explore the conceptualisation of internal threat, more broadly beyond suicidality, and to examine how psychosis varies in relation to it. A novel continuum of internal threat was modelled using data from the British Psychiatric Morbidity Survey ($N = 8580$). Exploratory and confirmatory factor analyses identified a correlated 4-factor structure of internal threat (low self-worth and subordination, depression, suicidal thoughts and self-harm) while subsequent factor mixture modelling revealed seven classes that in turn reflected graded levels of internal threat severity. Traumatic experiences and markers of social adversity conferred risk for class membership. Graded classes of internal threat severity were also modelled in separate population-based samples from the UK and Israel, using symptoms derived from established external threat (trauma)-related psychiatric phenomena (Complex PTSD and Borderline Personality Disorder) which, notably, have been meaningfully associated with psychosis. While clinical psychotic disorder status was associated mainly with extreme expressions of internal threat (i.e. suicidality), subclinical psychotic experiences (PEs) were associated with internal threat across the continuum from lower to more extreme levels. Furthermore, examination of PE connectivity at different levels of internal threat severity suggested an ‘evolving’ and ‘growing’ network of internal threat oriented psychosis. This thesis not only advances the Suicidal Drive Hypothesis but also introduces a broader conceptualisation of internal threat that may have applications beyond psychosis research. A broad array of clinical, theoretical and methodological implications of this research are considered throughout.

Abbreviations

χ^2	Chi square
AIC	Akaike information criterion
APA	American Psychiatric Association
ARMS	At risk mental state
BIC	Bayesian information criterion
BPD	Borderline personality disorder
BPMS	British Psychiatric Morbidity Survey
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CI	Confidence interval
CIS-R	Clinical Interview Schedule-Revised
CPTSD	Complex posttraumatic stress disorder
CSA	Childhood sexual abuse
df	Degrees of freedom
DSM	Diagnostic and Statistical Manual of Mental Disorders
DSO	Disturbances in self-organisation
EFA	Exploratory factor analysis
FEP	First episode psychosis
FMM	Factor mixture model
GAD	Generalised anxiety disorder
ICD	International Classification of Diseases

ITQ	International Trauma Questionnaire
LCA	Latent class analysis
LEC	Life Events Checklist
LRT	Likelihood ratio test
NSC	Negative self-concept
NSE	Negative self-evaluation
NSSI	Non-suicidal self-injury
OCD	Obsessive compulsive disorder
OR	Odds ratio
PE	Psychotic experience
PSQ	Psychosis Screening Questionnaire
PTSD	Posttraumatic stress disorder
RMSEA	Root mean square error of approximation
SA	Suicide attempt
SCAN	Schedules for Clinical Assessment in Neuropsychiatry
SCID-II	Structured Clinical Interview for DSM-IV Axis II Disorders
SES	Socioeconomic status
SH	Self-harm
SI	Suicidal ideation
ssaBIC	Sample size adjusted Bayesian information criterion
TLI	Tucker-Lewis index
UHR	Ultra-high risk

WHO World Health Organization

WLSMV Weighted least squares means and variance adjusted

Chapter 1

Introduction to thesis: Psychosis as an internal threat response

1.0. Introduction to Chapter 1

A new hypothesis, namely the Suicidal Drive Hypothesis (J. Murphy et al., 2018; J. Murphy et al., under review), challenges traditional conceptualisations regarding the relationship between suicidality and psychosis. Despite an abundance of research investigating the co-occurrence and strength of association between these phenomena, suicidality and psychosis have, up until recently, only ever been considered within a unidirectional framework. Suicidality has been considered primarily as an outcome of psychosis and pathways in which psychotic symptoms directly or indirectly cause suicidality have been widely evidenced and advocated. A Suicidal Drive Hypothesis, however, contests orthodox assumptions about the co-occurrence of these phenomena and suggests that psychotic symptoms may, in some cases, be consequential to suicidality.

Viewed in the context of threat to life, suicidality may be considered a form of internally generated and self-directed threat ('internal threat'). In such a case, where threat is internal and inescapable (i.e. emanating from self), threat externalisation (i.e. attribution of threat to an external source) may prevent harm and/or prolong life by creating psychological distance from the source of the threat (i.e. the self). In this context externalised suicidality may become manifest as e.g. command hallucinations that instruct someone to engage in self-harm/suicide or persecutory delusions that convince someone that others are plotting to cause them harm or bring about their death (i.e. positive psychosis symptom expression). This externalisation of internal threat may, in turn, trigger emotional responses (e.g. distress, fear, hypervigilance) and activate safety- and help-seeking behaviours which can aid survival and alert others to this otherwise undetectable at-risk state (J. Murphy et al., 2018; J. Murphy et al., under review). Hence, the Suicidal Drive Hypothesis conceptualises suicidality as a 'driver', rather than an outcome of psychosis.

However, internal threat as a concept may be broader and more complex than suicidality alone. At present in the research literature, suicidality refers to suicidal ideation, self-harm, suicide planning and suicide attempts. This thesis proposes that suicidality constitutes the extreme end of an internal threat continuum, that also includes a spectrum of less severe, more common self-threatening thoughts, beliefs and behaviours related to

negative self-evaluation. Therefore, at the earliest possible stage, if the Suicidal Drive hypothesis is to be explored successfully, we must first accurately measure and conceptualise internal threat and secondly, measure how psychosis varies in relation to that construct, whatever its composition.

The first section of Chapter 1 will involve setting the scene for this thesis by giving an overview of how we currently think about psychosis and its relationship with suicidality. This foundation is necessary to appreciate the novelty of both the Suicidal Drive Hypothesis as well as the current research examining the conceptualisation of internal threat and its relationship with psychosis. Firstly, past and present conceptualisations of psychosis and its aetiology will be outlined. Considering psychosis as potentially understandable in the context of psychological and social processes is relatively new; a biomedical model has dominated the literature for some time. Next, the main variables deemed to represent risk and outcome for psychosis are discussed. Suicidality, regarded as a continuum of self-injurious thoughts and behaviours, is then described before examining its association with psychosis. This section will highlight that despite the vast amount of research in this area, which has also experienced a surge in recent years, suicidality has always been conceptualised as an outcome but never a risk factor in this relationship. Furthermore, the proposed pathways by which this relationship might operate, as suggested in the literature, are discussed.

Section Two introduces the Suicidal Drive Hypothesis which challenges the traditional conceptualisation of the psychosis-suicidality framework by proposing a bi-directional causal relationship between the variables, in which psychosis is viewed as a response to as well as a risk factor for suicidality. This alternative pathway has been overlooked as a viable model until recently empirically tested by J. Murphy and colleagues (2018; under review). Due to the recency of the proposed model, an in-depth outline is given, supporting evidence for the model is highlighted and an overview of recent findings is presented. This section establishes our knowledge base for a potential new way of thinking about psychosis as a response to suicidality.

Finally, Section Three draws the readers' attention to the proposition that the concept of suicidality alone is insufficient to wholly describe the phenomena of internal threat.

Utilising an evolutionary psychology framework, more common, less severe ‘self-attacks’ are considered as forms of internal threat. Thus, a broadening of the internal threat concept is proposed, inclusive of milder self-threatening thoughts, beliefs and behaviours as well as suicidality. An overview of the relationship between psychosis and these internal threat states is given, along with a discussion of their common risk factors. Finally, the potential presence of these internal threat phenomena within the extant external threat diagnostic literature is described.

1.1. Section One

In attempting to describe and discuss psychosis as an internal threat response, it is valuable, first, to consider our conceptualisation of psychosis. A historical overview of the concept of psychosis is given with a specific focus on biological and psychosocial models, and categorical and continuous conceptualisations. Further, a description of the main risk factors for and outcomes of psychosis as generally categorised in the literature are outlined. Crucially, despite repeated investigations of the relationship between psychosis and suicidality in the psychiatric research literature, suicidality’s potential as a risk factor for psychosis has not been considered. The main mechanisms proposed to account for the relationship between both phenomena are outlined. These are (i) a direct causal link whereby psychotic symptoms (e.g. command hallucinations) result in suicidality and (ii) the relationship between both phenomena is explained by shared risk factors (e.g. depression, trauma). Finally, the Suicidal Drive Hypothesis is introduced, focussing on an overlooked third pathway between the phenomena, from suicidality to psychosis.

1.1.1. Overview of psychosis

Although there is no consensus as to what the term means (Arciniegas, 2015), in general, psychosis is an umbrella term referring to the experiences of “hearing voices (‘hallucinations’), believing things that others find strange (‘delusions’), speaking in a way that others find hard to follow (‘thought disorder’) and experiencing periods of confusion where you appear out of touch with reality (‘acute psychosis’)” (British Psychological

Society, 2017, p.10). These ‘positive symptoms’ of psychosis, are additional, abnormal psychological features, while ‘negative symptoms’ reflect deficits to normal functioning (Crow, 1980), such as flattened affect. Factor analytic research has suggested that cognitive disorganisation, depression and mania may also constitute other dimensions of psychosis (Reininghaus, Priebe & Bentall, 2013; Shevlin, McElroy, Bentall, Reininghaus, Murphy, 2017). The current research operates within a framework in which psychosis development may be understood in the context of an individual’s psychological environment, specifically their own threatening thoughts, feelings and behaviours. This perspective, however, has not always been widely accepted, with biological psychiatry dominating the field for many years.

1.1.1.1. Schizophrenia: A chronic brain disease

Both Emil Kraepelin and Eugen Bleuler are responsible for the concept of schizophrenia (Read, 2013a). Kraepelin popularised the classification of ‘dementia praecox’ (‘premature dementia’) in his attempt to recategorize and amalgamate various disorders of the time, distinguishing it from manic-depressive psychoses. Dementia praecox was viewed as a progressively deteriorating and incurable disease characterised primarily by disordered cognitive functioning and loss of volition (Jablensky, 2010; Noll, 2007). Bleuler further developed the concept and relabelled it ‘schizophrenia’ in his publication ‘Dementia Praecox or the Group of Schizophrenics’ (1911/1950). Bleuler distinguished between ‘accessory’ symptoms (positive symptoms in today’s terms) and ‘basic’ symptoms which included thought disorder, ambivalence, affective incongruence and withdrawal from reality (Jablensky, 2010). The term, originating from the Greek meaning ‘split mind’ originally served to facilitate the idea that the disorder was due to the ‘splitting’ of psychic functions (Picchioni & Murray, 2007).

Within these perspectives, schizophrenia was thought of as a disease, a categorical entity which, based on the aetiological frameworks proposed, was genetic in origin. Kraepelin believed that there was a heritable component to dementia praecox which predisposed individuals to abnormalities in their hormonal metabolic functioning, which eventually lead to autointoxication, affecting the brain (Noll, 2007). Bleuler was more

optimistic regarding prognosis, but also advocated intoxication of the brain as part of its aetiology and supported the idea of genetic inheritance (Noll, 2011). Notably, Bleuler also recognised the elevated frequency of suicidality in psychosis; more than 100 years ago, he identified “the suicidal drive” as the “most serious of all schizophrenic symptoms” (Bleuler, 1911/1950, p.488).

1.1.1.2. A continuum of psychotic experiences

The concept of schizophrenia has remained remarkably unchanged since its inception (Guloksuz & van Os, 2018), however, today its boundaries are governed by classification systems such as the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association [APA], 2013) and the International Classification of Diseases (ICD; World Health Organization [WHO], 2018) which cover a range of psychotic disorders. Since the 1990s however, the traditional conceptualisation of psychosis as a biologically based, categorical entity has been challenged. This movement stemmed from the recognition that schizophrenia is a scientifically meaningless, disjunctive concept, which, based on investigation of the literature, is neither reliable nor valid (Boyle, 1990; Read, 2013b; van Os, 2016). Furthermore, what have been seen as the core symptoms of a very rare, genetically based mental disorder are surprisingly common. Psychosis can be expressed below the clinical threshold for schizophrenia/psychotic disorder; this is commonly referred to as psychotic experiences (PEs), psychotic-like experiences (PLEs), schizotypy or at-risk mental states (ARMS; van Os, Linscott, Myin-Germeys, Delespaul & Krabbendam, 2009).

Both the prevalence and incidence of PEs in the general population, 7.2% and 2.5% respectively (Linscott and van Os, 2013), greatly exceeds that of clinically defined psychotic disorders (Perälä et al., 2007). PEs confer risk for later psychotic disorders (Fisher et al., 2013; Poulton et al., 2000; Welham et al., 2009), however, they are transitory for the majority of individuals; only 20% of those who report PEs experience them persistently, for 80%, PEs remit over time (Linscott & van Os, 2013). PEs in children are associated with many of the same risk factors and correlates of clinically diagnosed schizophrenia, including genetic, social, neurodevelopmental, home-rearing and

behavioural risks (Polanczyk et al., 2010). Based on this research, van Os and colleagues (Linscott & van Os, 2013; van Os, Hanssen, Bijl & Ravelli, 2000; van Os et al., 2009) developed the psychosis proneness-persistence-impairment model suggesting that psychosis is a continuous phenomenon, ranging from subclinical PEs to clinically diagnosed psychotic disorders. Resultingly, there has been a shift in focus from individual diagnostic categories, towards symptom-based and subclinical population research.

1.1.2. Risks and outcomes

At present, a number of biological, social, environmental and psychological variables are considered as risk factors for psychosis. Biological explanations related to genetics, neuroanatomy and neurochemistry have historically dominated the field. Specific genetic variations have been found to link individuals with schizophrenia and bipolar disorder (Craddock, O'Donovan & Owen, 2005). Familial risk for psychosis has also been evidenced; individuals who have a close relative with a psychotic disorder are themselves at an elevated risk of developing a psychotic disorder (Chou et al., 2017; Goldstein, Buka, Seidman & Tsunag, 2010; Hameed & Lewis, 2016; Rasic, Hajek, Alda & Uher, 2014). Hyperresponsivity of the dopamine system has been widely acknowledged in neurochemical models of psychosis (Mizrahi et al., 2012; Seeman et al., 2006). Furthermore, structural brain abnormalities, including reduction in grey and white matter density and volume have been recognised in individuals with psychosis (Hugdahl, Løberg & Nygård, 2009; Kubicki, McCarley & Shenton, 2005).

More recently, however, psychological, social and environmental risk factors have also been considered. One of the most frequently studied risk factors for psychosis is trauma, particularly that occurring in childhood. Meta-analytic research has consistently reported an association between childhood traumas such as sexual abuse, physical abuse, emotional abuse, neglect, bullying, parental death and life-threatening accidents and psychotic outcomes (Bonoldi et al., 2013; Trotta, Murray & Fisher, 2015; van Dam et al., 2012; Varese et al., 2012). Varese et al. (2012) conducted a meta-analysis of patient-control, prospective and cross-sectional cohort studies of childhood adversity and psychosis and reported a significant association with an overall effect of odds ratio (OR) = 2.78.

Sexual trauma has been noted to confer particular risk for psychosis (see Coughlan & Cannon, 2017).

Moreover, lower socioeconomic status (SES) at birth, indicated by parental years in education, lower paternal occupational status and poorer residential area have been found to increase risk for schizophrenia in a population-based 13-year birth cohort (Werner, Malaspina, Rabinowitz, 2007). Similarly, a robust association between first-episode psychosis (FEP) and social disadvantage has been reported (Stilo et al., 2013; Stilo et al., 2017). Migration (Cantor-Graae, Pedersen, McNeil & Mortensen, 2003) and urbanicity (living in an urban environment; Vassos, Pedersen, Murray, Collier & Lewis, 2012) are also established risk factors for psychosis. Shevlin et al. (2016) conducted a comprehensive data-linkage study analysing prospective data from a Danish birth cohort. They found that parental psychosis, being placed in care, parental separation or death, parental unemployment and urbanicity all independently conferred risk for a psychotic disorder diagnosis after age 10 (ORs ranged from 1.42 – 3.32).

A number of poor functional, social and health outcomes have also been considered in psychosis. Kooyman, Dean, Harvey and Walsh (2007) reviewed the literature on six main adverse outcomes in schizophrenia: violence, victimisation, suicide/self-harm, substance use, homelessness and unemployment, finding a strong association between schizophrenia and these outcomes. Even when in remission from symptoms, individuals with psychosis report a lower quality of life (Addington, Young & Addington, 2003) and commonly experience substance use problems (Swofford, Scheller-Gilkey, Miller, Woolwine & Mance, 2000). High levels of unemployment compared to the general population are present (Marwaha & Johnson, 2004). Moreover, individuals with schizophrenia suffer from a range of comorbid physical health conditions such as diabetes, cardiovascular disease, obesity, cancer, HIV/AIDS, hepatitis C, and osteoporosis; many of these conditions are associated with the use of antipsychotic medication (Connolly & Kelly, 2005; Lambert, Velakoulis & Pantelis, 2003). This contributes to increased rates of mortality, for example, individuals with psychotic disorders are approximately 2.5 times more likely to die of all-cause mortality compared to the general population (Walker, McGee & Druss, 2015). Furthermore, individuals with psychosis are vulnerable to violent

and sexual victimisation (Brekke, Prindle, Bae & Long, 2001; Short, Thomas, Luebbers, Mullen & Ogloff, 2013).

The second national Australian survey of psychosis (Morgan et al., 2012) reported that two-thirds of participants had impaired socialising abilities, more than half had a metabolic syndrome, two thirds currently smoked, educational achievement was low and less than a quarter (21.5%) were in employment. Over half of the sample had lifetime drug or alcohol abuse/dependence. More than 15% had been a victim of violence whereas 10.7% had been arrested or charged with an offence. The majority were on antipsychotic medication and experienced medication side effects. Of these, 64% experienced impairment due to medication side effects, of which 32% constituted moderate or severe impairment. Notably, half of the sample (49.5%) reported attempting suicide in their lifetime (Morgan et al., 2012).

Previously, some of the outcomes of psychosis have also been considered as risk factors and vice versa. For example, Degenhardt et al. (2018) examined data from the WHO World Mental Health Survey and found that temporally ordering substance use and PEs revealed a bidirectional association, even after adjustment for demographics, comorbid substance use and antecedent mental disorders. Individuals with a prior alcohol use disorder, extra-medical prescription drug use, alcohol use and tobacco use had elevated risk of subsequent first onset of PEs (ORs ranged from 1.6-1.3). Furthermore, those with prior PEs had increased odds of subsequent tobacco, alcohol and cannabis use as well as substance use disorders (ORs ranged between 1.5-1.3). Therefore, in this study, alcohol and tobacco use were found to be both risk factors for and outcomes of PEs; the strength of this relationship was of similar magnitude in both directions.

1.1.3. The suicidality continuum

Of all the outcomes of psychosis, suicidality is amongst the most, if not the most, frequently studied outcome. Suicidality is a broad, catch-all term used to describe a range of suicide-related thoughts, feelings and behaviours including suicidal ideation (SI), intent, motivation and planning as well as suicidal ‘threats’, ‘gestures’, rehearsals and suicide

attempts (SA). Some uses of the definition also include engagement in self-harm (SH) (Silverman, 2016).

SH and SI have each been shown to confer risk for SA (Ribeiro et al., 2016). SH, SI and SA are also characterised by many of the same underlying risk factors e.g. depression, anxiety and substance abuse (Andover, Morris, Wren & Bruzzese, 2012; Grandclerc, De Labrouhe, Spondenkiewicz, Lachal & Moro, 2016; Mars et al., 2014; May & Klonsky, 2016). Moreover, these experiences seem to be temporally associated. De Leo, Cerin, Spathonis and Burgis (2005) showed that over 99% of suicide attempters planned their attempt or experienced SI before their attempt and that over 50% of individuals who reported suicidal thoughts or behaviour experienced all levels of ‘less severe’ suicidal thoughts and behaviours preceding their most severe experience (e.g. thinking life not worth living, seriously considering suicide). Non-suicidal self-injury (NSSI), a form of SH, has also been found to prospectively predict elevated SI (Guan, Fox & Prinstein, 2012). Kessler, Borges and Walters (1999), analysing data from the National Comorbidity Survey, showed that transition rates from ideator to planner, planner to attempter and ideator to unplanned attempter were 34%, 72% and 26%, respectively. Similar transition rates have also been observed more recently in a large metropolitan Chinese sample (Lee et al., 2007). Cessation of SH (regardless of intent) has also been shown to reduce the risk for later suicidal thoughts and behaviours (Koenig et al., 2017). Importantly, however, these phenomena can be distinct; they do not always precede or co-occur with one another. For example, SA has been shown to occur in the absence of SI or suicide planning (Bertolote et al., 2005).

It has been suggested by some, therefore, that self-injurious thoughts and behaviours may exist on a continuum of ‘suicidality’, anchored at one end by less severe experiences (e.g. SI) and the other by SA or death by suicide (Stanley, Wichel, Molcho, Simeon & Stanley, 1992; Svetlicic & De Leo, 2012). In general, a skewed distribution of related phenomena that decrease in frequency (SA occurs less frequently than SI) but increase in severity (SA are associated with more extreme outcomes than SI), has now been well established in a diverse range of samples (Bertolote et al., 2005; Ghazinour, Mofidi & Richter, 2010; Nock et al., 2008; Scocco & De Leo, 2002). The characteristics of the

suicidality continuum, as well as literature for and against it, will be described in greater detail in Chapter 2.

1.1.4. Psychosis and suicidality

Suicidality has only ever been considered as an outcome of psychosis in the research literature, i.e., it is thought to have a unidirectional association with psychosis (psychosis → suicidality). A large body of research, as outlined below, attests to this association. The last several years have seen a growing interest in the topic of suicidality and psychosis. Indeed, since 2015 several meta-analyses and systematic reviews have been produced, collating information on, for example, mortality (including death by suicide) in first episode psychosis (FEP; Nordentoft, Madsen & Fedyszyn, 2015), risk of suicidality in individuals experiencing PEs (Honings, Drukker, Groen & van Os, 2016; Huang, Fox, Ribeiro & Franklin, 2018; Yates et al., 2019) and in those at clinical high-risk for psychosis (Taylor, Hutton & Wood, 2015), risk factors associated with suicidality in individuals diagnosed with schizophrenia (Cassidy, Yang, Kapczynski & Passos, 2017), risk factors associated with suicidality before and after FEP (Challis, Nielssen, Harris & Large, 2013), and the impact of depression on suicidality risk in psychosis (Coentre, Talina, Góis & Figueira, 2017; McGinty, Haque & Uptegrove, 2018). Despite the recent attentional focus, the recognition of the elevated frequency of suicidality in psychosis has long been acknowledged. As mentioned, Bleuler (1911/1950) identified suicidality as a key component of schizophrenia. Moreover, a 1986 World Health Organization study concluded that “the risk of suicide in schizophrenia is as great, if not greater, than the risk of suicide associated with affective disorders” (Sartorius et al., 1987, p.110).

1.1.4.1. Prevalence of death by suicide in psychosis

Current estimates calculate risk of suicide at approximately 5% for individuals with psychotic disorders (Hor & Taylor, 2010; Nordentoft, Mortensen & Pedersen, 2011; Palmer, Pankratz & Bostwick, 2005). However, some studies have reported lower lifetime risk (Castelein et al., 2015; Dutta, Murray, Allardyce, Jones & Boydell, 2011), and older

studies, perhaps due to methodological limitations, reported higher risk (Castelein et al., 2015). Increased mortality extends to PEs also, Shafiri et al. (2015) found PEs in the general population to be associated with increased risk of all-cause mortality, including death by suicide. Nordentoft and colleagues' (2015) review claimed that there is up to a 20-fold increase in relative risk for suicide amongst those with psychotic disorders compared to the general population. A number of risk factors are associated with suicide in those with psychotic disorders (Caldwell & Gottesman, 1990; De Hert, McKenzie & Peuskens, 2001; Hawton, Sutton, Haw, Sinclair & Deeks, 2005; Hor & Taylor, 2010; McGirr et al., 2006). Demographic factors include male gender, younger age, high premorbid IQ and higher level of education. Psychological and mental health factors are also important predictors such as previous SA, including depressive symptoms or disorders, presence of positive psychosis symptoms, presence of insight, high levels of functional impairment at discharge, fear of further mental deterioration, loss of faith in treatment or excessive treatment dependence, frequent relapses, SH, impulsive behaviour, motor restlessness, and more comorbid diagnoses. A family history of suicide and substance misuse have also been reported as common risk factors for suicide in schizophrenia. Interestingly, while Hor and Taylor's (2010) systematic review showed that active hallucinations and delusions were associated with later suicide, Hawton et al. (2005) reported that hallucinations were associated with a reduced risk in their systematic review.

1.1.4.2. Prevalence of SI, SH and SA in psychosis

Estimates of SI, SH and SA among this population are much higher than death by suicide. Current SI has been reported between 19 – 41% in individuals experiencing psychosis (Bertelsen et al., 2007; Fialko et al., 2006; Fulginiti & Brekke, 2015; Radomsky, Haas, Mann & Sweeney, 1999). Furthermore, frequency of NSSI and lifetime SA among those with a diagnosis of schizophrenia have been reported at 36% and 23 – 49% respectively (Bertelsen et al., 2007, Fulginiti & Brekke, 2015; Harkavy-Friedman, Nelson, Venarde & Mann, 2004; Mork et al., 2013; Radomsky et al., 1999; Yoo et al., 2015). Similar estimates have been reported in ultra-high-risk (UHR) and ARMS samples (D'Angelo et al., 2017; Hutton, Bowe, Parker & Ford, 2011; Taylor et al., 2015; Welsh & Tiffin, 2014). A meta-

analysis by Taylor et al. (2015) found a high prevalence of SI (66%), lifetime SH (49%) and lifetime SA (18%) in individuals at UHR. High prevalence of suicidality is also observed among general population samples reporting PEs. For example, Kelleher et al. (2013) found that in a non-clinical adolescent sample, among those with PEs, a SA was reported by 7% at 3-month follow-up and 20% at the 12-month follow-up. Notably, for many, these thoughts of suicide are not just fleeting. For around 40% of individuals with psychosis their trajectory of SI is either persistent or increasing over the first years after treatment (Madsen, Karstoft, Secher, Austin & Nordentoft, 2016).

1.1.4.3. Association between psychosis and suicidality

Research highlighting the relationship between psychosis and suicidality has been conducted longitudinally (e.g. Cederlöf et al., 2017; Fisher et al., 2013; Kelleher, Cederlöf & Lichtenstein, 2014; Martin, Thomas, Andrews, Hasking & Scott, 2015; Sullivan et al., 2015) and cross-sectionally (e.g. Bromet et al., 2017; Capra, Kavanagh, Hides & Scott, 2015; Koyanagi, Stickley & Haro, 2015a); on adolescent (e.g. Fisher et al., 2013; Kelleher et al., 2012; Martin et al., 2015; Nishida et al., 2010) and adult samples (e.g. Bromet et al., 2017; Capra et al., 2015; Koyanagi et al., 2015a; Saha et al., 2011); and using PEs broadly (e.g. Fisher et al., 2013; Gawęda et al., 2019; Kelleher et al., 2014), individual PEs (e.g. Jang et al., 2014; Koyanagi, Stickley & Haro, 2015b; Nishida et al., 2010; Saha et al., 2011) or schizotypy (e.g. Schimanski, Mouat, Billingham & Linscott, 2017) as predictor variables.

Furthermore, this research has been conducted in clinical (e.g. Gournellis et al., 2018; Zalpuri & Rothschild, 2016), general population (e.g. Honings, Drukker, van Nierop et al., 2016; Koyanagi et al., 2015a; Sullivan et al., 2015) and high-risk samples (e.g. D'Angelo et al., 2017; Lindgren et al., 2017; Taylor et al., 2015). It has been investigated cross-culturally (e.g. Bromet et al., 2017) and a range of suicidality variables have been investigated as outcomes: death by suicide (e.g. Chapman et al., 2015; Sharifi et al., 2015), SA (e.g. Bromet et al., 2017; Capra et al., 2015; Fisher et al., 2013; Koyanagi et al., 2015a), suicide plans (e.g. Capra et al., 2015; Gawęda et al., 2019; Saha et al., 2011), SI (e.g. Jang et al., 2014; Kelleher et al., 2014; Nishida et al., 2010), SH (e.g. Hielscher et al., 2018;

Nishida et al., 2010; Nishida et al., 2014) and NSSI (Koyanagi et al., 2015b; Martin et al., 2015).

Indeed, a robust association has been shown. Multiple meta-analyses and systematic reviews (Honings, Drukker, Groen & van Os, 2016; Huang et al., 2018; Yates et al., 2019) have been published in the last few years amalgamating the research findings that have been reported to date. For example, a recent meta-analysis of 10 longitudinal studies investigating PEs and suicidality among the general population (Yates et al., 2019), reported that individuals with PEs have elevated odds of future SI (OR = 2.39), future SA (OR = 3.15) and future death by suicide (OR = 4.39). Adjustment for comorbid psychopathology attenuated this relationship but it still remained significant (adjusted SI OR = 1.59, adjusted SA OR = 2.68). Honings, Drukker, Groen and van Os (2016) also conducted a meta-analysis and systematic review of general population studies reporting the risk of suicidality in individuals with PEs, including cross-sectional as well as longitudinal studies, 25 in total. Similarly, ORs increased as severity of outcome increased, SI (OR = 2.47) to suicidal behaviour (defined as SA or completed suicide; OR = 3.03). The ORs reduced in size, but remained significant, after adjusting for depression.

A dose-response effect between number of PEs and severity of suicidality has been reported in several studies. Notably, as mentioned previously, the majority of these associations remained, though attenuated, after adjustment for various confounders such as sociodemographic factors, depression, anxiety, substance abuse, psychopathology, familial mental illness and trauma. However, DeVlyder et al. (2015) included an exhaustive range of potential confounders in their study of the association between PEs and suicidality in college students. Adjustment for these variables in the model accounted for the association between PEs and SA, suicidal plan and intensity of SI. The only outcome that remained significant was broadly defined SI, leading the authors to suggest that psychosis does not cause suicidality, but rather these phenomena share common causes. Of the 24 confounders included, only a few of these explained the relationship - these were childhood sexual abuse (CSA), bullying and victimisation, sexual orientation and school mobility.

1.1.5 Mechanisms linking psychosis and suicidality

It is clear that psychosis and suicidality are associated, although the mechanisms that underpin this relationship are uncertain. Recently, Hielscher, DeVylder, Saha, Connell and Scott (2018) systematically reviewed and critically appraised the relationship between PEs and suicidality. Three potential pathways of association were outlined: (i) PEs are directly causal, i.e., PEs cause suicidality; (ii) shared risk factors fully explain the relationship (mediators and confounders) and (iii) Suicidality is directly causal, i.e., suicidality causes PEs.

(i) PEs are directly causal

The first pathway asserts that PEs directly cause individuals to engage in suicidality. A scenario under which this association might operate is with command hallucinations. Command hallucinations are a subtype of auditory hallucinations in which an individual hears voices instructing them to engage in specific behaviours (Montross, Zisook & Kasckow, 2007). They are common among those experiencing auditory hallucinations, frequently instruct engagement in harmful or dangerous acts, and are complied with by a significant proportion of individuals (Harkavy-Friedman et al., 2003; Kasper, Rogers & Adams, 1996; Shawyer, Mackinnon, Farhall, Trauer & Copolov, 2003; Trower et al., 2004). However, a recent study (Kelleher et al., 2012) found that very few participants reported command hallucinations to harm themselves. The overall relationship between command hallucinations and SH behaviour is questionable. In a sample of prisoners with command hallucinations, Rogers, Watt, Gray, MacCulloch and Gournay (2002) reported that SH command hallucinations were positively associated with SH. However, others have reported no association, for example, Hellerstein, Frosch and Koenigsberg (1987) reported no significant difference between those with command hallucinations and those without on SI, suicidal behaviour or assaultive behaviour. Similarly, reviews have suggested no empirical relationship is present between command hallucinations and suicidality (Montross et al., 2007; Rudnick, 1999).

(ii) Shared risk factors fully explain the relationship

The second pathway assumes that confounders (variables which are associated with both the predictor and outcome variable) and mediators (confounders presumed to be the causal consequence of the predictor; Babyak, 2009) fully explain the relationship between the two phenomena. As previously mentioned, a range of risk factors are associated with suicide among those with psychotic disorders including male gender, younger age, depressive symptoms, substance misuse, comorbid disorders, and treatment issues (Hawton et al., 2005; Hor & Taylor, 2010). Some of these risk factors have been proposed as potential mediators and confounders of the PE – suicidality association. For instance, substance use disorders (SUDs) are significantly associated with SI, SA and death by suicide (Poorolajal, Haghtalab, Farhadi & Darvishi, 2016). It is suggested that substance use may trigger impulsivity, encourage depressive thoughts, restrict attention to the negative situation and reduce barriers to engaging in SH/SA (disinhibition, numbing of pain) which may facilitate engagement in suicidality (Pompili et al., 2011). Moreover, even at a subclinical level, PEs can be distressing (Kelleher et al., 2015) and this has been considered a potential mediator. Martin et al. (2015) for example, found that among Australian adolescents, those endorsing PEs only were not at increased risk of future NSSI and SA, however, those who endorsed both PEs and psychological distress were at increased risk of both experiences. Moreover, among a clinical sample, Fialko et al. (2006) reported that the only characteristic of delusions associated with suicidal thinking were the amount and intensity of distress.

Furthermore, fear of mental disintegration, hopelessness, shame, stigma, loss of social role, lower perceived social status, greater social marginalization, self-blame, and feelings of entrapment and humiliation which occur in the aftermath of a psychotic episode (Gumley, 2007; Iqbal, Birchwood, Chadwick & Trower, 2000; Turner, Bernard, Birchwood, Jackson & Jones, 2013) may stimulate suicidality (Pompili et al., 2011). Indeed, depression is one of the most frequently considered potential mediators/confounders in the literature due to its relationship with both suicidality and PEs (Häfner et al., 2005; Häfner, Maurer, an der Heiden, 2013; Hartley, Barrowclough & Haddock, 2013; Isometsä, 2001; Large, Smith, Sharma, Nielssen & Singh, 2011; Uptegrove et al., 2010; Yoshimasu, Kiyohara & Miyashita, 2008). Depression has been

found to partially, but not fully mediate the relationship between PEs and SI (Jang et al., 2014). Furthermore, Honing and colleagues' meta-analysis (Honings, Drukker, Groen & van Os, 2016) reported that even when controlling for depression, an increased risk of suicidality remained; ORs reduced but did not disappear (from 3.20 to 2.02).

Trauma has also been implicated as a potential mediator/confounder due to its associations with both suicidality and PEs (de Araújo & Lara, 2016; Park, Hong, Jeon, Seong & Cho, 2015; Saha et al., 2011; Scott, Chant, Andrews, Martin & McGrath, 2007; Stein et al., 2010; Varese et al., 2012; Zatti et al., 2017). While the experience of a psychotic episode can be traumatic for some (Chisholm, Freeman & Cooke, 2006; Dunkley, Bates & Findlay, 2015) trauma is also highly prevalent before PE onset (Morrison, Frame & Larkin, 2003). Saha et al. (2011) found that when controlling for a range of confounders including traumatic life events, delusional experiences were associated with SI, suicidal plans and SA. Similarly, Koyanagi et al. (2015a) found the relationship between PEs and suicidality remained after controlling for a range of confounders including stressful life events such as bullying, sexual abuse, violence at home or work and a major financial crisis. As previously mentioned, DeVlyder et al. (2015) found that controlling for a broad range of variables accounted for the PE – suicidality relationship and that a few key trauma variables (CSA and bullying) accounted for most of the association.

Despite this, Hielscher and colleagues' critical review (Hielscher et al., 2018) concluded that environmental exposures including traumatic or stressful life events did not fully account for the PE-suicidality relationship. Furthermore, this review found that adjusting for mental disorders (including depression), sociodemographic variables, substance use and psychological factors attenuated the relationship between suicidality and PEs. This suggests that while depression, trauma, substance use etc. may be confounders/mediators which partially explain the relationship, they did not, independently, fully explain the PE-SITB relationship. Consequently, this review supported a direct causal pathway from PEs to suicidality (Hielscher et al., 2018). It also noted that based on the evidence available, it could not reject the hypothesis that shared risk factors fully account

for the association; inclusion of a range of confounding variables in the same study and consistent measurement of temporal order is needed. It is clear therefore, that more studies controlling for a broad range of confounders (e.g. DeVlyder et al., 2015) are needed to more fully understand this mechanism.

(iii) Suicidality is directly causal

Until recently, no consideration had been given to the idea that rather than solely operating in a unidirectional psychosis → suicidality framework, the reverse temporal ordering may also be conceivable in some cases. While it has been claimed that this position is “less consistent with broad clinical assumptions” (Hielscher et al., 2018, p.1423), the orthodoxy of the unidirectional framework is beginning to be challenged. As outlined in Section Two, the Suicidal Drive Hypothesis, which asserts a pathway from suicidality to psychosis, has recently been empirically tested with supportive initial findings.

1.2. Section Two

Section Two gives an overview of the recently developed Suicidal Drive Hypothesis. Its roots in threat responsivity research are outlined before describing the position of the model. Supporting evidence for the hypothesis is discussed, namely, the threat-related content present in PEs, the research on externalising biases in individuals with psychosis and the frequency of suicidality early in the manifestation of psychosis. Furthermore, the recent empirical evidence supporting the model is outlined. Specifically, analysis of Danish Registry and UK epidemiological data has provided a foundation for future research. Limitations of the Suicidal Drive Hypothesis and its research moving forward is also considered.

1.2.1. Introduction to the Suicidal Drive Hypothesis

The Suicidal Drive Hypothesis (J. Murphy et al., 2018; J. Murphy et al., under review) proposes that suicidality may be a risk for, rather than a response to psychosis, for some individuals. This proposition diverges from previous research on the topic which has only

ever considered these two phenomena within a unidirectional framework. The authors suggest that when viewed within the context of threat responsivity, suicidality operates as a form of ‘internally generated and self-directed threat’. Human defence mechanisms serve to protect from current and future harm through evolved systems which detect threat and motivate engagement in precautionary behaviour (Woody & Szechtman, 2011). They operate on a ‘better safe than sorry’ principle; engaging in defensive behaviour when there is no threat present is more useful than failing to engage defensively when a threat is present (Gilbert, 1995). While originally serving as defences against predators, defensive states such as fight, flight, freeze, collapse can be applied to a variety of modern-day threatening situations (e.g. traumatic experiences such as abuse, war and accidents; Baldwin, 2013). Traditionally, threat response has mainly focussed on hyper- and hypo-activity and arousal in psychological and physiological systems to external sources of threat. For example, Ehlers and Clark’s (2000) cognitive model of PTSD proposes that the symptoms of the disorder such as re-experiencing, avoidance and hypervigilance are coping strategies and safety behaviours used as defences against further threat or distress. Thus, despite the distress or other negative elements associated with these responses, they still serve an adaptive purpose; re-experiencing keeps defence in the foreground, hypervigilance is a rapid aggressive defensive response, avoiding thoughts associated with the trauma is akin to psychological flight and avoiding activities associated with the threat is a defensive reaction to avoid distress and harm (Cantor, 2009).

In the case of internal threat, however, where for example, an individual is thinking of taking their own life, gaining physical distance from the source of threat is not possible and avoidance of these thoughts may be challenging. Thus, defensive reactions triggered in response to external threats likely prove ineffective for internal threat. As such, alternative, but equally complex defensive strategies may be utilised. J. Murphy and colleagues (2018; under review) suggest that such defensive strategies may take the form of threat externalisation. Such a process may involve attributing the source of threat to an external source. This may take the form of paranoia about the presence of threat or jeopardised personal safety, hearing voices commanding one to engage in suicidal behaviour or persecutory delusions regarding the intention of others to cause harm. Thus, positive psychotic symptomology may represent an adaptive strategy to distance and protect

oneself, via externalisations, from the source of threat. The elevated frequency of PEs among those engaging in suicidal thinking and behaviour may be the product of this psychological process serving to achieve threat externalisation. Externalisation and retreating from reality may be the most beneficial or effective strategy when an individual themselves pose a risk to their own life. It may result in achieving psychological distance through altering an individual's reality, when achieving physical distance is not possible. Furthermore, not only are PEs adaptive in that they distance the individual from the source of threat, they also may stimulate affective states (fear, distress, hypervigilance) and behaviours (safety seeking, help-seeking) that enhance survival and alert others to the at-risk state (J. Murphy et al., 2018; J. Murphy et al., under review).

1.2.2. Evidence for Suicidal Drive Hypothesis

Several strands of research have been proposed to support the Suicidal Drive Hypothesis, these literatures relate to (i) threat content in PEs, (ii) externalising biases and (iii) suicidality in early psychosis.

(i) Threat-related content in PEs

Threatening content is evident in PEs. By their very nature, persecutory delusions, the most common type of delusion (Cannon & Kramer, 2012), are threatening; believing that some individual, organisation, or force is intentionally trying to cause harm by damaging one's reputation, or causing physical injury or death (Freeman & Garety, 2000). Visual hallucinations often take the form of powerful beings (both real and mythical) or objects such as nooses or gravestones (Gauntlett-Gilbert & Kupiers, 2003; Uptegrove et al., 2016). Critical, abusive, threatening and insulting voices are also common, as are command or instructional hallucinations (Kent & Wahass, 1996; Nayani & David, 1996; Uptegrove et al., 2016). Voices can be experienced passively, thus, more than commanding an individual, they are reported have control over their day-to-day life (Uptegrove et al., 2016). Many of these commands take the form of engaging in dangerous or violent acts such as harming themselves or others (Kasper et al., 1996; Kent & Wahass, 1996). Voice

omnipotence (perceived ability to cause harm) and malevolence (perceived intention to cause harm) have been found to be significantly correlated with threat of physical harm as well as shame threats and threats of losing control (Hacker, Birchwood, Tudway, Meaden & Amphlett, 2008). While the traditional causal route (from psychosis to suicidality) interprets the threatening content of PEs as the cause of suicidality (command hallucinations to engage in SH, delusions that one needs to be punished for a wrongdoing), the Suicidal Drive Hypothesis, rather interprets this as an externalisation of the individuals own threat and jeopardised safety.

Indeed, attentional and attributional biases towards threat appear to exist among those with psychosis (Savulich, Shergill & Yiend, 2012; Underwood, Kumari & Peters, 2016). Attention to stimuli interpreted as threatening is heightened, perhaps with the goal to maintain or achieve safety from it. Slower reaction times on the Stroop test are present for individuals with persecutory delusions when naming paranoia-relevant words (Bentall & Kaney, 1989). These individuals are also better able to recall threatening information relayed to them (Kaney, Wolfenden, Dewey & Bentall, 1992). Research on these biases in delusion-prone individuals suggests that they may have an automatic bias to seek out threatening stimuli and a subsequent controlled attentional bias away from the threat, i.e., a threat vigilance – avoidance process (Green & Phillips, 2004; Green, Williams & Davidson, 2003). Such processes are likely to maintain a state of threat within the individual. Moreover, believing visual hallucinations to be a threat to physical and/or psychological wellbeing was associated with distress and lead to engagement in safety seeking behaviours relevant to the perceived threat (Dudley et al., 2012). Furthermore, Gaynor, Ward, Garety and Peters (2013) compared clinical and non-clinical subjects experiencing PEs. The clinical group was more distressed by their PEs and displayed more threat appraisals and safety-seeking behaviours than the non-clinical group. It may be possible that the clinical group represents those with the severest levels of internal threat. This threat has been externalised resulting in hypervigilance (heightened threat appraisals), distress (which may alert others to their concerning mental state) and safety-seeking behaviours, all of which aim to protect the individual from harm.

(ii) Externalising biases

Hallucinations involve attributing an external source to an internally generated event (Bentall, 1990; Frith, 1992; Larøi & Woodward, 2007). Paranoia and persecutory delusions involve the belief that other people or agencies are intentionally trying to cause harm (Freeman & Garety, 2000), passivity experiences and delusions of control also involve attributing internally-generated feelings and states to others; the individual's own thoughts, feelings and behaviours feel under an external, alien control (Frith, 2012; Frith, 1992). Therefore, on a phenomenological level, positive PEs appear to reflect processes in which an individual's internal state is projected onto an outside scenario, individual or group. For example, the governmental agency which is poisoning food, the voice commanding engagement in SH, the alien that has taken over control of one's body.

Cognitive mechanisms have been used to explain positive PEs, many of which focus on externalising. A recent review found that an externalising attributional bias (attributing negative events to others) was associated with paranoia severity in psychosis and that individuals with persecutory delusion report a greater externalising attribution bias than non-clinical individuals, depressed individuals and individuals with psychosis but without persecutory delusions (P. Murphy, Bentall, Freeman, O'Rourke & Hutton, 2018). For both clinical and non-clinical individuals experiencing hallucinations, source monitoring deficits (disrupted ability to recognise thoughts and actions as self-generated) are present. These individuals had an elevated likelihood of misattributing internally generated events to external sources compared to non-hallucination prone individuals, with moderate to large effect sizes (Brookwell, Bentall & Varese, 2013). Similarly, Waters, Woodward, Allen, Aleman and Sommer (2012) found self-monitoring was impaired in individuals with schizophrenia, particularly those who experienced auditory hallucinations. This deficit was specific to processes involving self-recognition and not recognition of new external information (Waters et al., 2012). Furthermore, experimental studies have found that individuals with schizophrenia have difficulties with source flexibility (processes used to switch attention between stimulus inside one's own head and stimulus from the outside world) and that this is related to hallucinatory experiences particularly (Laloyaux, Della Libera & Larøi, 2018). This suggests that individuals experiencing hallucination may

experience difficulties both maintaining attention either internally or externally, and difficulty switching from one process to another (Laloyaux et al., 2018). Moreover, some research suggests that individuals experiencing psychosis at a clinical level may be more likely to utilise externalising appraisals than those experiencing subclinical PEs (Brett et al., 2007).

This body of research compliments the propositions of the Suicidal Drive Hypothesis. It suggests that cognitive mechanisms by which an individual may externalise internal stimuli exist and are present and elevated in individuals experiencing PEs. From the perspective of the Suicidal Drive Hypothesis, these attributional biases and source monitoring and source flexibility ‘deficits’ may actually represent adaptive neural functioning and cognitive mechanisms triggered in cases of internal threat. They, along with other factors, facilitate the protection of the individual from the source of threat. These source monitoring deficits have been observed in those displaying positive but not negative schizotypy symptomology (Humpston, Linden & Evans, 2017); indeed they have been found to be negatively associated with negative symptoms in schizophrenia (Brébion, Gorman, Amador, Malaspina & Sharif, 2002; Stirling, Hellewell & Ndlovu, 2001). Again, this is supportive of the Suicidal Drive’s assertion that threat-laden content commonly seen in positive symptomology is associated with externalisation.

(iii) Suicidality in early psychosis

Many studies report that the greatest risk of suicide or SH is early in the condition (Nielssen & Large, 2009; Palmer et al., 2005; Pompilli et al., 2011; Ventriligo et al., 2016; Verdoux et al., 2001), with many studies finding high rates in the months preceding, and the first year after, first contact with mental health services. SA prior to contact with mental health services has been reported between 15-28% (Addington, Williams, Young & Addington, 2004; Bakst, Rabinowitz & Bromet, 2010; Barrett et al., 2010; Bertelsen et al., 2007) with a further 3% attempting suicide in the following year after FEP (Addington et al., 2004). SH is also common in the early stages, Upthegrove et al. (2010) reported that a third of their FEP sample had reported SH at baseline. Moreover, a meta-analysis and systematic review (Challis et al., 2013) concluded that engaging in SH was more common

before contact with services (18%) than after (11%). Similarly, a large proportion of individuals (39%) report SI before initiation of treatment for FEP (Barrett et al., 2010).

Two recent studies have highlighted the prevalence of early SA in psychosis. Ayesa-Arriola et al. (2015) reported that among an FEP sample of 397 individuals with a 3-year follow-up, the greatest suicide risk was during the month before and two months after first contact with psychiatric services. More than half (53%) of individuals who attempted suicide over the course of the study did so within this 3-month window; 88% of those attempting before contact did so in the previous 31 days, and for those who attempted for the first time after entering, 22% did so within the first 46 days. This study highlighted the prevalence of ‘early’ attempters. Similarly, Canal-Rivero et al. (2016) found that in a FEP sample, 29% had attempted suicide before contact with services while 31% made their first SA during the 1-year follow-up. Of those attempting after contact with services, 70% did so within the first 6 months. Therefore, more than half of the entire sample (51%) and 85% of attempts could be considered ‘early’ attempters/attempts, i.e., occurring either before contact with services or in the first 6 months afterwards. A spike in suicide risk during the first month of treatment and a rapid decline in the following 6 months has also been reported (Fedyszyn, Robinson, Matyas, Harris & Paxton, 2010). Furthermore, in a Finnish birth cohort, Alaräisänen et al. (2009) found that 50% of all death among those with schizophrenia from age 16 to 39 were due to suicide and that 71% of these suicides occurred within the first 3 years after illness onset. Nordentoft et al. (2013), similarly reported that death from external causes, including suicide were twice as likely during the first year after contact than in the next 3 years.

UHR or clinical high-risk refers to individuals experiencing attenuated psychotic symptoms, short-term PEs or declined functioning in combination with a familial history of a psychotic disorder (Taylor et al., 2015). A systematic review and meta-analysis by Taylor et al. (2015) concluded that suicidality is highly prevalent in UHR populations, 66% endorsed recent SI, 49% lifetime SH and 18% lifetime SA. These rates are similar to those with psychotic disorders suggesting that high frequency of suicidality may precede diagnosis. D’Angelo et al. (2017) found that there was a significantly higher frequency and severity of suicidal behaviour among clinical high-risk individuals and individuals

diagnosed with a psychotic disorder than non-clinical controls. Duration of untreated psychosis (DUP), the period between the onset of first psychotic symptom and initiation of treatment has been linked to suicidality in FEP (Marshall et al., 2005). Barrett et al. (2010) found that 14% of their FEP sample made a SA during the period of untreated psychosis and prolonged DUP was associated with SA during the period of untreated psychosis. Similarly, Upthegrove et al. (2010) reported that a third of their FEP sample engaged in SH at baseline, and for the majority (70%) this occurred during the DUP.

From the perspective of the Suicidal Drive Hypothesis this highlights that internal threat, in the form of SI, SH and SA is frequently present in the early stages and before onset of a clinically-significant psychotic disorder. This could suggest that PEs begin to manifest in response to the individual's threatening thoughts and behaviours towards themselves. Notably, there appears to be very little overlap between those attempting suicide before and after FEP (Addington et al., 2004; Clarke et al., 2006) and risk factors differentiating early and late attempters have been found (Ayesa-Arriola et al., 2015). This could suggest the presence of heterogeneous groups, i.e. for some psychosis may be the response to suicidality, while for others suicidality may be the response to psychosis.

However, if psychosis is acting in a defensive capacity with the aim to prolong life, the fact that many individuals engage in SA or die by suicide once the disorder has reached a clinically significant level may appear contradictory. Understandably, such an interpretation is plausible. However, it is possible that PEs may manifest in response to suicidality yet the externalisation of threat as a defensive response does not completely thwart the threat from within. Internal threat may continue to develop, becoming more and more severe, resultingly, PEs may become more severe and distressing. This may prompt concern from family and/or friends and engagement with mental health services. If the individual does not receive support to actively help them deal with their own internal threat, SA may be an outcome. Importantly, this interpretation does not necessarily consider the SA as a result of the PEs.

1.2.3. Alternative interpretations of psychosis as a defensive strategy

Notably, like the Suicidal Drive Hypothesis, previous research has also postulated that psychosis may act in a protective/defensive way. The idea of psychosis operating as a defence mechanism has its roots in psychodynamic theory. From this perspective, psychotic experiences function to alter the difficult internal and external aspects of our realities (Freud, 1894/2001; Martindale & Summers, 2013). These defences or coping strategies are involuntary, acting to reduce the adverse effects of stress (Vaillant, 2011). In this sense, they can be seen to have a “self-preservative and even a developmental function” (Martindale & Summers, 2013, p.125). The content of PEs are meaningful but the individual’s reality has been shrouded by these defensive processes, such as denial of external reality, delusional projection and distortion (Martindale & Summers, 2013; Vaillant, 1971). Melanie Klein’s (1946 as cited in Garvey, 2009) concepts of splitting and projective identification similarly entertained related ideas; good or bad parts of the self are split off from the ego and projected onto external objects/individuals. Fusion and identification of the projected parts of the self with the external object/person can, in the case of projecting ‘bad’ aspects of the self, lead the individual to perceiving the external object/person as dangerous or threatening (Klein, 1946, as cited in Garvey, 2009). Similarly, psychoanalytic interpretations of ‘dissociation’ have characterised it as a withdrawal from others and reality, serving as a defence against personal anguish and anxiety (De Masi, 2006; Steiner, 1993).

Bentall’s work (e.g. Bentall, 1990, Bentall, Kinderman & Kaney, 1994) also stipulated the idea that threat to self could be externalised as a protective mechanism which could result in anomalous experiences such as hallucinations and delusions. Bentall and colleagues (Bentall et al., 1994; Bentall, Corcoran, Howard, Blackwood, Kinderman, 2001) proposed a model of persecutory delusions, firstly, the Paranoia Defence model which was subsequently revised as the Attribution-Self Cycle model. They suggested that persecutory delusions result from attributional biases to externalise responsibility for negative events (which are threats to an individual’s self-esteem) serving to protect feelings of low self-esteem surfacing in the individual. That is, delusions aim to maintain positive self-esteem by projecting responsibility for the negative event onto an external source. While the first

iteration of this theory suggested that individuals with persecutory delusions would therefore have preserved self-esteem, the updated version suggested rather that self-esteem would be unstable in these individuals (lower implicit self-esteem and higher explicit self-esteem). A recent meta-analysis and systematic review of the topic (P. Murphy et al., 2018) concluded that although there is conflicting evidence, the results suggest that the earlier version of the model can be rejected but that there is some support for the Attribution-Self-Cycle (Bentall et al., 2001). While Bentall's model suggest that externalisation occurs to protect the individual from the emergence of negative views about themselves (in the form of low self-esteem), the current research suggest that rather, the experience of having negative views of oneself and thus the self being the source of the threat, potentially triggers a defensive response in the form of externalisations.

1.2.4. Overview of Suicidal Drive findings

J. Murphy et al. (2018) carried out two separate analyses to test the Suicidal Drive hypothesis.

1.2.4.1. Danish Registry data

Firstly, using Danish registry data (The Danish Civil Registration System and the Danish Psychiatric Central Register), a cohort of all individuals born in Denmark in 1984 ($N = 27,840$ males and $26,618$ females) was accessed. The Danish Registry system allows information on relevant variables to be assessed with permission from Denmark Statbank. Using unique individual civil registry numbers (identification not possible to researchers) individuals can be traced and tracked across various registers (see Pedersen, Gøtzsche, Møller, & Mortensen, 2006 for details). In this analysis, information from the National Patient Register and Psychiatric Nationwide Case Register was accessed and information on hospitalisation for SH or SA and psychotic disorder diagnoses (schizophrenia, schizotypal and delusional disorders) were sought. Using annual data from the registers, it could be determined how many individuals in the cohort and in what year they were diagnosed with a psychotic disorder and presented at a hospital with SH/SA. The temporal

occurrence of these phenomena was then analysed. Less than one percent (0.7%) of the cohort received a psychotic disorder diagnosis and 1.8% had a hospital or psychiatric record reporting SH/SA in their lifetime. Eighty-two (0.1%) individuals had a record of both; 31 (37.8%) of these had a record of both in the same year, 34 (41.4%) had a SH/SA record before a psychotic disorder record and 17 (20.7%) had a psychotic disorder diagnosis before a hospital record for SH/SA. This difference was statistically significant. Of the individuals who were treated for SH/SA before being diagnosed with a psychotic disorder, 38% were treated in the year before receiving the diagnosis. Of the individuals diagnosed with a psychotic disorder prior to SH/SA treatment, 82% were diagnosed in the year before hospitalisation. Thus, SH/SA preceded or occurred in the same year as psychotic disorder diagnosis in 79% of cases.

1.2.4.2. UK epidemiological data

Secondly, data from two large-scale epidemiological studies, the British Psychiatric Morbidity Survey (BPMS) and the Adult Psychiatric Morbidity Survey 2007 (APMS) were used to explore PEs in the general population and the recency and severity of suicidality. This allowed sub-clinical experiences to be investigated and thus these individuals were less likely to have been exposed to the aforementioned distress of psychiatric hospitalisation and its associated stigma and the stigma, social exclusion and hopelessness of receiving a diagnosis. Individuals with a psychotic disorder were excluded from these analyses. Past year and lifetime SI and SA were measured as well as PEs in the last year (as measured by the Psychosis Screening Questionnaire). The prevalence of PEs tended to increase in relation to both the recency and severity of suicidality with those both thinking about and attempting to take their lives in their lifetime and during the last year being a greatest risk. Regression analyses confirmed that individuals with more recent and severe suicidality exhibited a greater risk of experiencing PEs.

1.2.5. Limitations of current Suicidal Drive research

While these results offer early support for Suicidal Drive framework, the datasets analysed have individual limitations. Firstly, the Danish Registry data is an impressive prospective

cohort however, as it utilised hospital and clinical records, i.e., diagnosis of a psychotic disorder and hospital admission for suicidality, the hypotheses could not be tested at a subclinical level. If both phenomena occurred within the same year, records were not able to determine which occurred first. Furthermore, due to the life-threatening nature of suicidality, a more prompt response may be taken compared to PEs; somebody who has self-harmed will likely present at A&E within a relatively short period of time, whereas individuals may have been experiencing PEs for some time before they are in contact with mental health services and subsequently receive a diagnosis.

Conversely, the UK BPMS and APMS datasets allowed subclinical psychotic and suicidality experiences in the general population to be captured. However, its cross-sectional nature meant that temporal ordering of the phenomena could not be investigated. J. Murphy and colleagues (under review) have recently attempted to overcome some of the limitations of the previous Suicidal Drive research. Utilising the Environmental Risk (E-Risk) Longitudinal Twin Study, a nationally representative birth cohort of 2,232 twin children born between 1994-1995, the authors have sought to test the first known longitudinal bidirectional test of the PE – suicidality relationship. Cross-lagged panel modelling analysis will test the bidirectional associations between PEs and any SH or SA at ages 12 and 18.

1.2.6. Moving forward with the Suicidal Drive Hypothesis

Notably, J. Murphy et al. (2018) and Koyanagi et al. (2015a) both used the same data, the APMS, to test the relationship between suicidality and psychosis. Koyanagi et al. (2015a) examined the relationship from the orthodox perspective. Using logistic regression analysis, Koyanagi et al. (2015a) reported that PEs were associated with SI (ORs 3.22 – 4.20) and SA (ORs 3.95 – 10.23). J. Murphy et al. (2018) reported findings of a similar magnitude when investigating this relationship from the opposite perspective. For example, lifetime SI and lifetime SA were significantly associated with a range of PEs (SI ORs range 2.66 – 7.99; SA ORs range 4.32 – 22.15). The occurrence of similar effects when examining this relationship from both directionalities suggests that the Suicidal Drive Hypothesis merits further attention. Particularly, if promising results are garnered from the E-Risk study,

further consideration on how to proceed with the testing of the Suicidal Drive Hypothesis will be necessary. However, in these preliminary studies, the authors use SI, SH and SA to capture internal threat; before moving forward with future research on the hypothesis it may be beneficial to get a better understanding of this concept and whether it could encompass and manifest itself as more than suicidality.

It is also important to note that the Suicidal Drive Hypothesis does not rule out the idea that shared risk factors can play a role or that PEs may indeed causally result in someone engaging in suicidality. Indeed, based on the literature outlined previously, these mechanisms are likely to operate in certain cases. The Suicidal Drive Hypothesis, rather, suggest that the suicidality → psychosis pathway has been overlooked in the research literature despite its potentially important implications. Given the research that has been conducted so far, it is deserving of further attention.

1.3. Section Three

The Suicidal Drive Hypothesis has prompted consideration of suicidality as a risk factor, rather than solely an outcome of, psychosis. Suicidality in this case has been conceptualised as a form of internal threat. Given promising preliminary empirical evidence supporting the hypothesis, further investment in and investigation of this model is necessary. The authors have thus far restricted their conceptualisation of internal threat to suicidality, however, in order to successfully move forward with this research, consideration must be given to a broader internal threat concept. Without such a consideration, further exploration of the hypothesis and its potential clinical implications could be hindered.

1.3.1. A continuum of internal threat

Within the existing Suicidal Drive research internal threat terminology has been used to refer to suicidality. It is understandable to consider self-injurious thoughts and behaviours as internal threats; they pose a viable threat to life. However, suicidality may be insufficient alone to describe this complex phenomenon. Gilbert and colleagues have previously discussed the concept of internal threat in their work, which is rooted in evolutionary

psychology. This body of work would indeed suggest a greater potential for internal threat. Gilbert (2002) noted that “For some, the threats are external (e.g. other people); for others they are internal and come from their own feelings, thoughts and bodily processes” (p.281). Social Mentality Theory (Gilbert, 1989, 2000a, 2005; discussed in Chapter 2) proposes that humans have evolved social strategies to aid the achievement of biosocial goals such as finding a mate and protecting offspring. One of these social strategies, social rank, evolved for use in competitive situations to gain resources and status. It involves the ‘winner’ showcasing hostility and dominance while the ‘loser’ acts submissively. While these social mentalities originally evolved for use in self-other interactions, the theory proposes that humans’ abilities for complex cognitive processing (e.g. self-reflection, rumination) allow for self-other mentalities to be applied to self-self interactions. As such we can be hostile-dominant towards ourselves (e.g. through self-criticism) which triggers a threat response (e.g. submissive behaviour), just as it would if occurring in a self-other interaction. Thus, internally attacking oneself may be conceptualised a form of internal threat (Gilbert, 1989; 2000a; 2002; 2005).

Severe, suicidality-related phenomena such as SH or SA are a threat to our physiology and our life; they are akin to physical assault on oneself. However, a degree of variation is likely in that internal threat may be present before the onset of suicidality. Our self-concept can also be threatened “when favourable views about oneself are questioned, contradicted, impugned, mocked, challenged or otherwise put in jeopardy” (Baumeister, Smart & Boden, 1996, p.8). When individuals engage in self-attacking thoughts which threaten favourable self-views, for example “I’m worthless”, “I’m useless”, they are instigating a verbal assault on themselves. Thus, it may be useful to consider a broader range of self-threatening thoughts, beliefs and behaviours as internal threat. Consequently, if positive psychosis symptomology operate as a response to internal threat states, understanding at what level of severity this threat becomes externalised would be clinically and therapeutically useful. Such a broader construct may encompass self-attacking phenomena involving negative self-evaluation (NSE) alongside suicidality. This may take the form of feelings of worthlessness, inferiority, shame, low self-esteem, defeat, self-criticism, submissive behaviour, etc.

Moreover, when individuals negatively evaluate themselves, they may also, in a precursory sense, be sowing the seeds of questioning whether their life is worth living. As previously mentioned, a suicidality continuum exists in the literature manifesting as an interrelated set of phenomena which increase in severity as one moves closer to SA/death by suicide. Furthermore, NSE concepts are related to suicidality (outlined in Chapter 2). It therefore may be plausible to suggest that less severe internal threat phenomena in the form of NSE could be incorporated within the suicidality continuum, at the lower end, and that this may reflect a graded continuum of internal threat.

1.3.2. Psychosis and a broader conceptualisation of internal threat

As described in Section Two, there is evidence to support the idea that positive PEs may be a response to severe internal threat in the form of suicidality. However, if a graded continuum of internal threat is present it may be useful, and necessary, to consider whether PEs may also be reactive in some form to less severe forms of internal threat, i.e., NSE. Indeed, a range of NSE concepts have been found to be associated with psychosis/PEs: low self-esteem, negative self-beliefs, low self-confidence, self-disgust, low self-worth, self-hating, self-persecution, low social comparison, defeat, submissive behaviour and shame (Atherton et al., 2016, Birchwood, Meaden, Trower, Gilbert & Plaistow, 2000; Collett, Pugh, Waite & Freeman, 2016; Fowler et al., 2012; Freeman et al., 2005; Garety & Freeman, 2013; Gilbert, Boxall, Cheung & Irons, 2005; Gracie et al., 2007; Hutton, Kelly, Lowens, Taylor & Tai, 2013; Ille et al., 2014; Kesting & Lincoln, 2013; Lincoln et al., 2010; Matos, Pinto-Gouveia & Gilbert, 2013; Mills, Gilbert, Bellew, McEwan & Gale, 2007; Oliver, O'Connor, Jose, McLachlan & Peters, 2012; Smith et al., 2006; Taylor et al., 2010; Tiernan, Tracey & Shannon, 2014). While most of these studies examine these phenomena and their relationship with psychosis separately, Collett et al. (2016) is one of a few studies to investigate multiple negative self-concepts in the same study. They found that, compared to a non-clinical group, a clinical group experiencing persecutory delusions had lower self-compassion, low self-esteem, increased fears of being mad, beliefs of inferiority to others, negative self-schemas and low positive self-schemas. These effect sizes were large and the negative self-concepts were strongly correlated with one another.

Furthermore, similar to Fialko et al. (2006), these negative self-concepts were associated with suicidality among the clinical PE individuals.

Furthermore, the phenomenology of positive PEs is not only characterised by content regarding death or self-injury, but also NSE and depressive content. In a qualitative analysis of 100 voice hearers' voice content and characteristics (Cortsens & Longden, 2013), 98% found that the voice criticised them, 73% that the voice commanded them and 64% that the voice made threats. Moreover, the voices were frequently recognised as aspects of the hearer including disowned aspects of their personality. Underlying problems which were considered to embody the voice(s) included low self-worth and self-esteem (93%), anger (60%) and shame and guilt (60%). The role of NSE in psychosis development has also been tested empirically. Jaya, Ascone and Lincoln (2018) used longitudinal data to find a unidirectional path from negative self-schemas (NSS) to positive symptoms and bidirectional paths from NSS to negative affective and vice versa. Additionally, negative affect mediated the path from NSS to positive symptoms.

Cognitive models have noted the role of NSE in the development, maintenance and content of positive PEs. Cognitive models, such as those posed by Garety, Kupiers, Fowler, Freeman and Bebbington (2001) propose that positive symptoms of psychosis develop through cognitive and affective changes or through affective changes alone in the aftermath of a triggering event. Cognitive disturbance and dysfunction may lead to anomalous conscious experience (e.g. externalising bias, jumping to conclusions). Emotional disturbances (e.g. depression, anxiety, anger) occur in response to these anomalous experiences and the triggering event. The authors proposed that these processes are facilitated by cognitive vulnerabilities related to negative schemas of the world as dangerous and the self as vulnerable to threat. These negative schematic models may be the result of childhood trauma or social adversity. Additionally, these negative schemas can provide content for psychotic experiences (Garety et al., 2001). Commenting on cognitive perspectives on delusions, Beck and Rector (2002) note among individuals with persecutory delusions, negative thoughts of oneself are common prior to the manifestation of the delusion, with individuals typically viewing themselves as "powerless, inferior and socially undesirable" (p. 462). Again, these authors suggest that while cognitive biases

maintain a sense of vulnerability and threat, dysfunctional negative schemas contribute to the content of delusions. Similarly, regarding hallucinations, these authors suggest that internally-oriented cognition tend to provide the content for hallucinations, thus the presence of negative automatic thoughts about oneself results in derogatory content, for example hearing “loser”, “useless” and “you’re worthless” (Beck & Rector, 2003). Accordingly, negative beliefs about the self, but not others, have been found to be associated with amount and degree of negative content in voices, as well as intensity of distress associated with the voice(s) (Smith et al., 2006).

1.3.3. The context of internal threat states

If a continuum of internal threat exists, this may afford the opportunity to consider a number of clinical issues regarding risk for internal threat states. For example, what risk factors facilitate the emergence of internal threat and are there risk factors associated with transitioning from lower to higher levels of internal threat. To answer these questions, an understanding of the environments in which internal threat states flourish is needed. Moreover, if a continuum was present, it would be expected that similar risk factors would operate along the spectrum of internal threat, i.e., both NSE and suicidality.

Both traumatic experiences and social disadvantage have been proposed as factors which may erode or inhibit development of an individual’s sense of self-worth. Early trauma and adversity can affect our social, emotional and neurological development (Putnam, 2006). Traumatic experiences can disrupt the development of competencies in a number of areas and can lead to feelings of worthlessness, shame, self-blame and hostility and criticism towards oneself (Pearlman, 1997; Yates, 2004), it can disrupt our schematic models and alter our social roles and personal identities (Bertensen & Rubin, 2007). A range of negative self-appraisals have been documented following trauma, particularly that which is interpersonal, for example self-disgust (Badour & Adams, 2015). Furthermore, suicidality and trauma have been consistently linked (Stein et al., 2010; Zatti et al., 2017).

Socially adverse or disadvantageous circumstances are also associated with internal threat states. Perceptions of one’s economic standing, classism, SES, unemployment,

financial hardship, poverty and low educational attainment are associated with self-esteem, feelings of inferiority, shame, depression, etc. (Bosma, Brandts, Simons, Groffen & van den Akker, 2015; Hoebel, Maske, Zeeb & Lampert, 2017; Kraus & Park, 2014; Twenge & Campbell, 2002). Moreover, socioeconomic deprivation has also been linked to suicidality (Mossige, Huang, Straiton & Roen, 2016; Robinson et al., 2017; Wetherall, Robb & O'Connor, 2019). Social rank theory (Gilbert, 1992; Gilbert & Allan, 1998) posits that individuals in these circumstances perceive themselves at a lower status than others and resultingly feel defeated due to their failure to attain or loss of social or material resources.

Notably, as briefly discussed in Section One, these factors are also risk factors for psychosis. Meta-analyses have consistently highlighted the association between trauma and psychosis (Bonoldi et al., 2013; Trotta et al., 2015; van Dam et al., 2012; Varese et al., 2012). For example, Coughlan and Cannon (2017) found childhood trauma and adversity to be associated with non-clinical PEs and clinical psychotic disorder, with CSA in particular indicating psychosis outcomes. Trauma has been acknowledged to have a potentially aetiological role in psychosis development (Bebbington, 2009). Additionally, both low SES at birth, parental unemployment and social disadvantage have been considered risk factors for psychosis (Werner et al., 2007; Stilo et al., 2017; Shevlin et al., 2016). The Social Defeat Hypothesis for schizophrenia (Selten, van der Ven, Rutten & Cantor-Graae, 2013; discussed in Chapter 5) unifies research on this topic. It suggests that long-term exposure to social defeat, in the form of urban upbringing, migration, childhood trauma, low intelligence and drug abuse, may lead to PEs through a perception of a subordinate position or outside status. It appears therefore that socially defeating and traumatic experiences may in certain circumstances create an environment for internal threat to thrive in the form of NSE and suicidality. Given that these same environments are also considered as risk factors for psychosis, this may suggest that internal threat acts as a mediator between socially adverse and traumatic circumstances and psychosis. This compliments the Suicidal Drive Hypothesis' proposal of psychosis operating as a response to internal threat.

1.3.4. Internal threat in the diagnostic literature

Internal threat states have previously been considered in the clinical diagnostic literature. These phenomena both appear in the diagnostic criteria for and are associated with, many disorders but have not been considered as threat responses. Most obviously, these internal threat phenomena are present in depression. Negative self-schemas, reflecting a view of oneself as “defective, inadequate, diseased or deprived...undesirable and worthless” (Beck, Rush, Shaw & Embry, 1979, p.11) are central to widely accepted cognitive theories of depression (Beck et al., 1979). Moreover, suicidal thoughts and attempts are part of the diagnostic criteria for major depression (APA, 2013; WHO, 2018) and depressive disorders are strongly associated with suicidal risk (Yoshimasu et al., 2008).

Although not part of the diagnostic criteria, internal threat is commonly present in individuals with a range of mental disorder diagnoses; internal threat is transdiagnostic, present across a spectrum of mental health issues. For example, SI, SH, and SA are common among those with eating disorders (Fennig & Hadas, 2010; Svirko & Hawton, 2007). Heightened levels of low self-esteem, negative self-schemas, depression and shame, as well as fewer positive self-concepts are reported among those with eating disorders (Cooper & Turner, 2000; Gual et al., 2002; Stein & Corte, 2007; Troop, Allan, Serpel & Treasure, 2008). Furthermore, NSE has been incorporated into cognitive models of social anxiety (Clark, 2001) in that it is central in the processing of social situations. Moreover, social anxiety/social phobia has been found to be associated with shame, social rank, submissive behaviour and inferiority (Gilbert, 2000b) as well as SI and SA (Cogle, Keough, Riccardi & Sachs-Ericsson, 2009). It is clear that phenomena which tap into feelings of negative self-evaluation e.g. low self-worth, inferiority, self-criticism, defeat, etc. are present across the spectrum of psychopathology and may, alongside other factors, act in a causal capacity.

Internal threat, therefore, is transdiagnostic and present across a range of diagnoses, however, it is particularly relevant to those occurring in the context of external threat, i.e. traumatic experiences such as abuse, war, assaults, natural disasters, accidents. This is consistent with the previously discussed literature on the relationship between internal threat states and childhood trauma and social adversity. Specifically, diagnoses of complex

posttraumatic stress disorder (CPTSD) and borderline personality disorder (BPD) are characterised by features of internal threat: CPTSD criteria contains a ‘negative self-concept’ cluster (WHO, 2018), which contains information of beliefs about oneself as diminished, defeated or worthless, as well as feeling guilt, shame and failure (Maercker et al., 2013) and BPD involves a range of symptoms including SH behaviour (APA, 2013), which is extremely prevalent among this population (Goodman et al., 2017). Moreover, both of these diagnoses are considered to have a trauma aetiology: for CPTSD this is part of the diagnostic criteria and although not a prerequisite for a diagnosis, a substantial body of research evidence has also linked trauma exposure to BPD. Thus, both of these diagnoses have been framed in relation to external threat exposure but are also distinctly characterised by variation in and vulnerability for a range of internal threat states. As such, it may be meaningful to consider whether external threat response symptomology may present as, in some cases, evolving internal threat states. Interpersonal traumas, in particular, have been found to confer risk for these diagnoses (Cloitre, Garvert, Brewin, Bryant & Maercker, 2013; Westphal et al., 2013). Given that internal threat underpins CPTSD, BPD, depression and psychosis, and that these disorders are highly comorbid with one another (Frost, Hyland, Shevlin & Murphy, 2018; Frost, Vang, Karatzias, Hyland & Shevlin, 2019; Resick et al., 2012; Slotema, Blom, Niemantsverdriet, Deen & Sommer, 2018; Upthegrove et al., 2010), this may reflect a Suicidal Drive Hypothesis threat response in action.

1.3.5. Aims of thesis

In summary, this introductory chapter has led to a number of important observations. Firstly, psychosis lies on a continuum which varies from mild, non-distressing, potentially benign experiences, to those which are severe, distressing, causing social and functional impairment and requiring clinical intervention. Suicidality, a phenomenon also considered to lie on a continuum of severity, has consistently been studied as a relatively frequent and grave outcome of experiencing psychosis. This body of research reports that individuals experiencing subclinical PEs or clinically relevant psychotic disorders such as schizophrenia are at an elevated risk for thinking about taking their own lives, engaging in self-harming behaviours, with and without an intent to die, and to die by suicidal/self-

injurious means. Little consideration has been given however, to the possibility that the relationship between psychosis and suicidality may be bidirectional. Not only may individuals experiencing psychosis be at risk of thinking about or engaging in SH, but that individuals who engage with thoughts/actions of SH may also be at risk of psychosis. This is the position of the recently formulated Suicidal Drive Hypothesis (J. Murphy et al., 2018; J. Murphy et al., under review). This hypothesis has considered suicidality as a form of internal threat to which positive psychotic symptomology may be a resulting threat response. Preliminary research supports this suicidality → psychosis framework.

However, the concept of internal threat has not been adequately considered within this hypothesis. Clearly, suicidality could be understood as an internal threat, however, other variables may also fit the criteria to be considered internal threats. These less severe phenomena may be considered ‘internal attacks’ and broadly involve negatively evaluating oneself. Both ‘milder’ and ‘severe’ forms of internal threat are associated with one another, thus, there is potential that a broader spectrum from mild to severe self-threatening thoughts, feelings and behaviours may be present. Internal threat phenomena have already been considered in relation to psychosis, however, it has not previously been framed within a threat response context. Social adversity and traumatic experiences have been shown to confer risk for both psychosis and internal threat states. Additionally, a spectrum of internal threat may already be present in the diagnostic literature when considering the internal threat states present within external threat response diagnoses.

Broadly, this thesis aims to further our understanding of internal threat and how it may operate as a risk factor for psychosis using a range of analytic techniques. This thesis will comprise of two parts. Part 1 (Chapters 2, 3 and 4) will focus on the conceptualisation of internal threat, while Part 2 (Chapters 5 and 6) will focus on the internal threat – psychosis association. Specifically, Chapter 2 aims to further conceptualise internal threat by establishing the concepts that characterise it in its broadest sense and inform it meaningfully. Chapter 3 is also concerned with the context in which internal threat is likely to operate, i.e., what the risk factors and exacerbators of these internal threat states may be. Chapter 4 considers the characteristics of internal threat which reside in established psychiatric diagnoses such as BPD and CPTSD. Notably, these are external threat related

disorders and thus the potential for internal threat states to be responsive to external threats is explored. Chapter 5 examines whether internal threat states have transdiagnostic influence, as would be suggested by a range of mental health disorder models. But, more relevantly, this chapter explores whether this extends to psychotic disorders and subclinical PEs. If a spectrum of internal threat is present, one might consider the point, along this spectrum of severity, at which psychosis risk would be conferred. Chapter 6 attends to the expression of psychosis within different levels of severity of internal threat. If psychosis was a response to internal threat, in what context might this be expressed and, when expressed, how might this manifest? Exploring these issues raises a number of theoretical, clinical and research implications. These are discussed in detail in the final chapter of this thesis, Chapter 7. In conclusion, this body of research aims to further develop the concept of internal threat as discussed in the Suicidal Drive hypothesis. This thesis will not specifically test for a bidirectional association between internal threat states and psychosis. It will, however, provide the foundations for further analyses such as this to be conducted.

Chapter 2

The dimensional structure of internal threat in the general population

The analysis from the current study was submitted for peer review publication and was successfully accepted: Butter, S., Shevlin, M., & Murphy, J. (2018). Negative self-evaluation and the genesis of internal threat: Beyond a continuum of suicidal thought and behaviour. *Psychological Medicine*, 1-9. doi:10.1017/S0033291718003562

Background and research aim: Self-injurious thoughts and behaviours have been considered to exist on a continuum of suicidality. The content of this continuum has been conceptualized as ‘internal threat’ within the recently proposed Suicidal Drive Hypothesis. However, internal threat may originate in forms other than suicidality. Evolutionary psychopathology models have considered negative internal signals, such as self-critical thoughts, as stimulants of our threat defence system also. Thus, internal threat may be reflected by more than suicidality exclusively. Moreover, research suggests that these negative internal signals, referred to as negative self-evaluation (NSE), are highly associated with and may precede suicidality. Therefore, it may be plausible to suggest an extension to the suicidality continuum whereby NSE is incorporated at the lower end. This wider array of internal threatening thoughts, feelings and behaviours may reflect a graded continuum of internal threat states in the general population. Therefore, as an initial investigatory step, the dimensionality of internal threat phenomena was examined.

Method: Key indicators of internal threat were harvested from the British Psychiatric Morbidity Survey (BPMS) dataset (N = 8,580). Latent variable modelling was used to assess dimensionality. Specifically, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted to identify the dimensional structure of internal threat in the general population. Models were compared in order to find the best-fitting model.

Results: Firstly, EFA of 50% of the sample revealed good fit for both 4- and 5-factor models. This was confirmed using CFA of the remaining 50% of the sample, however, the 4-factor model exhibited marginally better fit in this instance. Analysis of the full sample similarly identified the 4-factor correlated model as the best fit of the data when compared to unidimensional, second-order and 5-factor models. These factors were considered to represent (1) low self-worth and subordination, (2) depression, (3) suicidal thoughts and (4) self-harming behaviours. Factor correlations ranged between 0.47 and 0.71.

Conclusion: The factor analysis results indicated that, at a population level, the items identified as potential manifestations of internal threat were best represented by a correlated 4-factor structure. Distributional and epidemiological validity were partially indicated, suggesting the potential for these factors to represent a continuum. These findings promote

further investigation of the emergence, presence and evolution of internal threat within the general population.

2.0. Introduction to Chapter 2

The primary aim of this chapter was to examine the dimensional structure of internal threat. Since it has been suggested that internal threat may be expressed in other, potentially less severe forms (other than suicidality), identification of these forms was firstly necessary. Moreover, establishing whether these less severe forms of internal threat could, together with suicidality, reflect a dimensional structure potentially suggestive of a continuum of internal threat was an important analytic step. Given the broader aims of this thesis, to examine how psychosis varies in relation to internal threat, investigation of the dimensional structure of internal threat was necessary before considering psychosis expression in relation to this threat.

2.1. Suicidality

The Suicidal Drive Hypothesis (Murphy et al., 2018; Murphy et al., under review) focuses on suicidality as its conceptualization of internal threat. As briefly outlined in Chapter 1, suicidality is an umbrella term which is used most commonly to refer to experiences of suicidal ideation (SI), suicide attempt (SA) and death by suicide. However, the clinical utility of the term has been questioned; its use in clinical research literatures has been criticized as impeding knowledge by reporting on a general ‘suicidality’ phenomenon rather than individual SI, SA, etc. outcomes (Silverman, 2016). Therefore, it is important to note a number of points regarding the use of the term within this body of work. Firstly, the purpose of using the term in this thesis is not to amalgamate these individual phenomena into one general construct, but rather to simplify the discussion of multiple phenomena. It is acknowledged that these are independent but related phenomena; use of the term is for communicative purposes only.

Furthermore, the term has not been used consistently (Silverman, 2016), however, in most cases, authors use the term to refer to ideation, plans, attempts and death by suicide (e.g. Epstein & Spirito, 2010; King & Merchant, 2008). However, others have included self-harm (SH) in their definition (e.g. Dunster-Page, Haddock, Wainwright & Berry, 2017; Wong, Besag, Santosh & Murray, 2004). Given that this thesis is interested in the

conceptualization of internal threat and previous Suicidal Drive research has included SH behaviour in its conceptualization of internal threat (J. Murphy et al., 2018; J. Murphy et al., under review), it was therefore included within the definition of suicidality in this body of work. Therefore, ‘suicidality’ is used in this thesis to refer to SI, SH and SA, with these phenomena representing the severe manifestation of internal threat.

2.1.1. Prevalence of suicidality

Suicidality is common in the general population, particularly among adolescents and young adults. Large scale international studies have reported lifetime prevalence of SI to be 9.2%, 3.1% for suicide plans and 2.7% for SA (Nock et al., 2008). Similarly, Casey et al. (2008) found, in their study of 12,000 general population Europeans, that the overall prevalence of SI was 9.5%, however, this varied drastically depending on study site. Less extreme thoughts, such as thoughts about death or dying were found to be approximately twice as common as seriously considering suicide in an Australian community sample (De Leo, Cerin, Spathonis & Burgis, 2005). Studies investigating SI in young adult samples have reported substantially higher rates; Mortier et al. (2018) reported a lifetime prevalence of SI at 22.3% in their study.

Although less common than SI, a substantial proportion of the population engage in self-harming behaviours. A meta-analysis on this topic (Swannell, Martin, Page, Hasking & St. John, 2014) concluded that the prevalence of SH varied by age: adolescents (17.2%), young adults (13.4%) and adults (5.5%). A higher prevalence is reported among clinical samples (Jacobson & Gould, 2007). Similar to Nock et al. (2008), several other general population studies have reported prevalence of SA at approximately 2.7% (Bertolote et al., 2005; Müller, Claes, Smits, Brähler & de Zwaan, 2016). Again, this is higher among young people (approximately 3.2%; Mars et al., 2014; Mortier et al., 2018) and in adolescent clinical samples (35%; Jacobson, Muehlenkamp, Miller & Turner, 2008) Substantial cross-cultural variation in these experiences is noted (Bertolote et al., 2005; Ghazinour, Mofidi & Richter, 2010; Nock et al., 2008).

2.1.2. The suicidality continuum

As mentioned in Chapter 1, it has been suggested that these suicidal and self-harming thoughts and behaviours may exist on a continuum of suicidality (Paykel, Myers, Lindenthal & Tanner, 1974; Stanley, Wichel, Molcho, Simeon & Stanley, 1992; Sveticic & De Leo, 2012) which encompasses the more ‘mild’ suicidal phenomena (e.g. thoughts of death and dying, SI) anchored at the lower end and more extreme and dangerous experiences at the upper end (e.g. SA), with increasing severity of experience as one moves through the continuum.

2.1.3. Research supporting the suicidality continuum

It is clear that there is a robust relationship between these experiences, both intuitively and empirically. Sveticic and De Leo’s (2012) review highlight some of the key studies supporting and contesting the suicidality continuum. Firstly, SH, SI and SA share many risk factors including depression, anxiety, substance abuse, hopelessness, impulsivity, sexual abuse, physical violence, bullying, low self-esteem, female gender, family/friend SH, posttraumatic stress disorder (PTSD), borderline personality disorder (BPD) and externalizing behaviours (Andover, Morris, Wren & Bruzzese, 2012; Fox et al., 2015; Grandclerc, De Labrouhe, Spodenkiewicz, Lachal & Moro, 2016; Mars et al., 2014; May & Klonsky, 2016; Nock et al., 2008; ten Have et al., 2009; Wichstrøm, 2009). Furthermore, the suicidality continuum can be showcased through the frequency and distribution of items. In general, a skewed distribution is present whereby the less severe items are endorsed more frequently while the more severe items (those which have more extreme outcomes) are endorsed less frequently, i.e., decreasing frequency with increasing severity.

This distribution has been replicated over a diverse range of samples (Bebbington et al., 2010; Bertolote et al. 2005; Dhingra, Boduszek & Klonsky, 2016; Ghazinour et al., 2010; Nock et al., 2008; Paykel et al., 1974; Scocco & De Leo, 2002). For example, Ghazinour et al. (2010) found that in an Iranian sample, thoughts of death were endorsed most frequently in the previous year, followed by life weariness, death wishes, SI, suicide plan and finally SA. High rates of co-occurrence were found between these thoughts and

behaviours and those that were considered to be the next most severe. This finding, however, was not as robust regarding the relationship between suicide planning and attempt; this could be the result of the substantial increase in severity from plan to attempt, the societal and cultural norms associated with sample and the exclusion of a SH related item in the study. Similarly, Bebbington et al. (2010) using a large general population sample, the British Psychiatric Morbidity Survey (BPMS), found that three separate measures of suicidal thoughts: life weariness, death wishes and specific SI were closely related to one another. The least extreme, life weariness, was most common and most likely to occur in isolation. The authors suggested a “credible path” was present from life weariness to death wishes and SI having investigated the frequency and recency of these thoughts (Bebbington et al., 2010, p.430).

Moreover, these experiences seem to be temporally associated. In an Australian community sample, De Leo et al. (2005) reported that over 99% of suicide attempters planned or experienced SI before their attempt. Additionally, over 50% of individuals reporting SI or SA experienced all levels of ‘less severe’ thoughts and behaviours preceding their most severe experience (e.g. life not worth living, seriously considered suicide, planned suicide). A recent meta-analysis (Ribeiro et al., 2016) reported that SI increased odds of future SI, suicide plans, SA and death by suicide. Transition rates from ideation to more severe experiences have also been shown to support the suicidality continuum. Kessler, Borges and Walters (1999) reported that in the National Comorbidity Survey, transition rates from ideator to planner were 34%, planner to attempter were 72% and ideator to unplanned attempter were 26%. Similar results were observed in a large metropolitan Chinese sample (Lee et al., 2007). Cessation of SH (regardless of intent) reduces risk for later suicidal thoughts and behaviours (Koenig et al., 2017). Additionally, Thompson, Dewa and Phare (2012) reported that lower age of onset of an individual’s first death wish was associated with increased severity of suicidal intent (i.e. progression along the suicidality continuum), independent of depression.

Non-suicidal self-injury (NSSI), a subtype of SH typically researched in US-based studies, has also been found to prospectively predict elevated SI, suicide plans and SA, even when controlling for depressive symptoms, previous suicidality and common mental

disorders (Guan, Fox & Prinstein, 2012; Hamza & Willoughby, 2016; Kiekens et al., 2018; Ribeiro et al., 2016). Additionally, NSSI has been found to predict first onset SI among college students (Mortier et al., 2017). NSSI was also associated with elevated risk of transitioning from SI to plans and from plans to SA (Kiekens et al., 2018). NSSI was found to be the strongest predictor of first time SA among adolescents with SI (OR= 2.78) in a prospective cohort study (Mars et al., 2019). Studies on military veteran samples have reported history of NSSI as a stronger predictor of future SA than a history of SA (Bryan, Rudd, Wertenberger, Young-McCaughon & Peterson, 2015). Moreover, among this population, SI emerged before NSSI (67%) more often than the reverse (17%) and NSSI emerged before SA (91%) more often than the reverse (9%) (Bryan, Bryan, May & Klonsky, 2015). These authors suggest that NSSI may serve as a ‘stepping stone’ from SI to SA in approximately 40% of cases. Similarly, using a clinical adolescent outpatient sample, Glenn et al. (2017) reported that, on average, SI occurred before onset of NSSI. It appears that there is a robust association between these phenomena and it is possible that the temporal association may differ between individuals, i.e., NSSI may precede SI or SI may precede NSSI.

Due the definitional stipulation of NSSI, that is, it is deliberate self-injury in the absence of an intent to die, its inclusion in discussion of a continuum of suicidality may be questioned. Although important differences do exist between engaging in SH with and without suicidal intent (Brausch & Gutierrez, 2010; Muehlenkamp & Kerr, 2010) a number of similarities exist between NSSI and SA as outlined above. Therefore, some researchers have argued that self-injurious behaviours, regardless of intent, should be considered on a continuum (Kapur, Cooper, O’Connor & Hawton, 2013). Kapur and colleagues (2013) highlighted a number of important points on this matter. Firstly, they argued that the prefix is misleading due to its strong association with SA; engagement in NSSI while experiencing suicidal thoughts is common (Klonsky, 2011). Moreover, when engaging in self-injurious acts, many individuals report being ambivalent as to whether they lived or died (Hawton, Cole, O’Grady & Osborne, 1982). Additionally, motivation/intent can change between and within episodes of self-injury (Cooper et al., 2011). Stanley et al. (1992) included both suicidal and self-mutilative (defined in that study as self-injury without an intent to die) behaviours in their conceptualization of the continuum. The

authors suggest that they are manifestations of the same underlying biological and or psychological characteristic which they suggest may be impulsive aggression towards oneself (Stanley et al., 1992). They state that “While suicidal behavior appears to be the most severe form of self-harm, self-mutilation can be viewed as a less serious form of self-harm as a result of the lack of intent to die and less serious consequences” (p.153).

2.1.4. Research opposing the suicidality continuum

Importantly, these supposed continuum-based phenomena can also be distinct; they do not always precede or co-occur with one another. For example, SA can occur in the absence of SI or suicide planning (Bertolote et al., 2005) and a number of unique risk factors have been identified (Mars et al., 2014; Wichstrøm, 2009). Although De Leo et al. (2005) found supportive evidence for the suicidality continuum in their Australian community study, they also note that despite the majority of the sample having experienced all previous levels of suicidality preceding their most severe experience, this cannot be taken as explicit evidence for a continuum, it “does not imply that this happened in a progressive crescendo of severity” (p.221). Other studies have reported that only small proportions of individuals who attempt suicide have a linear pattern consistent with increasing severity of suicidality before an attempt (Wyder & De Leo, 2007). Further, rather than a continuous progression towards SA, retrospective reports of development of suicidality suggest that they may be better conceptualize as fluctuations in these experiences culminating in a SA (De Leo et al., 2005; Wyder & De Leo, 2007). Additionally, some SAs are considered impulsive, with a variety of factors being used to describe such an attempt. For example, a SA may be considered impulsive if there is only a brief time interval between ideation/plan and attempt, lack of thought in conceiving the act and/or lack of preparatory steps, absence of a suicide plan over the individual’s lifetime as well as other criteria (Rimkeviciene, O’Gorman & De Leo, 2015). Due to these definitional issues, it is difficult to determine what proportion of SAs are impulsive. As illuminated by Wyder and De Leo’s (2007) study, understanding progression to SA and conceptualizing it as continuous or not is fraught with issues.

2.2. Broadening the suicidality continuum

Traditionally, research on the suicidality continuum has used SI (passive or active) as a starting point and SA or completed suicide as an end point. However, it is unlikely that the pathway to SA begins with thoughts of death/dying or thinking about taking one's life. As such, there is potential to consider whether the documented suicidality continuum extends beyond its current boundaries of extreme self-injurious thoughts and behaviours. Given that the Suicidal Drive Hypothesis considers suicidality as a form of internal threat, it may be worthwhile to consider whether a more inclusive, wider array of internally threatening thoughts, beliefs, feelings and behaviours, less severe in nature, may precede suicidality. This extended suicidality continuum may therefore represent a continuum of internal threat. If this was the case, it would suggest the need for the Suicidal Drive Hypothesis to include these additional internal threat phenomena in future testing of the hypothesis.

As outlined in Chapter 1, internal threat can be discriminated from external threat. As described by Gilbert (2002) “for some, the threats are external (e.g. other people); for others they are internal and come from their own feelings, thoughts and bodily processes” (p.281). Indeed, Gilbert has considered the concept of internal threat extensively in his research on evolutionary processes underlying psychological distress. In particular, Social Mentality Theory outlines the mechanisms by which internal threat may arise and result in internally attacking oneself.

2.2.1. Social Mentality Theory

Social Mentality Theory (Gilbert, 1989; 2000a; 2002; 2005) proposes that humans have evolved strategies to help achieve biosocial goals necessary for survival, for example, gain status, find a mate or protect offspring. Social mentalities “generate *patterns* of cognition, affect and behaviour into meaningful sequences that allow for the enactment of social roles” (Gilbert, 2000a, p.120). Thus, cognitive, emotional and behavioural processes are organised into packages which predispose us to act in particular ways in certain socially-motivated, self-other interactions. The main social mentalities as outlined by Gilbert (1989; 2000a; 2005) are: care eliciting, care giving, formation of alliances (co-operation), social

rank (hostile-competitive) and sexual. Thus, our social mentality when we are caring for someone (attention to the object of care, suppression of aggression, feelings of sympathy, empathy and affection) is very different to our social rank mentality (threats and derogation attacks of shaming and put-downs; Gilbert, 2000a).

While these processes evolved to aid the process of relating to others to further chances of survival and acquire resources, they can also be utilised in our self-to-self relating (Gilbert, 1989; 2000a; 2002; 2005). Humans' capabilities for complex higher-order cognitive processing such as metacognition, self-reflection, self-awareness, theory of mind, mentalising, imagination, rumination etc. enable us to understand our minds and social contexts differently from other animals (Gilbert, 2015a; 2015b). These evolved abilities give us insight and self-consciousness and have many benefits; however, they also allow us to apply our social mentalities inwards which can be detrimental to our mental health. Thus, the social role relationships of caring-cared for, dominant-subordinate, etc. can be a source of self-relating (Gilbert, 1989, 2000a; 2002; Gilbert & Irons, 2005)

Our brains have evolved to be highly attuned to threat (Woody & Szechtman, 2011). These threats may come from other people or situations and, when identified by our threat detection system, trigger an array of neurobiological processes, including activation of the hypothalamic-pituitary-adrenocortical (HPA) axis, designed to prepare ourselves to respond to the potential threat (Woody & Szechtman, 2011). However, just as our brains can detect and respond to threat coming from an external source (e.g. a man wielding a knife at you), threat coming from an internal signal (e.g. imagining a man wielding a knife at you) will similarly be detected and produce a response, particularly if the internal signal is based on a previous experience (Lee, 2009). Thus, a hostile-dominant social mentality applied in a self-to-self relationship can take the form of self-critical self-attacks which are perceived as threatening and trigger a response (Gilbert 2000a; Gilbert & Irons, 2005; Gilbert & Procter, 2006). For example, just as we may call an enemy or subordinate derogatory names ("you're stupid", "you're worthless"), we can also direct these inwards; the threat response that is triggered may activate fight, flight or submissive responses, etc. (Gilbert, 2000a; Gilbert & Irons, 2005). Notably, self-critical thinking has been found to be associated with activity in the lateral prefrontal cortex and dorsal anterior cingulate regions of the brain

which are linked to error processing and resolution and behavioural inhibition (Longe et al., 2010).

As Gilbert (2000a) summarises: “the proposition is that our own evaluations can (1) act as internal signals which have the same or similar effects as external signals, (2) negative internal signals (self-criticism) can, under some conditions, activate brain systems that evolved to cope with attacks such as submissive and defeat behaviours”. This type of self-to-self relating is particularly problematic for individuals who do not have the ability to have compassion for oneself and self-soothe; self-compassion is important for our wellbeing (Barnard & Curry, 2011) and self-attacking is involved in many forms of psychopathology (Gilbert, 2002). Compassion-focused therapy (CFT) has been developed with the aim of helping individuals replace their internalized dominating-attacking style which activates submissive responses with caring and compassionate self-warmth (Gilbert & Procter, 2006).

2.3. Manifestations of internal attacks

In his work on self-attacking, Gilbert has focused mainly on the constructs of self-criticism and shame. However, other related constructs are present within the research literature which may also capture the manifestation of this less severe form of internal threat, i.e., self-attacking. A hostile, attacking, derogatory internal relationship with oneself may be reflected in a range of concepts related to negatively evaluating oneself, i.e., negative self-evaluation (NSE). A description of these interrelated constructs is outlined below, although this is not an exhaustive list. Rather, it is an outline of some constructs that are present in the literature that represent manifestations of self-attacking, as well as how these constructs are associated with suicidality.

2.3.1. Self-criticism

Self-criticism is a form of internal interaction with oneself characterized by an attacking and/or harassing nature which can become ingrained in our personal identity (Gilbert,

2004). Self-critical individuals are harsh on themselves, they self-scrutinize, feel unworthy and inferior, they strive for perfection and fear disapproval and criticism from others (Blatt & Zuroff, 1992). Self-criticism has an adaptive function; it can be used in a self-improving capacity helping us to stop making mistakes and avoid shame. This is only designed for short-term use however, if self-criticism is frequently used in an individual's inner dialogue it can be distressing and maladaptive. The function can begin to punish and destroy parts of the self (Gilbert & Procter, 2006).

Indeed, Gilbert, Clarke, Hempel, Miles and Irons (2004) analysed the forms and functions of self-criticism, finding three forms: the self as inadequate and inferior, feeling hatred towards the self and an inability to self-reassure, and two functions: to self-correction and to self-persecute by punishing oneself for wrongdoing or self-dislike. Form and functions were moderately to strongly correlated with each other and depression. Moreover, all forms of self-criticism independently predicted depression. Indeed, self-criticism has been conceptualized as a vulnerability and subtype of depression (Blatt & Zuroff, 1992). The combination of high self-criticism and low self-compassion is highly associated with depression, even when controlling for perfectionistic beliefs and cognitions, rumination and overall adaptive emotion regulation (Ehret, Joormann & Berking, 2015). Furthermore, each of the forms and functions significantly correlate with shame, feelings of inferiority and submissive behaviour (Gilbert et al., 2010).

These forms and functions of self-criticism are also correlated with SH, particularly self-persecution (Gilbert et al., 2010). Even when controlling for the other forms and functions, self-hatred and self-persecution significantly correlated with anxiety, depression and SH; self-persecution was also the only variable to significantly contribute to the variance in these variables in a regression model. These results indicated that it is the more severe forms and functions of self-criticism that are linked to SH and negative affect. Similarly, Xavier, Pinto-Gouveia, Cunha and Carvalho (2016) reported that the 'hated self' form of self-criticism was strongly associated with NSSI in an adolescent sample, both directly and indirectly through depressive symptoms. It is proposed that self-criticism and self-hatred remove barriers to SH by lowering the desire to avoid harm/pain (Hooley, Ho, Slater & Lockshin, 2010). Indeed Hooley et al. (2010) found that in an experimental study

of pain perception, pain endurance was predicted by more negative beliefs about oneself and a highly self-critical cognitive style (related to beliefs of being bad, inferior, lack of worth and deserving of suffering) was the best predictor of prolonged pain endurance. Moreover, self-critical individuals showed better mood improvements after engaging in pain endurance tasks (Fox, O’Sullivan, Wang & Hooley, 2019). However, improving self-worth has been found to decrease pain endurance among those who engage in NSSI (Hooley & St. Germain, 2014a). Furthermore, among individuals who have attempted suicide, there was greater lethality and intent to die among self-critical individuals (Fazaa & Page, 2003). O’Connor’s (2007) systematic review concluded that self-critical evaluations are related to suicidality.

2.3.2. Shame

Shame is a complex self-conscious feeling characterized by self-reflection and self-representative thinking. It is both internal and external; “external shame arises from believing and experiencing a negative view of self in the minds’ of others; that others devalue or look down on the self. Internal shame is related to negative self-evaluations and seeing the self as unattractive, inadequate, bad, or flawed. Thus, shame can involve a range of experiences that can include self-conscious feelings of inferiority, a sense of self being flawed, and being self-critical” (Gilbert et al., 2010, p.565). Accordingly, self-critical/self-attacking thoughts are those that are internally shaming. Moreover, both types of shame, internal and external, are highly correlated (Goss, Gilbert & Allan, 1994).

Humans are competitive and have a need to prove themselves as desirable and socially attractive, striving to not be rejected by others and endure the resulting inferiority (Gilbert, 1992; 2004; Gilbert, McEwan, Bellew, Mills & Gale, 2009). Evolutionary psychology therefore posits that shame is related to the detection of social threats. Shame is believed to be related to the involuntary submissive behaviour as a result of such social threats and can be seen in part as a self-protective defence strategy (Gilbert & McGuire, 1998). It is associated with a range of NSE-related variables such as social rank, rumination, poor social comparison, submissive behaviour, low self-esteem and the forms and functions of self-criticism: feeling inadequate, self-hatred, poor self-reassurance, self-

correction and self-persecution (Cheung, Gilberts & Irons, 2004; Gilbert, 2000b; Gilbert et al., 2004; Gilbert et al., 2009; Gilbert et al., 2010; Rüsçh et al., 2007). As well as this, it is associated with depression (Cheung et al., 2004) and predictive of depression prospectively (Andrews, Qian & Valentine, 2002). Further, depression vulnerability is thought to stem from strong feelings of inferiority, triggered by shame and feeling defeated (Gilbert, 1992). External shame is a strong predictor of striving to avoid inferiority and it also mediates the relationship between striving to avoid inferiority and depression (Gilbert et al., 2009).

Moderate correlations have been reported between shame and SH (Gilbert et al., 2009; Gilbert et al., 2010), yet it was not found to significantly predict SH in a regression analysis (Gilbert et al., 2010). Xavier et al. (2016) found that adolescents with external shame had higher levels of depression and more frequent NSSI than those who did not. Moreover, shame proneness (experiencing shame in a trait-like manner) was found to be associated with NSSI beyond other negative emotions in a college sample (Wielgus, Hammond, Fox, Hudson & Mezulis, 2019), and was associated with NSSI via self-attacking (Mahtani, Hasking & Melvin, 2018). In a sample of traumatized individuals, several schemas were related to SI and planning, including the defectiveness/shame schema. However, only two schemas were associated with attempted suicide in the sample, one of which was defectiveness/shame (Dutra, Callahan, Forman, Mendelsohn & Herman, 2008). Overall, although it has not consistently supported (Wiklander et al., 2012), much of the empirical as well as clinical and anecdotal evidence points to support for suicidal behaviours motivated by shame (Fullagar, 2003; Lester, 1997; 1998).

2.3.3. Low self-esteem

Self-esteem, being one of the most well-known psychological constructs, is more commonly thought of in regards to NSE. It is defined as how individuals generally feel about themselves, how they appraise and evaluate their abilities and is related to feelings of self-worth (Brown, Dutton & Cook, 2001). Measures of self-esteem correlate moderately with those of self-criticism (Abela, Webb, Wager, Ho & Adams, 2006; Dunkley & Grilo, 2007). Furthermore, longstanding research has documented a relationship between low self-esteem and suicidality. McGee and William's (2000) longitudinal study of children and

adolescents found low global self-esteem predicted a range of health compromising behaviours including eating problems and SI. Both self-based self-esteem (beliefs about oneself) and other-based self-esteem (others' beliefs about oneself) were negatively associated with SI after controlling for depression and hopelessness in psychiatric outpatients (Bhar, Ghahramanlou-Holloway, Brown & Beck, 2008). Additionally, in a prospective adolescent study, Garisch and Wilson (2015) used cross-lagged panel modelling to show that better self-esteem at baseline assessment predicted lower risk of engagement in NSSI approximately five months later.

2.3.4. Guilt

Shame and guilt have historically been widely recognized as intertwined concepts and attempts to differentiate and disentangle them have been plagued by complications (Tangney & Dearing, 2002). Lewis's (1971) seminal work claimed the difference between these experiences lay in the role of the self: shame has a direct focus on negatively evaluating oneself whereas guilt is more occupied with negative evaluation of the behaviour or situation one has engaged in/with. Guilt experiences were therefore believed to be less painful than shame, as guilt experiences are somewhat distanced from the individual (Lewis, 1971). Lewis's distinction between shame and guilt has been supported by empirical research, however, they do co-occur in many instances (Tangney & Dearing, 2002).

Despite 'inappropriate guilt' being listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM) as criteria for a diagnosis of major depressive disorder (American Psychiatric Association [APA], 2013), guilt has been found to only correlate with depression in the presence of shame, providing no unique contribution (Orth, Berking & Burkhardt, 2006; Webb, Heisler, Call, Chickering & Colburn, 2007). Therefore, guilt appears to be less pathogenic than shame, its shared variance with shame contributing to much of its association with psychopathology (Tangney, Wagner & Gramzow, 1992). The evolutionary nature of guilt is also proposed to be less self-focused and instead focused on avoiding harming others, thus Gilbert (2003) suggests that guilt is not rooted in "threat to self" or activation of defences (p.1206).

However, Gausel and Brown's (2012) review of the literature suggests that there is a NSE component to guilt which is linked to self-punishment and self-anger; their study highlights that the guilt-behaviour, shame-self distinction between the emotions may not be as straightforward as suggested. Moreover, when opportunities to resolve guilt do not arise, through pro-social behaviour for example, self-punishment can occur (Nelissen & Zeelenberg, 2009). Moreover, studies on veterans and military personnel have found strong associations between guilt and SI; Bryan, Morrow, Etienne and Ray-Sannerud (2013) reported both guilt and shame to be independently associated with SI controlling for depression and PTSD and they fully mediated the depression-PTSD relationship. Interestingly, when considered simultaneously, only guilt was significantly associated with SI in this military sample.

2.3.5. Worthlessness

Feelings of worthlessness are considered as part of the diagnostic criteria for depression (APA, 2013) and cognitive theorists have claimed that it is a central aspect of the condition (Beck, Rush, Shaw & Emery, 1979). Thus, the majority of the literature on worthlessness has focused on feelings of worthlessness in relation to depression. A recent study by Zahn et al. (2015) explored self-blaming emotions in individuals with remitted major depression and no lifetime Axis 1 comorbidity. Self-blaming emotions were very common (>80%). Feelings of inadequacy and worthlessness co-occurred closely with depressed mood and hopelessness, creating a consistent set of symptoms for <90% of the sample. Just under half of the sample (46%) reported self-disgust/contempt, more than guilt (39%), shame (20%) or anger/disgust at others (26%). Guilt and self-disgust were strongly related and were most associated with core depressive symptomology. These feelings of inadequacy, self-blame and worthlessness were reported as distressing by most individuals (85%). Among symptoms of depression, 'feelings of worthlessness' had the strongest association with meeting criteria for a diagnosis in future (Murphy et al., 2002). Furthermore, among individuals who have experienced a major depressive episode in which they attempted suicide, feelings of worthlessness during the episode was the only significant predictor of SA post-remission, after controlling for previous SA (Wakefield & Schmitz, 2016).

2.3.6. Defeat

Many of the constructs previously described are part of the diagnostic criteria for depression, e.g. guilt, worthlessness (APA, 2013) while others have been found to be strongly related to depression in the research literature, e.g. shame, self-criticism, etc. Indeed, individuals experiencing depression tend to view themselves as inferior to others, feel shame and engage in submissive behaviour (Gilbert, 1992; Allan & Gilbert, 1997; Gilbert, 2000b; Beck et al., 1979). Accordingly, defeat is a closely related concept used frequently in the depression literature which refers to a sense of a failed struggle and losing rank (Gilbert & Allan, 1998). Along with loss of resources and experiencing hostile behaviours from others, internal self-attacks of one's inferiority, failure, worthlessness, etc. can induce perceptions of defeat (Gilbert, 2014b; Sloman, Gilbert & Hasey, 2003; Sloman, 2014).

Depressive states may function as a form of involuntary submissive behaviour which occurs when an individual recognizes that defeat in social competition is inevitable. Depressive states down-regulate behaviour to prevent appearing as a challenge/threat to the dominant other and to keep a low profile, thus further potential harm (e.g. failure, punishment) is avoided (Gilbert, 1992; Gilbert & Procter, 2006; Sloman et al., 2003). Affect may also be regulated to inhibit aspirations of success (Sloman et al., 2003). Thus, depressive states (e.g. low mood, social withdrawal) may be adaptive in some situations. Individuals may be motivated to escape from their defeated, submissive state, however, they may not have the ability to do so (e.g. due to lack of resources). In this case, 'arrested flight', perceptions of entrapment arise (Gilbert, 1992; 2001; Sloman, 2014; Gilbert & Allan, 1998). Rumination on these feelings of defeat and entrapment, without an apparent solution, may trap an individual in a state of chronic stress arousal (Gilbert, 2001). Defeat has been found to be strongly associated with depression even when controlling for hopelessness (Gilbert & Allan, 1998). These concepts have also been integrated into theories of suicidality. Baumeister (1990) posited that suicide may result from the desire to escape from the self-awareness of one's inadequacies, failures and the accompanying negative affect. Entrapment has been found to moderate the relationship between defeat and

SI (Rasmussen et al., 2010). Additionally, SH, even that without suicidal intent, has been conceptualized as stemming from a wish to escape from an unbearable internal situation (Williams, 2001). Furthermore, in the first longitudinal study on the subject, people reporting higher levels of defeat became more suicidal over a 12-month period even when controlling for baseline suicidality and depression. The reverse relationship, where suicidality leads to greater feelings of defeat and entrapment was not supported (Taylor, Gooding, Wood, Johnson, Tarrier, 2011).

2.3.7. Self-disgust

Self-disgust has recently received attention for its role in psychopathology (Alanazi, Powell & Power, 2015; Badour & Adams, 2015; Fox, Grange & Power, 2015; Ille et al., 2014) and has been linked to traumatic experiences, particularly those which are sexual in nature (Badour & Adams, 2015). While some have equated self-disgust to a component of self-criticism (Gilbert et al., 2004), others have conceptualized it as a more complex, ‘emotion schema’ (Powell, Simpson & Overton, 2015) which incorporates elements of, but is a unique form of self-criticism. Dysfunctional self-disgust has been considered as “a maladaptive and persistent, self-focused generalization (or internalisation) of the otherwise adaptive disgust response” (Powell et al., 2015, p.4). Disgust is a basic emotion which has evolutionary roots in avoidance of disease and contamination, when applied inwards it can be particularly maladaptive if directed towards a feature that is significant to one’s self-concept (Powell et al., 2015).

A recent review of the concept supported the idea that it is distinct from other negative self-referent emotions like shame, guilt and self-hatred (Clarke, Simpson & Varese, 2019). Nonetheless, it is strongly associated with these emotions as well as self-criticism, self-hatred and mental contamination (Powell et al., 2015). Self-disgust has been found to partially mediate the relationship between dysfunctional negative cognitions about oneself, the world and the future and depressive symptomology (Overton, Markland, Taggart, Bagshaw & Simpson, 2008; Simpson, Hillman, Crawford & Overton, 2010). Furthermore, it fully mediated the relationship between depressive symptoms and NSSI and

partially mediated the relationship between sexual abuse and NSSI (Smith, Steele, Weitzman, Trueba & Meuret, 2015).

2.3.8. Lack of self-compassion

Self-compassion is important for our mental wellbeing (Barnard & Curry, 2011). Although multiple definitions of compassion exist, it is thought to be more than simply the absence of self-criticism (Cleare, Gumley & O'Connor, 2019). An active component is present, aimed at preventing suffering in oneself through the application of self-kindness (Neff, 2003). Self-compassion is associated with lower levels of stress, anxiety and depression (MacBeth & Gumley, 2012). Self-compassion is also inversely correlated with shame (Ferreira, Pinto-Gouveia & Durate, 2013; Gilbert & Procter, 2006). Additionally, individuals with a history of SH report lower trait self-compassion (Gregory, Glazer & Berenson, 2017) and self-forgiveness is negatively associated with suicidality among this population (Nagra, Lin & Upthegrove, 2016). Furthermore, higher levels of self-forgiveness or self-compassion are also associated with lower levels of SI and SH (Cleare, Gumley & O'Connor, 2019).

2.4. Aims and hypotheses

In summary, humans' ability for complex cognitive processing allow us to direct our cognitive, affective and behavioural patterns for self-to-other relating (social mentalities) inwards. Thus, we are able to self-criticise, self-derogate, and experience shame, etc. which can activate a defensive threat response. While these processes may have evolved as adaptive self-protection strategies against hostile, powerful others (Gilbert, 2002), when applied to self-to-self relating they can be detrimental to one's mental wellbeing. Just as with physiological self-protection strategies (e.g. vomiting, fever), if triggered inappropriately, too frequently, too intensely or for a prolonged duration they become maladaptive (Nesse & Williams, 1998). Moreover, if an individual engages in self-attacking too often, too intensely, etc., without the ability to adequately self-soothe or reassure, it may become ingrained in their self-identity (Gilbert & Procter, 2006). As a result, submissive states are generated (Gilbert, 2002) and ruminating on these self-critical

thoughts and feelings of defeat and inferiority reinforce them (Baumeister, 1990). As such, these feelings can become a threat in themselves. Individuals may engage in SH in an attempt to regulate these negative emotions or to self-punish in response to their self-criticisms (Klonsky, 2007; 2009). Additionally, individuals may begin to look for ways to escape from their internal pain and may view suicide as a viable option in the absence of alternative solutions (Baumeister, 1990; Williams, 2001).

“...the language and emotional strength of attacks can be as if the attacked is a non-compliant subordinate, a derogated rival, or at times a hated outsider. In the latter case the person can see part of themselves as highly undesirable and want to be rid of it – sometimes literally to kill it off” (Gilbert, 2000a, p.129).

Therefore, internal threat may be present before the emergence of suicidality. It may emerge as self-attacking and may be considered as less severe than thoughts of ending one’s life or engaging in self-harming behaviours. Given the theoretical and empirical literature outlined, it may be plausible to extend the extant suicidality continuum, incorporating a wider array of internally threatening thoughts, beliefs and behaviours, less severe in nature, that have been shown to precede SI. This emergence and evolution of internal threat severity may reflect a graded continuum of internal threat. To the author’s knowledge, such a continuum has not been empirically tested before; it is necessary, therefore, to determine whether these phenomena can be modelled together to potentially represent a continuum of internal threat as an initial investigatory step. If established, this would afford an opportunity to examine the presence and expression of psychosis along this internal threat continuum.

In testing the dimensional structure of these phenomena, latent variable modelling will be utilized. It is expected that dimensions will vary in severity of internal threat; less severe manifestations of internal threat (self-attacking through NSE) will emerge separately from suicidality indicators. Furthermore, these dimensions representing less severe internal threat will be associated with suicidality dimensions. Overall, the presence of a correlated multidimensional structure, representative of a continuous construct reflecting variation in internal threat severity is expected to be established. Although previous research has

assessed the dimensionality of suicidality (Gutierrez, Osman, Barrios & Kopper, 2001; Yoder, Whitbeck & Hoyt, 2008), self-criticism (Gilbert et al., 2004), defeat (Gilbert & Allan, 1998), self-schemas (Welburn, Cristine, Dagg, Pontefract & Jordan, 2002), etc., no previous research has assessed the dimensionality of these types of phenomena together.

2.5. Method

2.5.1. Sample

The BPMS was a large-scale epidemiological study conducted by the Office of National Statistics in 2000, the first having been carried out in 1993. The sample was designed to be representative of the adult population, aged 16-74, living in private households in Britain which aimed to estimate the prevalence and correlates of mental health problems, examine service use, identify social disadvantage associated with mental health difficulties and compare these rates to the initial survey. A multistage, stratified sampling design was adopted using the small user Postcode Address File, which yielded a total of 15,804 addresses. These addresses were visited by interviewers to identify households with at least one adult age 16-74 and one adult within each household was selected for interview using the Kish grid method.

The survey consisted of two stages: firstly, an assessment interview was conducted which screened for the presence of mental disorders, risk factors, service use and sociodemographic information. Subsequently, a phase two clinical interview was carried out by trained psychologists on a subsample to assess for psychosis and personality disorders. Phase one interviews were successfully conducted with 8,580 adults (45% male, 55% female). Mean age was 45.37 ($SD = 15.61$) years. The majority of the sample were White (94%), with small proportions of Black (2%), Indian/Pakistani/Bangladeshi (2%) and other ethnic group respondents (2%). Details of the survey methods are available (Singleton, Bumpstead, O'Brien, Lee & Meltzer, 2001).

2.5.2. Measures

In order to examine whether a continuum of internal exists in the general population, a pool of relevant items was generated. The BPMS was considered the most suitable data source and was screened for appropriate items in the phase one assessment interview schedule. Item selection was based on whether the item was considered to have a meaningful internal threat component that could not be solely attributable to context. Appropriate items were located in the sections which screened for neurotic disorders (assessed using the Clinical Interview Schedule-Revised, CIS-R; Lewis, Pelosi & Dunn, 1992), personality disorders (assessed using the Structured Clinical Interview for DSM-IV Axis II, SCID-II; First, Gibbon, Spitzer, Williams & Benjamin, 1997) and deliberate self-harm (DSH). Only items which were available to the entire sample were utilized (i.e. screener linked items were not used).

In total, 14 items were identified on the basis of the criteria. One item was taken from the ‘Depression’ section of the questionnaire which assessed for the presence of sad and depressive feelings within the last month. Four items were included from the ‘deliberate self-harm’ (DSH) section of the questionnaire which related to suicidal thoughts, ideation and SH behaviour. In addition, nine items were included from the ‘Personality Disorder’ (PD) section which consisted of 116 items assessing for different personality disorders. The nine items selected were from the avoidant, dependent and borderline subscales. All of these items were believed to reflect aspects or manifestations of internal threat in the form of suicidality and NSE (low self-esteem, feelings of inferiority, feelings of worthlessness, submissive behavior, defeat, self-criticism, shame). These 14 items selected were as follows:

- Have you had a spell of feeling sad, miserable or depressed in the past month?
(Depression)
- Have you ever felt that life was not worth living? (DSH)
- Have you ever wished that you were dead? (DSH)
- Have you ever thought of taking your life, even if you would not really do it?
(DSH)

- Have you ever deliberately harmed yourself in any way but not with the intention of killing yourself? (DSH)
- Do you avoid getting involved with people unless you are certain they will like you? (PD: Avoidant)
- Do you often worry about being criticised or rejected in social situations? (PD: Avoidant)
- Do you believe that you're not as good, smart, or as attractive as most other people? (PD: Avoidant)
- Do you need a lot of advice or reassurance from others before you can make everyday decisions – like what to wear or what to order in a restaurant? (PD: Dependent)
- Do you find it hard to disagree with people even when you think they are wrong? (PD: Dependent)
- Do you usually feel uncomfortable when you are by yourself? (PD: Dependent)
- Have you tried to hurt or kill yourself or threatened to do so? (PD: Borderline)
- Have you ever cut, burned, or scratched yourself on purpose? (PD: Borderline)
- Do you often feel empty inside? (PD: Borderline)

Several other items were considered for inclusion but were eliminated from the final pool of items as it was felt that they did not clearly tap into internal threat. Examples included “Do you often feel nervous when you are with other people?”; while this could have been seen as indicative of low self-esteem or confidence, it was also highly contextual and did not necessarily indicate that the person had a negative view of themselves, rather they may just have had a shy disposition. In contrast, an item such as “Do you often worry about being criticised or rejected in social situations?” did have a contextual component, however it was clear that this item was tapping into an inherently negative aspect of the self not being good enough which others may become aware of. Similarly, “Does your sense of self often change dramatically?” was clearly related to self-concept but did not evidently indicate a negative one. All items were recoded as yes (1) or no (0). Responses of ‘does not apply’ relating to the personality disorder questions were recoded and treated as missing

data. A SA item was present in the BPMS dataset but was not modelled, rather it used as a potential validator of the continuum in Chapter 3.

2.5.3. Analytic plan

Latent variables are constructs which are thought to exist but are not directly observable in nature. These unobservable latent variables (e.g. happiness, intelligence, depression) are inferred and quantified through the observance of responses believed to reflect the latent construct, for example, using questions on an IQ test to measure 'intelligence' or measuring 'depression' based on responses to questions regarding sadness, weight gain, SI, etc. Thus, latent variables account for systematic patterns in observed responses (Lubke & Neale, 2006).

In factor analysis, the relationship between a set of observed items is condensed into one or more continuous latent dimensions called factors (Kline, 1994; McCrea, 2013). If these factors explain most of the variation in the correlations among the observed variables (known as common variance) then it can be implied that these factors represent the latent construct(s) (Henson & Roberts, 2006). Variance not accounted for by the latent variable is referred to as unique variance, which is comprised of variance specific to the indicator and random error variance (Brown & Moore, 2012). Therefore, the relationship between variables is assumed to be explained by the presence of one or more continuous latent variables. Factors are considered to both cause and summarize responses to variables/items and these factors represent underlying latent variables (Henson & Roberts, 2006). It can be used when attempting to determine what theoretical constructs underlie a set of variables (Henson & Roberts, 2006).

As this chapter is examining whether the variables harvested from the BPMS may reflect differing levels of severity of the same phenomena (internal threat), factor analysis was an appropriate technique to assess the dimensional structure of these items. Utilization of factor analysis is a necessary foundational step to explore the theoretical structure of these items. It allows for a number of important considerations to be tested. Firstly, do the variables harvested separate clearly into dimensions that reflect low to high severity of internal threat? If milder and severe internal threat dimensions are present, do these factors

strongly correlate with one another? Do the fit statistics suggest that a model highlighting the interrelatedness of these internal threat states is a good-fitting model?

Two main stages of factor analysis were conducted: firstly, as no existing theoretical framework described the relationship between our internal threat items, exploratory factor analysis (EFA) was initially employed. EFA is used to explore and identify the internal dimensional structure of latent constructs and to generate theory when there is little or no theory hypothesizing how the variables will perform (Fabrigar, Wegener, MacCallum & Strahan, 1999; Henson & Roberts, 2006). The full BPMS dataset was randomly split into two sub-samples, each containing 50% of the survey respondents. The fit of six models (a 1-factor through to a 6-factor model) was assessed using EFA on one of the randomly generated subsamples. Once an EFA was carried out, validation of the model generated by this analysis was necessary. Therefore, a confirmatory factor analysis (CFA) was used to test the validity of the best EFA-generated model on the remaining 50% of the sample. CFA is primarily used when there is an empirical basis to test a specific hypothesis about the number of underlying factors and what variables define these factors (Brown & Moore, 2012; Fabrigar et al., 1999), in this case, the best-fitting model derived from the EFA.

Secondly, the best fitting CFA, as derived from the 50% sample analysis, was then specified and estimated using the entire sample data to test whether it held for the full sample. Additionally, a unidimensional (all items loading onto one factor) and second-order factor model (established factors loading onto a general higher-order factor) were also modelled and compared. Conducting these analyses would ensure that the most accurate dimensional representation of internal threat was identified. Moreover, a good-fitting dimensional structure as identified by CFA is a necessary precursor to conducting further planned analyses such as regression, which involve specifying structural relationships among latent variables (Brown & Moore, 2012).

All models were specified and estimated using Mplus version 7.4 (Muthén & Muthén, 1998-2015) with the appropriate weighting variable. Weighted least squares means and variance adjusted (WLSMV) estimation was employed for the factor analyses as it is the most appropriate estimator for use with categorical, ordinal or non-normal data (Brown, 2006; Brown & Moore, 2012). Oblique rotation was used in the analyses. Rotation is used

to allow for better interpretation of the factors; in oblique rotation factors correlate with one another (Tabachnick & Fidell, 2013). The goodness of fit of each model in the factor analyses was assessed using a series of fit statistics. As individual fit statistics only reflect a particular aspect of fit, there is no statistic that can be used to determine model fit, thus a range of indices must be considered and reported (Kline, 1994). The χ^2 goodness-of-fit statistic calculates the degree of difference between the sample and fitted covariance matrices (Hu & Bentler, 1999); the comparative fit index (CFI; Bentler, 1990) is an incremental fit index which scores the hypothesized model against the statistical baseline model (Kline, 1994); the Tucker-Lewis index (TLI; Tucker & Lewis, 1973), another incremental fit index which compensates for model complexity (Brown, 2006); and the root mean square error of approximation (RMSEA; Steiger, 1990) also penalizes for poor model parsimony and “assess the extent to which a model fits *reasonably* well in the population” (Brown, 2006, p.83). Furthermore, the standardized root mean square residual (SRMR; Jöreskog & Sorbom, 1981) was estimated for the EFAs and the weighted root mean residual (WRMR) was estimated for the CFA models. WRMR was used as an alternative to SRMR in the CFA; SRMR has been found to not work as well in CFA analyses with binary indicators (Yu, 2002).

Although there are not definitive levels of acceptability for the fit indices, Hu and Bentler’s (1999) guidelines are the most commonly used and cited in the literature. Based on their recommendations for parameters for acceptable model fit, values greater than 0.95 for the CFI and TLI, a value of 0.06 or below for the RMSEA and close to or below 0.08 for the SRMR indicate good model fit (Hu & Bentler, 1999). Additionally, a non-significant χ^2 (Brown, 2006) and values closer to 1 for the WRMR (Yu, 2002) also indicate good fit. Notably, while a non-significant chi-square usually indicates good model fit, it should be noted that this statistic is highly sensitive to sample size (Brown, 2006; Brown & Moore, 2012); it is routinely reported but should be interpreted cautiously and in the context of the other fit indices.

2.6. Results

2.6.1. Preliminary EFA (50% sample)

Endorsement rates for each item are shown in Table 2.1. The most frequently endorsed item was the depression item (42%), followed by two of the personality items, both from the avoidant subscale relating to feeling inferior. The least endorsed item was the NSSI item (2%); another of the SH items was also endorsed by a very small proportion of the sample (3%). There was a general trend for the more severely oriented item (i.e. those relating to SH) to be less frequently endorsed as expected, however, some of the SI items were endorsed by a relatively substantial proportion of the sample.

All inter-item correlations were significant at the 0.01 level, ranging from 0.046 to 0.721; as correlations were below +/- .90 multicollinearity and singularity were not deemed an issue. Inspection of the correlation matrix also revealed a considerable amount of inter-item correlations above 0.30 indicating the use of factor analysis was appropriate (Hair, Black, Babin & Anderson, 2010; Tabachnick & Fidell, 2013). The proportion of missing data was very small, particularly for the depression and SH items (<1%); it was slightly higher for the personality disorder items (2-4%) as these items had a response option of 'don't understand/does not apply' which was recoded as missing data.

Based on the results of the EFA (50% of the data), the 1-, 2- and 3-factor models were rejected. Each of these models had unsatisfactory CFI and TLI model fit values. Both the 4- and 5-factor models were judged to have good fit; CFI and TLI were greater than 0.95, the RMSEA was less than 0.05 and SRMR less than 0.08, although the 5-factor model had a slightly better fit based on the fit index guidelines (Hu & Bentler, 1999). The majority of the factor loadings were moderate or high in these models; factor loadings measure how much a variable contributes to a factor with high loadings indicating that the variable accounts well for the particular factor (Tabachnick & Fidell, 2013). Regarding factor loadings, rules of thumb suggest only those above .32 should be interpreted (Tabachnick & Fidell, 2013), however, given the large sample size, Hair et al. (2010) suggest smaller loadings (<0.30) should still be taken into consideration and interpreted meaningfully (Hair

et al., 2010). Items are considered to have ‘crossloaded’ if they load onto two or more factors at .32 or higher; removal of these items should be considered (Costello & Osborne, 2005). In the 4-factor EFA, the item ‘Hurt’ significantly crossloaded while in the 5-factor EFA, three items (‘Involvement’, ‘Hurt’ and ‘Empty’) significantly crossloaded. Since the ‘Hurt’ item significantly and substantially crossloaded in both models, it was removed from the analysis.

Table 2.1. Frequency of internal threat items in the BPMS (*N* = 8,580)

Item	Label	<i>N</i> (%)
Have you had a spell of feeling sad, miserable or depressed in the past month?	Depressed	3581 (41.7)
Do you often worry about being criticised or rejected in social situations?	Criticism	2329 (27.1)
Do you believe that you’re not as good, smart, or as attractive as most other people?	Inferior	2179 (25.4)
Have you ever felt that life was not worth living?	Not worth living	1911 (22.3)
Do you find it hard to disagree with people even when you think they are wrong?	Disagree	1754 (20.4)
Do you often feel empty inside?	Empty	1506 (17.6)
Have you ever wished that you were dead?	Wish dead	1465 (17.1)
Have you ever thought of taking your life, even if you would not really do it?	SI	1380 (16.1)
Do you avoid getting involved with people unless you are certain they will like you?	Involvement	1102 (12.8)
Do you usually feel uncomfortable when you are by yourself?	Uncomfortable	742 (8.6)
Have you tried to hurt or kill yourself or threatened to do so?	Hurt	685 (8.0)
Do you need a lot of advice or reassurance from others before you can make everyday decisions?	Reassurance	613 (7.1)
Have you ever cut, burned, or scratched yourself on purpose?	SH	271 (3.2)
Have you ever deliberately harmed yourself in any way but not with the intention of killing yourself?	NSSI	200 (2.3)

SI Suicidal ideation; *SH* Self-harm; *NSSI* Non-suicidal self-injury

2.6.2. Preliminary CFA (50% sample)

CFA was then performed on the remaining 50% of the data in an attempt to validate the results of the EFA and to compare the 4- and 5- factor models (Table 2.2). Factors were specified according to which factor they loaded most highly onto in the EFA. Converse to the EFA, the 4-factor model was found to be marginally better than the 5-factor model in this analysis. All factor loadings were moderate or high in both models, however, the 4-factor model in this instance had a slightly higher CFI and TLI index. Furthermore, the extremely high correlation between factors 4 and 5 (.95) in the 5-factor model was a cause for concern, suggesting that these two dimensions should not be separate. Typically, factor correlations above 0.80 or 0.85 are considered to be indicative of poor discriminant validity (Brown, 2006). These results suggested that the 4-factor model was the best fit of the data.

2.6.3. CFA (100% sample)

The best fitting CFA model (4-factor model) was then specified and estimated using 100% of the data. It was important not only to test the 4-factor solution on the full sample, but to test it against alternative models to check that it was the best-fitting, most parsimonious explanation of the data. Therefore, this model was tested against (i) the 5-factor model (given the acceptable fit criteria in the preliminary EFA and CFA), (ii) a unidimensional model (all items loading onto one factor) and (iii) a second-order model based on the 4-factor solution (established factors loading onto a general higher-order factor). Table 2.3 outlines the factor loadings and fit indices for the competing CFA models on the full data.

Factor loadings were moderate to high in all of the models tested on the full sample. The RMSEA indicated good model fit in all except the unidimensional model. The CFI and TLI indices were below the threshold for both the second-order and unidimensional models whereas both indicated good fit in the 4 and 5-factor models. Similar to the preliminary CFA, the 4-factor model provided the best-fitting, most parsimonious representation of the full data; both the factor loadings and the fit indices indicated excellent model fit. This

model had a marginally lower RMSEA and marginally higher CFI and TLI. All items significantly loaded onto at least one factor in this model and ranged from .528 to .974. Factor correlations ranged between 0.47 and 0.71, suggesting the factors represented distinct constructs (Brown, 2006).

Table 2.2. Factor loadings for the 4-factor CFA and 5-factor CFA (N = 4,310)

Item	4-factor				5-factor				
	1	2	3	4	1	2	3	4	5
Empty	.929				.950				
Depressed	.635				.644				
Uncomfortable	.580								.615
SH		.956					.956		
NSSI		.930					.931		
Criticism			.806					.810	
Involvement			.735						.729
Inferior			.731					.734	
Reassurance			.634						.626
Disagree			.560						.555
Wish dead				.968	.968				
Not worth living				.964	.964				
SI				.939	.939				
Factor Correlations									
Factor 2	.630				.696				
Factor 3	.691	.498			.687	.612			
Factor 4	.699	.687	.440		.453	.656	.492		
Factor 5	-	-	-		.457	.699	.534	.945	
Fit Indices									
χ^2		142.136				176.376			
Df		59				55			
<i>p</i>		0.000				0.000			
CFI		0.997				0.996			
TLI		0.996				0.994			
RMSEA		0.018				0.023			
WRMR		1.039				1.143			

χ^2 = Likelihood ratio chi-square, CFI = Comparative fit index, RMSEA = Root mean standard error of approximation, WRMR = Weighted root mean square residual. Note: All factor loadings and factor correlations are statistically significant ($p < 0.001$).

In this model, as specified, three items loaded onto Factor 1 (F1): depressed, empty and uncomfortable which seemed to reflect a traditional depressed mood dimension; two items onto Factor 2 (F2): NSSI and SH clearly reflecting self-harming behaviour; five items loaded onto Factor 3 (F3): criticism, inferior, reassurance, involvement and disagree which was interpreted as low self-worth and feelings of subordination and finally Factor 4 (F4) contained three items: not worth living, wish dead and SI, all of which related to suicidal thoughts/ideation. Figure 2.1. shows the factor loadings and the factor correlations for the 4-Factor model. It is recommended that factors contain at least three items (Tabachnick & Fidell, 2013). Factors with two items however may be considered reliable if the items are highly correlated with one another but relatively uncorrelated with other items (Tabachnick & Fidell, 2013). Bivariate correlations between the two items in Factor 2 showed that there was a moderately strong correlation between them ($r = 0.58, p < 0.01$) and had reasonably low correlations with all other internal threat variables (ranging from 0.28 – 0.05, $p < 0.05$) indicating that it was a reliable factor.

Table 2.3. Factor loadings and fit indices for the factor models in the CFA ($N = 8,580$)

Item	1-Factor	4-Factor				5-Factor					Second-Order				
	F1	F1	F2	F3	F4	F1	F2	F3	F4	F5	F1	F2	F3	F4	
Depressed	.538	.628					.637				.633				
Uncomfortable	.454	.529								.565	.526				
Empty	.742	.919					.936				.916				
NSSI	.826		.958					.958				.962			
SH	.796		.934					.934				.930			
Involvement	.588			.748						.757			.748		
Criticism	.619			.812					.820				.813		
Inferior	.564			.726					.732				.726		
Reassurance	.495			.642						.648			.640		
Disagree	.398			.528						.531			.526		
Not worth living	.942				.960	.960								.960	
Wished dead	.963				.974	.974								.975	
SI	.907				.933	.933								.933	
Second-order factor loadings												F1=.960; F2=.801 F3=.669; F4=.751			
Fit indices															
χ^2	3450.3		236.964					261.217					428.677		
Df	26														
P	65		59					55					61		
CFI	0.000		0.000					0.000					0.000		
TLI	0.942		0.997					0.996					0.994		
RMSEA	0.930		0.996					0.995					0.992		
WRMR	0.078		0.019					0.021					0.027		
	5.865		1.352					1.396					1.906		

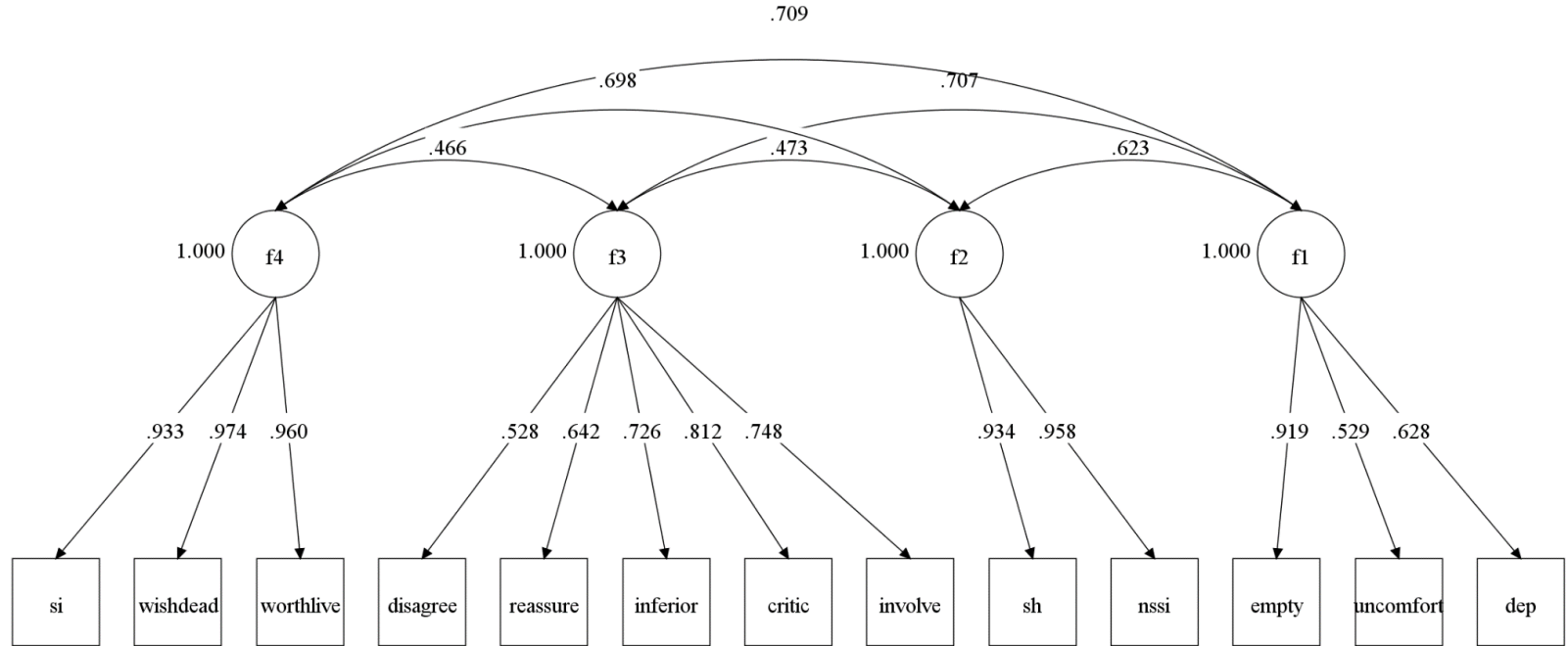
χ^2 = Likelihood ratio chi-square, CFI = Comparative fit index, RMSEA = Root mean standard error of approximation, WRMR = Weighted root mean square residual. Note: all factor loadings and factor correlations are statistically significant ($p < 0.001$)

2.7. Discussion

This chapter proposed an extension of the suicidality continuum to include a wider range of variables reflective of negative, self-threatening feelings, beliefs, attitudes, and behaviours related to oneself. These additional phenomena were conceptualized as preceding suicidality, i.e., NSE/self-attacking at the lower end, suicidality at the upper end and were believed to be underlain by the same construct: internal threat. As such a proposition had not been empirically tested before, statistical modelling of this proposed continuum was needed. Using a large general population dataset, a series of factor analyses were conducted to determine the dimensional structure. It was expected that NSE (less severe internal threat) phenomena would be associated with suicidality (severe internal threat) indicators. Furthermore, a correlated multi-dimensional structure was expected to emerge from the EFA which would then be replicated using CFA. This dimensional representation identified from the factor analyses was expected to indicate variation in severity of internal threat as well as suggesting the presence of a continuous construct.

2.7.1. Dimensional structure of internal threat

Exploratory analyses on a random half of the sample suggested both 4- and 5-factor models were good fit of the data. Further confirmatory analyses on half and the full sample indicated that the 4-factor model was ultimately marginally better than the 5-factor model. This 4-factor model consisted of 1) a factor comprised of items relating to worrying about being criticized or rejected, feeling inferior to others, lack of self-esteem/self-confidence and feelings of subordination; 2) a factor characterized by low, sad or depressed mood, as well as feelings of emptiness and feeling uncomfortable alone; 3) a factor comprised of death wishes, feeling life is not worth living and thoughts of taking one's own life; and 4) a factor containing two items which both involved self-harming behaviours: NSSI and SH without indication of suicidal intention.



F1 = Depression factor, F2 = Self-harm factor, F3 = Low self-worth and subordination factor, F4 = Suicidal thoughts factor; for individual item descriptions and labels, see Table 2.1.

Fig 2.1. Graphical illustration of 4-factor model including factor loadings and factor correlations

These factors were significantly correlated with one another. The strongest correlations were between the SI factor and the depression factor ($r = 0.709$), the depression and low self-worth factor ($r = 0.707$) and the SI and SH factors ($r = 0.698$). The remaining correlations were smaller in magnitude, but still moderate in size ranging from 0.466 – 0.623. The proposed extended continuum ranges from less to more severe elements of internal threat; arranging these 4 factors in proposed order of severity would result in a continuum beginning with low self-worth and subordination, moving to depression, then SI and ending with SH behaviours. The factor correlations compliment this suggestion; the factors are most strongly correlated with the factors they are positioned next to on the continuum, i.e., low self-worth is most strongly correlated with depression, depression is also strongly correlated with SI and SI is also strongly correlated with SH. These results facilitate the proposition of a continuous internal threat construct, ranging in degree of severity.

Similar findings were reported by Yoder et al. (2008) in their factor analytic study of death- and suicide-related thoughts. Despite inconclusive, mixed results as to whether death- and suicide-related thoughts were best conceptualized unidimensionally or as separate constructs, the authors found interesting correlational results. The correlation between the depressive symptoms and the thoughts of death subscale was significantly higher than it was with the suicidal thoughts subscale. Conversely, SA correlated significantly higher with suicidal thoughts than with depressive symptoms. The authors contemplated that the suicidality continuum can account for these results; depressive symptoms and thoughts of death being situated lower on the continuum, while suicidal thoughts and attempts are higher, resulting in stronger correlations between those particular items.

2.7.2. Continuum validity

These are exploratory findings and replication is needed, however, there is further support for these experiences constituting an extended continuum. van Os and colleagues (van Os, Linscott, Myin-Germeys, Delespaul & Krabbendam, 2009) set out a series of potential markers of a continuum in their seminal systematic review and meta-analysis of the psychosis continuum. Distributional validity could be showcased through the number of items endorsed. A continuum perspective would assume a ‘half-normal’

distribution; the majority of people have very low values with a small proportion of individuals having values at the higher end. By summing the items together, a total internal threat score could be calculated (ranging from 0 – 14). A half-normal distribution was found to be present in this sample; the majority of people endorsed none or very few of the internal threat items while few people endorsed most of or all of the items.

Furthermore, epidemiological validity refers to the distribution of the construct relative to the theory behind the continuum (van Os et al., 2009). The internal threat continuum would propose that the items in the low self-worth and subordination and depression factors would be endorsed more frequently than those in the SI and SH factors. Epidemiological validity was partially supported; feelings of sadness/depressed mood, worry about criticism and rejection and feelings inferiority were endorsed most frequently (over 25% of respondents) while the extreme SH items were rarer (2-3% of respondents). However, there were some outliers. For example, feeling that life was not worth living (SI factor) was endorsed by over a fifth of the sample, whereas some of the low self-worth items (e.g. reassurance) was endorsed by only a small proportion of the sample. Overall however, the severe internal threat items were endorsed less frequently than the less severe internal threat items. Further analysis is needed to endorse the validity of the proposed continuum.

2.7.3. Integration with previous research

These findings may also compliment the result of previous studies examining the complex relationships between these concepts. For example, the factor correlations compliment research which reported self-criticism to be moderately correlated with SH (Gilbert et al., 2010) and that the relationship between self-criticism and SH is mediated through depressive symptoms (Xavier et al., 2016). Although the items within the low self-worth and subordination factor did not come from a self-criticism measure, they were selected on the basis that they may be reflective of engagement with self-critical thoughts. Furthermore, the correlations between the depression and the SI and SH factors compliment the Taylor et al. (2011) finding that defeat was prospectively associated with suicidality, even when controlling for baseline suicidality and depression.

It is clear however, that the relationship between these variables is complex. For example, Zhang et al. (2017) investigated the pathways from negative emotion (e.g. depression and anxiety) to suicidal behaviours. They found negative emotion to be both directly linked to SI and indirectly through NSSI. Additionally, negative emotion was indirectly linked to a SA through both NSSI and SI. Similarly, NSSI has also been reported as a partial mediator between depression and suicidal risk, with depression also having a direct relationship to suicidal risk (Kang et al., 2019). These studies support a ‘graduation’ hypothesis from less to more severe experiences. Although the current study cannot infer temporal ordering, it similarly suggests have the potential to transition or ‘graduate’ to increasingly severe experiences.

Several theoretical models may be informative in interpreting this analysis and future analysis. The Integrated Motivation-Volitional (IMV) model of suicidal behaviour (O’Connor & Kirtley, 2018) proposes that a combination of factors result in an individual’s engagement in suicidal behaviour. These factors can be partitioned into three stages: (i) pre-motivational stage; background factors setting the context in which suicide may occur, (ii) motivational stage; factors influencing the development of suicidal ideation and (iii) volitional stage; factors influencing acting on suicidal thoughts. Stages (i) and (ii) are of particular relevance to internal threat research. In brief, certain characteristics lead individuals to be vulnerable to suicidality, one such characteristic that the authors have focused on is socially-prescribed perfectionism. Notably this is related to self-criticism (Hewitt & Flett, 1991; Trumpeter, Watson & O’Leary, 2006). These characteristics are thought to increase the likelihood of an individual feeling defeated when in crisis. Drawing on the cry of pain model (Williams, 2001) in the motivational stage, appraisals of defeat and humiliation (characterized by social rejection, loss), in a context of entrapment, lead to SI in some cases.

2.7.4. Limitations

Despite the large general population sample and robust analytic methodology testing alternative factor models, some limitations must be acknowledged. First and foremost, this study was an exploratory investigation, further research will be needed to confirm the presence of a continuous structure of internal threat. Moreover, the current models were tested on a single sample, and will require replication. Due to the complex nature

of suicidal and self-harming behaviours, it is unlikely that a single theory or model in isolation could explain every individuals' experiences. Just as the suicidality continuum is not considered to align with every individual's experience (Sveticic & De Leo, 2012), similarly, it is not posited that all individuals progress in a linear manner along the internal threat continuum.

Due to the constraints of working with secondary data, only internal threat variables which were available in the dataset were utilized. As there was a lack of NSE variable scales within the BPMS, individual items had to be harvested separately. There is an inherent degree of subjectivity within this process, however attempts were made to align selected items with items/concepts within pre-existing scales. However, utilising items from scales intentionally designed to measure these concepts (e.g. self-criticism, shame, etc.) would be beneficial in future research as they may more clearly tap into the internal threat concept. Furthermore, measures used in the BPMS were self-report, therefore, it is possible that some items may have been misinterpreted or misunderstood, affecting the participants' responses. Additionally, some researchers have considered SH as inclusive of both direct (e.g. cutting, burning) and indirect forms of SH (e.g. substance misuse, disordered eating and risky behaviours; Hooley & St. Germain, 2014b; Müller, et al., 2016; Sansone, Wiederman & Sansone 1998). As this research focused on the established suicidality continuum, which only includes direct SH, indirect forms of SH were not considered in the item selection process. Incorporating indirect SH into internal threat research may be considered in future.

Additionally, it is important to acknowledge that much of this extended suicidality continuum concept has been captured in established models of depression and suicide (e.g. IMV; O'Connor & Kirtley, 2018; Cry of Pain; Williams, 2001; Beck's Cognitive Model of Depression; Beck et al., 1979). These theories highlight the precursory role of self-criticism, defeat, low self-esteem, etc. in the formation of depression and suicidality. Thus, rather than modelling a continuum of internal threat, the results of this chapter and proposed future analysis could be interpreted as modelling severity of depression or suicidal behaviour. This interpretation will not be refuted in this body of research. Rather, given this body of work's alignment with the Suicidal Drive Hypothesis, the rationale for and interpretation of these analyses is from a specific threat response standpoint.

2.7.5. Future research

The results of this study suggest that internal threat phenomena may be represented by four correlated dimensions, namely, low self-worth and subordination, depression, SI and SH. Distributional validity, epidemiological validity, integration with the wider research literature and the factor correlations all supported the proposal that these phenomena may represent a continuum. However, further research is needed to confirm its viability. Establishing how individuals vary in relation to these dimensions is therefore a necessary next step. Moreover, validity could additionally be assessed through other means, for example, by examining demographic and aetiological factors. This will be examined in Chapter 3.

2.8. Conclusion

The purpose of this chapter was to first begin establishing what concepts, other than suicidality could be considered ‘internal threats’ and furthermore, whether these concepts could be integrated alongside suicidality to represent a continuum of internal threat in the general population. Analysing the dimensional structure of the variables was a necessary foundational step to establish such a continuum. The next chapter will advance the dimensional modelling specified here, specifically by investigating individual variation on the internal threat dimensions and their associated risk.

Chapter 3

The distribution of internal threat dimensions in the general population

The analysis from the current study was submitted for peer review publication and was successfully accepted: Butter, S., Shevlin, M., & Murphy, J. (2018). Negative self-evaluation and the genesis of internal threat: Beyond a continuum of suicidal thought and behaviour. *Psychological Medicine*, 1-9. doi:10.1017/S0033291718003562

Background and research aim: In order to further establish the internal threat continuum proposed in Chapter 2, additional research on the hypothesis was necessary. Validation of the continuum may be supported if it can be demonstrated that groups of individuals in the population vary in relation to the internal threat dimensions. A class structure representing gradation in internal threat experience would be supportive of predictions that individuals could transition along this continuum. Furthermore, if individuals did occupy various positions along this proposed continuum (characterised by progressively severe internal threat experiences), it would be expected that risk would operate in a dose-response way from the lower end of the continuum to the upper end.

Method: In order to test this, factor mixture modelling (FMM) was employed to group individual cases into categorical classes whilst allowing for variation within the classes to be modelled continuously. Utilising the established factor structure from the previous chapter: (1) low self-worth and subordination, (2) depression, (3) suicidal thoughts and (4) self-harm, FMM was conducted. Additionally, multinomial logistic regression was conducted to assess whether risk variables could (i) describe class membership, (ii) discriminate between class membership and (iii) demonstrate a dose-response effect with the classes. Moreover, a question on lifetime history of suicide attempt (SA) was used as a potential validator of the continuum.

Results: The FMM suggested the presence of a 7-class structure that reflected a graded, hierarchical structure of internal threat. Class 1 reflected the most severe class, characterised by elevated probabilities across all four internal threat factors. Class 7 represented a baseline class with little-to-no probability across any of the factors. These two classes were considered representative of the upper and lower ends of the internal threat continuum, respectively. Five additional classes corresponded to gradation in internal threat between these two ends of the continuum. For several of the risk factors included in the regression a dose-response linear association was present; increasing risk factor odds ratios were associated with membership to classes of increasing internal threat severity. This effect was most apparent for female gender, younger age, having experienced bullying, having experienced sexual abuse and meeting the criteria for a mental disorder. A linear trend was also exhibited for low income, however, this did not extend to the most severe class (Class 1). Analysis of the association between SA and

the internal threat classes found that SA was only relevant to those in classes characterised by suicidality or depression only.

Conclusion:

Further support was garnered for the proposed internal threat continuum. In Chapter 2, the factor correlations, item endorsements and item distribution were considered supportive of the continuum. FMM class composition and class proportions, as well as the suggestion of potential demographic and aetiological validity in this set of analyses were additionally considered as support for the continuum proposition. Thus, a suicidality continuum may extend beyond the most extreme thoughts and behaviours and incorporate a much wider array of phenomena related to negative self-evaluation, that may vary in severity and may constitute a broader internal threat spectrum. Although the current study cannot infer temporal ordering, it similarly suggests that individuals in the classes characterised by experiences at the lower end of the continuum have the potential to transition or ‘graduate’ to increasingly severe experiences. Overall, these preliminary results suggested potential for a hierarchical structure of internal threat and a ‘graduation’ hypothesis from less to more severe internal threat experiences. However, replication of these results is necessary.

3.0. Introduction to Chapter 3

In Chapter 2, exploratory and confirmatory factor analyses were conducted using items from a general population survey believed to be reflective of internal threat states. A 4-factor model, representing (1) low self-worth and subordination, (2) depression, (3) suicidal ideation (SI) and (4) self-harm (SH), was considered an excellent fit of the data based on established fit criteria. Alongside theoretical considerations and the established research literature, it was suggested that these results were supportive of a proposed internal threat continuum. This continuum, set within the context of the Suicidal Drive Hypothesis (Murphy et al., 2018; Murphy et al., under review), proposed suicidality and negative self-evaluation (NSE) phenomena to lie at the upper and lower ends of this continuum, respectively.

Moving forward, in order to further explore and establish this continuum, it was necessary to ascertain whether groups of individuals were present in the population that varied in their level of internal threat severity. Moreover, grouping individuals in such a way would allow for risk factors for these states to be investigated. Assessing risk factors for differing levels of severity had the potential to further validate the continuum, through determining whether risk factors operated in a dose-response manner.

3.1. Profiling individual variation along the internal threat continuum

As outlined in Chapter 2, latent variables are not directly observable but are inferred through responses to observable indicators. Moreover, latent variables are considered to account for systematic patterns among observed variables (Lubke & Neale, 2006). Factor analysis is a latent variable modelling technique which describes the relationship between a set of observed variables through the use of one or more continuous latent variables. Due to its continuous approach however, factor analysis does not easily allow individuals to be classified into groups in order for this to be investigated (Clark et al., 2013). Latent class analysis (LCA), however, is a related latent variable modelling technique which finds homogenous groups of individuals based on responses to observed indicators. Thus, while factor analysis assumes that the relationship between a set of variables is explained by the presence of one or more continuous latent variables,

LCA, rather, assumes it is explained by a categorical latent variable with two or more categories (Lubke & Muthén, 2005; McCrea, 2013).

LCA is based on the assumption of conditional independence (also known as local independence). This stipulates that class membership causes the association between the variables within the class. Therefore, the variables are conditionally independent; they are no longer related as they are conditional on membership to the class (Vermunt & Magidson, 2004). As such, individuals within a class are assumed to be more similar to individuals in their class than individuals in a different class. Moreover, within class covariance is zero so that each class is assumed to have the same degree of severity. As a result of this condition, LCA does not allow for underlying levels of severity to be modelled within the classes (Clark et al., 2013; McCrea, 2013). Given the promising results of the factor analysis in Chapter 2, there is potential that internal threat may be represented continuously, highlighting differing levels of severity. Use of LCA may lead to over-extraction of classes when the underlying latent variable is continuous (Lubke & Neale, 2006). Therefore, a more suitable, but similar technique to LCA, was required for this analysis - factor mixture modelling (FMM) was considered such a technique.

FMM is a hybrid model which combines LCA and factor analysis. It relaxes the assumption of conditional independence such that individuals can be divided into classes (as in LCA) but individuals within each class can differ along continuous variables (as in factor analysis) (Clark et al., 2013; Lubke & Muthén, 2005, 2007; McCrea, 2013). In this instance, the factor structure is imposed within the class structure, such that the four factors of internal threat identified in the Chapter 2 will be modelled across different classes of individuals. These individuals are homogeneous within their classes but heterogeneous across classes in relation to internal threat severity (Lubke & Muthén, 2005). This type of modelling is thought to better represent the dimensionality of psychological structures (Clark et al., 2013). Additionally, FMMs are better at selecting the correct number of classes than LCA (Lubke & Neale, 2006; 2008). Therefore, FMM was utilised as an appropriate analytic technique based on the aims of this chapter.

3.2. Examining risk factors for internal threat states

If the categorisation of individuals is suggestive of a graded continuum of internal threat, this may afford the opportunity to consider a number of issues. For example, the risk factors for the emergence of internal threat states in the general population may be examined. Although a broad range of variables are associated with internal threat phenomena, two areas of the literature appear to be most consistently associated with both NSE and suicidality: traumatic or adverse experiences and social disadvantage. These negative circumstances are considered to have the potential to erode or inhibit development of an individual's sense of self-worth; they are environments in which internal threat may flourish.

3.2.1. Traumatic and adverse experiences

Social Mentality Theory proposes that our inner hostile-submissive interaction and an inability to adequately self-soothe may develop as a result of our past experiences, such as critical or abusive parenting/relationships (Gilbert, 1989; Gilbert & Irons, 2005). That is, self-self interactions are derived from our experience of self-other interactions; self-other interactions provide a template which is mirrored in self-evaluation (Gilbert; 1989; Gilbert & Irons, 2005). This proposition has been supported, with self-critical adults recalling their childhood and/or parenting in various negative ways. Self-criticism is related to recollection and/or perceptions of maternal criticism (Brewin, Andrews & Furnham, 1996), parental rejection and overprotection (Irons, Gilbert, Baldwin, Baccus & Palmer, 2006) and memories of threat in childhood (Richter, Gilbert & McEwan, 2009). Lack of self-compassion is also associated with low early warmth and additionally, feelings of inadequacy are associated with parental invalidation and abuse (Naismith, Zarate Guerrero & Feigenbaum, 2019). Self-criticism may serve as a mediator between these recollections and future depression and suicidality (Campos, Besser & Blatt, 2013; Irons et al., 2006). Moreover, when controlling for recollection of parental care and control, peer victimisation predicts both self-hating and inadequacy forms of self-criticism (Kopala-Sibley, Zuroff, Leybman & Hope, 2013). Importantly, using a prospective study, Koestner, Zuroff and Powers (1991) reported that restricting and rejecting parenting at age 5 predicted self-criticism at age 12 even when controlling for the child's temperament.

Moreover, adverse or traumatic life experiences unrelated to parenting behaviours can also impact one's self-concept. Traumatic experiences have the potential to erode or prohibit development of an individual's self-worth (Pearlman, 1997), they can disrupt our schematic models and alter our social roles and personal identities (Bertensen & Rubin, 2007). Individuals hold sets of assumptions ('schemas') about how the world works and how they function within it. These schemas are developed over time, are deeply embedded and can be related to the degree to which an individual views themselves as good, moral, worthy, etc. (Janoff-Bulman, 1989; Janoff-Bulman & Timko, 1987). Changes can occur in one's schemas, but these are usually small and develop gradually. However, in the case of a negative traumatic event, one's assumptions can be severely and dramatically challenged, leading to schematic disruption and instability. The theory held about oneself, the world and how one operates within it, may not be able to incorporate information that has been processed as a result of a trauma; the theory no longer fits with the lived experience (Janoff-Bulman, 1989; Janoff-Bulman & Timko, 1987). Engaging in coping strategies such as self-blame can allow an individual to more easily assimilate their old assumptions with the new information (1989). Self-blame directed towards one's character results in self-depreciation and beliefs of personal flaws and deservingness for the traumatic event (Janoff-Bulman, 1979). Thus, in certain circumstances, negative self-schemas can develop in the aftermath of a trauma.

The complexity of a traumatic reaction can be dependent on and vary according to a number of factors such as age at trauma occurrence, nature of trauma, duration of trauma, support received and relationship between the individual and the perpetrator of the trauma (Courtois, 2004). Interpersonal trauma is associated with particularly complex traumatic reactions (Courtois, 2004; Green et al., 2000; Hyland et al., 2017). Experiencing childhood interpersonal trauma is associated with greater risk of multiple trauma exposure (Hagenaars, Fisch & van Minnen, 2011; Noll, Horowitz, Bonanno, Trickett, & Putnam, 2003) and in turn, multiple traumatic experiences are associated with higher levels of guilt, shame and self-directed anger compared to a single trauma (Hagenaars et al., 2011). A range of negative self-appraisals have been documented following traumatic experiences (Badour & Adams, 2015; Kim & Cicchetti, 2006; Turner, Finkelhor & Ormrod, 2010). Furthermore, heightened rates of childhood trauma are present in those who SH (Saçarçelik, Türkcan, Güveli & Yeşilbaş, 2013) and

women with a history of childhood sexual abuse (CSA) are more likely to have histories of SA or SH than those without, despite similar levels of depression (Gladstone et al., 2004). Childhood trauma, including emotional, physical and sexual abuse and neglect, is a risk factor for both depression and suicidality (Mandelli, Petrelli & Serretti, 2015; Nelson, Klumpp, Doebler & Ehring, 2017; Park, Hong, Jeon, Seong & Cho, 2015; Zatti et al., 2017). Indeed, Courtois' (2004) review suggests that alternations in regulation of affective impulses (e.g. SH) and alterations in self-perception (e.g. guilt, shame and low self-worth) are symptom areas particularly associated with interpersonal trauma at a young age.

Furthermore, several NSE concepts have been found to mediate the relationship between interpersonal traumas and depression, SI or SH (Dyer, Dorahy, Shannon & Corry, 2013; Glassman, Weierich, Hooley, Deliberto & Nock, 2007; Jones, Bilge-Johnson, Rabinovitch & Fishel, 2014). Sexual traumas appear to elicit particularly complex self-concept reactions (Keshet & Gilboa-Schechtman, 2017; Kucharska, 2017; Turner et al., 2010). A recent review of studies on adolescent samples concluded that a significant association was present between CSA and SI or SA in 49 out of 52 studies (Miller, Esposito-Smythers, Weismore & Renshaw, 2013). As discussed in Chapter 2, from an evolutionary perspective, self-criticism, shame, submissive behaviour, self-blame etc. can function as adaptive defensive strategies in threatening environments/situations, where it may be too dangerous to fight back or act out (Gilbert, 2002; Gilbert & Irons, 2005).

3.2.2. Social disadvantage

Socially disadvantageous circumstances are also associated with internal threat states. As suggested by Social Rank Theory (Gilbert, 1992), humans have evolved concerns for one's social position and being valued by others. Valued traits and abilities make one more capable of acquiring resources and thus more socially attractive. Individuals who perceived themselves as having less of these traits/abilities see themselves of low social rank. Resultingly, they feel defeated and engage in submissive behaviours (Gilbert, 1992; Sloman, 2014). Defeat is considered to arise through several means including failure to attain or loss of social or material resources (Gilbert, 2014b). Perceptions of defeat are particularly associated with depression and suicidality (Gilbert

& Allan, 1998; Siddaway, Taylor, Wood & Schulz, 2015; Taylor, Gooding, Wood, Johnson & Tarrier, 2011)

Perceptions of one's economic position in society is related to social rank and can carry over into one's general self-evaluations (Kraus & Park, 2014). Indeed, perceptions of one's economic standing is related to NSE even when controlling for neuroticism (Kraus & Park, 2014) and perceptions of classism are associated with feelings of inferiority (Simons, Koster, Groffen & Bosma, 2017). Moreover, unemployment and financial hardship are damaging to self-esteem (Waters & Moore, 2002) and low educational attainment and low income are associated with feeling socially inadequate (Bosma, Brandts, Simons, Groffen & van den Akker, 2015). Childhood poverty is associated with shame and low self-esteem (Bosma et al., 2015; Doi, Fujiwara, Isumi & Ochi, 2019). Twenge and Campbell's (2002) meta-analysis reported that high socioeconomic status (SES) individuals reported higher self-esteem than low SES individuals. Similarly, both low objective SES and subjective social status are associated with depressive symptomology (Hoebel, Maske, Zeeb & Lampert, 2017; Wetherall, Robb & O'Connor, 2019). However, despite this, individuals with low social status can develop strategies to buffer against feelings of low self-worth (Snow & Anderson, 1987).

Notably, these features of social disadvantage are also associated with suicidality. Socioeconomic deprivation and lower social rank are associated with SH (Hawton, Harriss, Hodder, Simkin & Gunnell, 2001; Jablonska, Lindberg, Lindblad & Hjern, 2009; Robinson et al., 2017; Wetherall, Daly, Robb, Wood & O'Connor, 2015; Wetherall, et al., 2019). Depression and anxiety have been reported as mediators of this relationship (Robinson et al., 2017). Moreover, Mossige et al. (2016) found that young people reporting suicidality were more likely to be from families on social welfare or families having financial difficulties compared to adolescents reporting no suicidality.

3.2.3. Other covariates

Other variables are also important to consider in the context of the internal threat continuum. For example, substance use disorders (SUDs) are significantly associated with SI, SA and death by suicide (Poorolajal, Haghtalab, Farhadi & Darvishi, 2016). It

is suggested that substance use may trigger impulsivity, encourage depressive thoughts, constrict attention on the negative situation and reduce barriers to engaging in SH/SA (disinhibition, numbing of pain) which may facilitate engagement in suicidality (Pompili et al., 2010). Substance use and negative self-schemas have also been linked, however, prospective analyses suggest that negative self-schemas are a risk factor for, not a consequence of, substance use (Corte & Zucker, 2008). Substance use may be used as a buffer against one's discomfort or distress with their highly negative self-concept (Corte & Zucker, 2008). Indeed, this parallels the Self-Medication Hypothesis (Khantzian, 1997) which posits that an individual's intolerance of strong negative affect motivates substance use. Recent longitudinal studies, using daily process methodologies, have found negative mood to predict future substance use (Harder, Ayer, Rose, Naylor & Helzer, 2014; Mason, Hitch & Spoth, 2009). Sadness and shame are particularly relevant in this context (Holl et al., 2017). Furthermore, other prospective studies have reported no significant association between self-esteem and substance use (McGee & Williams, 2000). Thus, while substance use may be a risk factor for suicidality, research suggests it may more likely be an outcome of, rather than risk factor for NSE.

3.3. Aims and hypotheses

This chapter sought to continue the exploration of a potential continuum of internal threat in the general population. In order to support this, consideration was given to the presence of individuals in the population who are characterised by similar patterns of internal threat. It was expected that individuals would be classifiable in relation to their variation on the four prespecified internal threat factors from Chapter 2. Firstly, it was predicted that a group characterised by little-to-no internal threat would emerge. Furthermore, it was predicted that several groups characterised by elevated probability of internal threat would emerge. These groups were expected to reflect a hierarchical structure which would be supportive of a proposed continuum. That is, it was expected that classes would emerge characterised by an increasing number of dimensions and increasing levels of these dimensions, reflecting graded severity of an internal threat construct. This is the first known empirical investigation of this topic.

Moreover, this chapter sought to understand what the risk factors for internal threat states were. It was expected that traumatic experiences and adverse social circumstances would confer risk for internal threat at both the upper and lower ends of the continuum. Additionally, the validity of the continuum may be further established if demographic and aetiological validity were demonstrated. Therefore, it was important to determine whether risk factors (demographic, environmental, etc.) are meaningful at different levels of the continuum or if they are common to all classes. For risk factors common across all internal threat classes, it was expected that they would be most strongly associated with the group(s) representing the severe end of the continuum and less strongly with the group(s) reflecting the lower end of the continuum, reflecting a dose-response effect. Furthermore, an opportunity to further validate the continuum was utilised by examining its association with a history of SA.

3.4. Method

3.4.1. Sample

As this analysis was a direct continuation of the previous chapter, the same sample was used. In brief, the British Psychiatric Morbidity Survey (BPMS) was a large-scale epidemiological study designed to be representative of adults, aged 16-74, living in private households in Britain. It was conducted in 2000, aiming to estimate the prevalence and correlates of mental health problems. Phase one assessment interviews were carried out on 8,580 adults (55% female, 45% male). Mean age was 45.37 ($SD = 15.61$) years and the majority of the sample were of White ethnicity (94%). See Chapter 2 for further details on the sample. Details of the broader survey methods are also available (Singleton, Bumpstead, O'Brien, Lee & Meltzer, 2001).

In Chapter 2, 13 items which were believed to reflect different forms of internal threat (e.g. self-criticism, inferiority, shame, SI, SH, etc.) were harvested from the BPMS dataset and were factor analysed. As the result of multiple exploratory and confirmatory analyses, a 4-factor correlated model emerged as the best fitting model. These 4 factors represented (1) low self-worth and subordination, (2) depressive states, (3) SI and (4) SH behaviours. These factors were used as the basis for analyses in the current chapter.

3.4.2. Measures

A number of variables were selected to predict class membership in the analysis, based on their known associations with internal threat. These were:

Sociodemography: Sex (male, female), age (≤ 24 , 25-34, 35-44, 45-54, 55-64, ≥ 65) ethnicity (white, non-white), annual income (\leq £5,199; £5,200-£15,599; £15,600-£33,799; \geq £33,800), employment (employed, unemployed), area (semi-rural/rural, urban) and relationship status (couple, not in couple).

Substance use: Alcohol problem and drug dependence (present, absent). Presence of a drinking problem was assessed using the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, De La Fuente & Grant, 1993). The AUDIT is a 10-item questionnaire which covers a series of aspects related to drinking behaviour. A score >8 was deemed to indicate hazardous drinking behaviour (Singleton et al., 2001). Information was collected regarding participants' use of eight types of drugs: cannabis, amphetamines, cocaine, crack, opiates, ecstasy, tranquillisers and solvents. Five follow-up questions on drug use over the previous 12 months was used to determine drug dependence. A positive score to any of these questions was regarded as having some level of drug dependence (Singleton et al., 2001).

Adversities: Several adverse and traumatic events assessed in the 'key lifetime events' section of the questionnaire were included as risk variables. These were: experiencing serious illness, injury or assault, separation or divorce, being sacked or made redundant, looking for work unsuccessfully for more than one month, having a major financial crisis, having a problem with the police involving a court appearance, being bullied, experiencing violence at work, violence at home, sexual abuse, running away from home and being homeless. These variables were dichotomously categorised as endorsed/not endorsed.

Psychiatric diagnosis variables: A selection of psychiatric diagnoses were used as risk variables. Presence of panic disorder, generalised anxiety disorder (GAD), obsessive compulsive disorder (OCD), specific phobia and social phobia were determined on the basis of Clinical Interview Schedule-Revised (CIS-R; Lewis, Pelosi & Dunn, 1992) responses. Individuals who screened positive for psychosis in the initial interview were invited for a follow-up clinical interview to determine presence of a clinical psychotic

disorder. The majority of these individuals took part in the follow-up interview and this information was used to generate a psychotic disorder diagnosis variable. Individuals who did not screen positive for psychosis in the initial interview were not believed to have a psychotic disorder. These diagnostic variables (panic, GAD, OCD, specific phobia, social phobia and psychosis) were combined to form an 'Any Diagnosis' variable. This variable was categorised as present/absent. Diagnoses of depression and mixed depression and anxiety (MAD) were not accounted for given that a screener for depression was used as one of the internal threat items. Details on the selection process for the follow-up interview are available (Singleton et al., 2001).

All variables were dichotomised to reflect endorsement or non-endorsement of the variable. For variables with more than 2 categories (i.e., age and income), dummy coding was used such that individual age and income categories could be compared to a specified age/income reference category. Variables indicative of traumatic experience and social disadvantage (included in the adversities and sociodemographic sections) were chosen based on their capacity to act as a risk factor for internal threat, as suggested by the research literature previously outlined. However, it was important to include other covariates as controls in the regression analysis. Substance use is associated with internal threat, however, research suggests it may be an outcome of NSE which reduces barriers for engagement in self-harming behaviours. Furthermore, as outlined in Chapter 1, internal threat content is present in a range of psychiatric diagnostic criteria and thus, individuals experiencing internal threat are likely to meet the criteria for one or more of these diagnoses. Therefore, it was important to control for these variables in the analysis in order to examine the unique effects of the other risk variables.

SA

Class membership was then used to predict lifetime history of SA. This was measured using an item from the 'Deliberate Self-Harm' section of the questionnaire: Have you ever made an attempt to take your life, by taking an overdose of tablets or in some other way?

3.4.3. Analytic plan

As discussed in the introduction, FMM was identified as an appropriate technique to categorise groups of individuals who share the same profile of variation across the established dimensions of internal threat. In brief, FMM allows for a concurrently categorical and continuous latent structure, which is thought to better represent the dimensionality of psychological structures (Clark et al., 2013). Although still relatively sparse, the use of FMM has grown. It has been used to model ADHD (Ranby et al., 2012), alcohol use disorders (McBride, Teesson, Baillie & Slade, 2011), paranoia (Bebbington et al., 2013; Preti et al., 2019), panic disorder (Pattyn et al., 2015) and material deprivation (Najera Catalan, 2017).

Eight models were specified and tested. All models were specified and estimated using Mplus version 7.4 (Muthén & Muthén, 1998-2015) with the appropriate weighting variable. Robust maximum likelihood estimation (Yuan & Bentler, 2000) was employed for the FMMA. In order to avoid solutions based on local maxima, 100 random sets of starting values were initially used, with 10 final stage optimisations. Several different variations of FMMA exist (Clark et al., 2013; Lubke & Muthén, 2007) which vary in restrictiveness of the models. As the aim of this analysis was not to test competing FMM models, a simplified, non-restrictive analysis was conducted which aimed to produce classes of individuals while recognising the preestablished underlying dimensional structure.

The relative fit of the FMMA models was compared by using three information theory-based fit statistics: the Akaike information criterion (AIC; Akaike, 1987), the Bayesian information criterion (BIC; Schwarz, 1978) and the sample size-adjusted Bayesian information criterion (ssa-BIC; Sclove, 1987). The model that produced the lowest values was judged to be the best fitting model. However, the BIC is considered to be the best of the fit indices tests in for deciding the number of classes in FMMA (Nylund, Asparouhov & Muthen, 2007). The Vuong-Lo-Mendell-Rubin likelihood ratio test (LRT; Lo, Mendell & Rubin, 2001) can also be used to determine class enumeration. The LRT compares a model with k classes to a model with $k - 1$ classes to examine whether there is a statistically significant improvement of fit (Nylund et al., 2007). When the LRT becomes non-significant it suggests the model with one less class is a better fit of the data. The entropy statistic should also be considered (Ramaswamy,

DeSarbo, Reibstein & Robinson, 1992). It ranges from 0 -1, with values closer to one indicating better classification of individuals within the analysis. In addition to the fit statistics, it is important to take into consideration the theoretical and conceptual relevance of the factors and latent classes when interpreting the results.

A multinomial logistic regression analysis was then conducted to assess whether the sociodemographic, substance use, adversities and diagnostic risk variables could discriminate between class memberships of the best-fitting FMM. Finally, logistic regression analysis was also used to investigate whether class membership predicted SA history.

3.5. Results

3.5.1. FMM

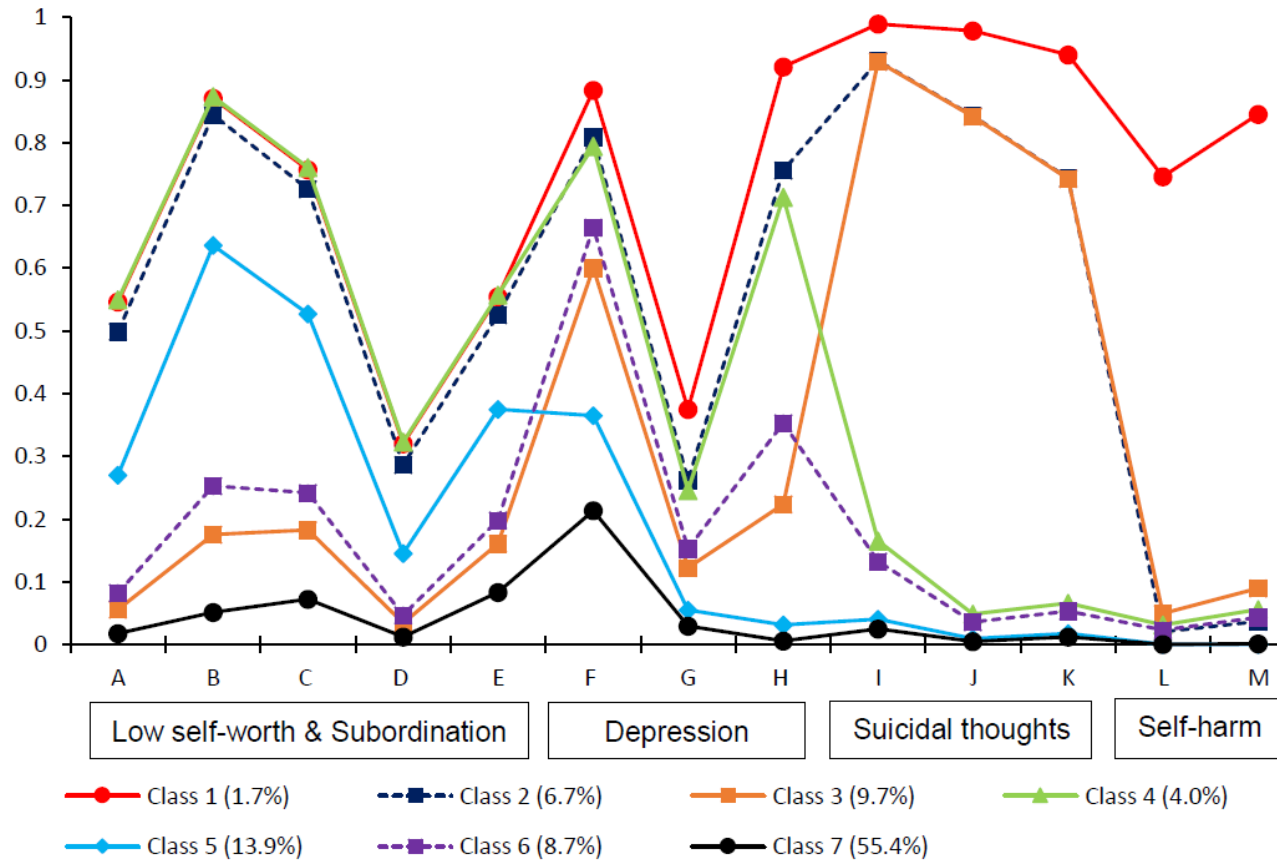
The fit indices for the FMMs are shown in Table 3.1. They indicated that the AIC, BIC and ssaBIC continued to decrease from the 2-Class model through to the 8-Class model. The LRT, however, became non-significant in the 8-class model, suggesting that the model with one fewer class should be accepted. Class enumeration should be based on both statistical and theoretical considerations. In this case, despite the BIC continuing to decrease throughout the models, the LRT suggested accepting the 7-class solution. Inspection of the class structure of the 7-class solution revealed the presence of distinct classes which appeared to reflect gradation on the internal threat factors, in line with the hypotheses. This solution also indicated acceptable classification of participants (entropy = .734). therefore, the 7-class solution (Figure 3.1) was accepted as the best fitting model in light of both statistical and theoretical considerations. The model selection process is described further in the Discussion section of this chapter.

Table 3.1. Fit indices for the factor mixture models (FMMs) ($N = 8,580$)

Model	Log-likelihood	Par.	AIC	BIC	ssaBIC	LRT (p)	Entropy
2	-39160.802	27	78375.603	78566.147	78480.346	-45144.722 (0.0000)	.895
3	-37930.012	32	75924.023	76149.853	76048.163	-39160.802 (0.0000)	.798
4	-37269.243	37	74612.486	74873.602	74756.022	-37930.012 (0.0000)	.813
5	-37138.709	42	74361.148	74657.820	74524.351	-37269.243 (0.0000)	.827
6	-37030.889	47	74155.777	74487.465	74338.108	-37154.287 (0.0000)	.790
7	-36926.200	52	73956.400	74323.374	74158.127	-37030.889 (0.0001)	.734
8	-36846.718	57	73807.436	74209.696	74028.560	-36926.200 (0.5031)	.746

Par., Number of free parameters; AIC, Akaike information criterion; BIC, Bayesian information criterion; ssaBIC, Sample size adjusted BIC; LRT, Vuong-Lo-Mendell-Rubin likelihood ratio test; selected model in bold.

Class 1 was the smallest class (1.7%; $n = 149$) and had elevated probabilities across all four dimensions: low self-worth and subordination (F1), depression (F2), SI (F3) and SH (F4). Notably, it was the only class to be characterised by elevated probability on the SH factor. Class 2 (6.7%, $n = 571$) had elevated probabilities on the low self-worth, depression and SI factors (F1, F2 and F3). Class 3 (9.7%, $n = 829$) was characterised by depressed mood and SI (F2 and F3). Class 4 (4.0%, $n = 340$) reflected a group of people high on the low self-worth and depression dimensions (F1 and F2). Class 5 (13.9%, $n = 1,193$) was the second largest class and was characterised primarily by low self-worth (F1). Class 6 (8.7% $n = 745$) was characterised by elevated probabilities on the depression dimension primarily (F2). Finally, Class 7 was the largest class made up of over half of the sample (55.4%, $n = 4,753$) which represented a baseline class with low-to-zero probability of endorsing any internal threat. For most items, this was close to zero, although the depression item had a slightly more elevated probability.



A Involvement; B Criticism; C Inferior; D Reassurance; E Disagree; F Depressed; G Uncomfortable; H Empty; I Not worth living; J Wish dead; K Suicidal ideation; L Non-suicidal self-injury; M Self-harm

Figure 3.1. FMMA 7-class model profile plot displaying class response probabilities to internal threat items

On the basis of the classes that emerged, Class 1 was considered to be the most severe internal threat class. It was the only class characterised by all four factors and furthermore, the only class to have elevated probabilities of engaging in self-harming behaviours. Classes 2 and 3 were also considered to be severe as they were both characterised by suicidality content. Classes 4, 5 and 6 were considered to be indicative of the middle-to-lower end of the continuum, reflecting low self-worth and depression combined or in isolation. The baseline group (Class 7) was considered to represent the lower end of the continuum. This group of individuals were unlikely to endorse any internally threatening experiences.

3.5.2. Multinomial logistic regression

Odds ratios (ORs) for the sociodemographic, substance use, adversity and diagnosis variables predicting FMM class membership are shown in Table 3.2. These ORs can be used to determine the strength of relationship between the variable and the continuum, and whether a dose-response relationship was present.

Sociodemography

A clear dose-response effect was present for gender, females had increasing risk of membership to the internal threat classes. A more mixed trend was present for age. Younger age, particularly in the <24 years group, exhibited a dose-response effect with internal threat. This age group was disproportionately associated with Class 1, however. For the 25-34 and 35-44 age groups, again a somewhat linear trend was present. For the 45-54 group a dose-response trend was present with the exception of Class 1; individuals in this group were no more likely to be in the most severe internal threat class than over 65s. The 55-64 age group was only associated with classes endorsing SI but not SH. No clear trend was present for ethnicity, e.g. while non-white ethnicity was significantly associated with membership to Class 4, white ethnicity was associated with membership to Classes 1 and 2.

Table 3.2. Predictors of internal threat class membership (N = 8,580)

Predictors	OR (95% CI)					
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6
Sociodemography						
Female	2.60 (1.62-4.16)***	2.44 (1.91-3.11)***	2.39 (1.96-2.92)***	1.96 (1.48-2.60)***	1.77 (1.51-2.08)***	1.34 (1.11-1.63)**
Age ^a <24	15.88 (5.09-49.57)***	3.50 (2.10-5.83)***	1.00 (0.65-1.55)	2.57 (1.52-4.36)***	1.50 (1.09-2.05)*	0.95 (0.65-1.39)
25-34	10.54 (3.53-31.43)***	3.74 (2.39-5.87)***	1.45 (1.03-2.04)*	1.42 (0.86-2.34)	1.38 (1.06-1.80)*	1.07 (0.78-1.47)
35-44	5.27 (1.72-16.15)**	3.97 (2.54-6.21)***	1.78 (1.28-2.48)***	1.99 (1.23-3.22)**	1.52 (1.17-1.97)**	1.11 (0.81-1.52)
45-54	2.35 (0.72-7.67)	3.00 (1.90-4.73)***	1.93 (1.39-2.69)***	1.67 (1.02-2.74)*	1.36 (1.04-1.78)*	1.05 (0.76-1.45)
55-64	0.80 (0.19-3.32)	2.49 (1.59-3.88)***	1.51 (1.10-2.08)*	1.57 (0.98-2.51)	0.91 (0.70-1.18)	1.10 (0.82-1.47)
Non-white ethnicity	0.31 (0.11-0.84)*	0.57 (0.35-0.92)*	1.07 (0.76-1.52)	1.59 (1.04-2.43)*	1.09 (0.82-1.45)	1.24 (0.88-1.74)
Income ^b	1.87 (0.52-6.73)	3.05 (1.63-5.71)***	0.98 (0.66-1.45)	2.47 (1.21-5.02)*	2.30 (1.62-3.27)***	2.16 (1.37-3.40)***
<£5,199	2.04 (0.60-6.96)	2.50 (1.37-4.57)**	1.14 (0.80-1.63)	2.14 (1.09-4.22)*	1.82 (1.31-2.53)***	1.89 (1.24-2.88)**
£5,200-£15,599	0.65 (0.17-2.52)	1.63 (0.88-3.02)	1.02 (0.71-1.47)	1.42 (0.71-2.86)	1.52 (1.09-2.12)*	1.53 (1.00-2.35)
£15,600-£33,799	1.89 (1.19-3.00)**	1.28 (1.00-1.64)	1.28 (1.03-1.60)*	1.26 (0.93-1.69)	0.85 (0.71-1.03)	1.03 (0.82-1.29)
Unemployed	1.04 (0.67-1.59)	1.11 (0.90-1.36)	1.02 (0.86-1.22)	1.05 (0.82-1.35)	0.99 (0.86-1.14)	0.96 (0.81-1.15)
Rural area	1.61 (1.06-2.45)*	1.79 (1.45-2.22)***	1.63 (1.36-1.94)***	1.38 (1.06-1.78)*	0.97 (0.83-1.13)	1.71 (1.43-2.04)***
Not in a couple						
Substance use						

Table 3.2 continued

Drink problem	1.78 (1.18-2.69)**	1.08 (0.85-1.37)	1.29 (1.06-1.57)*	1.55 (1.18-2.03)**	1.04 (0.88-1.23)	1.16 (0.95-1.42)
Drug dependence	3.11 (1.71-5.65)***	1.60 (0.97-2.63)	2.34 (1.54-3.57)***	1.47 (0.80-2.68)	0.82 (0.48-1.40)	2.13 (1.36-3.33)***
Adversities						
Illness, injury or assault	2.73 (1.81-4.11)**	1.52 (1.23-1.89)***	1.49 (1.24-1.78)***	1.04 (0.79-1.37)	1.07 (0.91-1.26)	1.23 (1.02-1.48)*
Divorce or separation	1.58 (1.04-2.42)*	1.36 (1.10-1.70)**	1.75 (1.47-2.10)***	1.19 (0.91-1.55)	0.99 (0.84-1.16)	1.37 (1.14-1.65)***
Sacked or made redundant	1.31 (0.84-2.03)	1.20 (0.95-1.51)	1.27 (1.05-1.53)*	0.90 (0.68-1.20)	1.09 (0.92-1.28)	0.88 (0.72-1.08)
Out of work >1 month	2.12 (1.38-3.25)***	1.25 (0.98-1.59)	1.41 (1.15-1.73)***	1.26 (0.94-1.69)	1.15 (0.96-1.38)	1.03 (0.83-1.28)
Major financial crisis	1.37 (0.84-2.25)	1.86 (1.42-2.44)***	1.56 (1.23-1.96)***	1.27 (0.89-1.82)	0.96 (0.76-1.23)	1.28 (0.98-1.67)
Problems with the law	1.09 (0.64-1.85)	1.16 (0.83-1.61)	1.15 (0.87-1.51)	1.00 (0.65-1.54)	0.99 (0.75-1.31)	0.93 (0.68-1.28)
Bullying	2.54 (1.68-3.84)***	2.23 (1.76-2.82)***	2.37 (1.94-2.90)***	2.33 (1.75-3.09)***	1.54 (1.28-1.86)***	1.71 (1.37-2.13)***
Violence at work	0.61 (0.27-1.40)	0.85 (0.53-1.37)	1.08 (0.74-1.57)	0.93 (0.52-1.66)	0.71 (0.47-1.08)	1.16 (0.77-1.74)
Violence at home	1.57 (0.97-2.54)	1.80 (1.33-2.43)***	1.39 (1.05-1.83)*	1.95 (1.33-2.84)***	0.99 (0.72-1.36)	1.21 (0.87-1.68)
Sexual abuse	5.39 (3.06-9.50)***	4.28 (2.86-6.41)***	2.93 (1.98-4.34)***	1.64 (0.91-2.94)	1.58 (1.00-2.50)*	1.61 (0.97-2.67)
Runaway from home	3.27 (2.00-5.32)**	1.94 (1.35-2.79)***	1.82 (1.30-2.54)***	1.27 (0.78-2.07)	1.10 (0.75-1.61)	1.24 (0.82-1.88)
Homeless	2.16 (1.23-3.79)**	1.52 (1.02-2.29)*	1.80 (1.26-2.58)***	1.56 (0.93-2.63)	0.97 (0.61-1.53)	0.91 (0.56-1.48)
Diagnoses						
Any disorder ^c	26.27 (16.44-41.99)***	13.72 (9.99-18.84)***	4.54 (3.25-6.34)***	13.55 (9.48-19.37)***	2.65 (1.84-3.80)***	6.48 (4.66-9.03)***

Note. * p < .05, ** p < .01, *** p < .001; Reference categories: ^a >65, ^b >£33,800; ^c Panic disorder, GAD, OCD, specific phobia, social phobia or psychosis. Class 7 used as reference class. Significant ORs in bold.

Regarding annual income, for those in the lowest (<£5,199) and second lowest (£5,200 - £15,599) brackets, a linear trend was present for internal threat, however, this did not extend to Class 1. No internal threat trend was present for those in the second highest income category (£15,600 - £33,799). Surprisingly, a linear trend was not exhibited for unemployment, although it was associated with some of the severe suicidality classes. Additionally, no significant associations were present for living in a rural/urban area. Significant associations were present for single relationship status; however, this was not a clearly linear trend.

Substance use

For those meeting the criteria for a drink problem, no association was present for the least severe internal threat classes (Classes 5 and 6). Significant associations were present with Classes 1, 3 and 4; this, however, did not display a dose-response effect. Similarly, drug dependence was only significantly associated with Classes 1, 3 and 6.

Adversities

Again, mixed results were present for adverse experiences. Illness, injury or assault and divorce or separation, were significantly predictive of severe internal threat. Being sacked or made redundant was only associated with Class 3. Furthermore, being out of work for more than a month was associated with Classes 1 and 3 while experiencing a major financial crisis was associated with Classes 2 and 3. No significant association was found between internal threat and problems with the law or experiencing violence at work.

Individuals who had experienced bullying were at an elevated risk of being members to all six internal threat classes compared to the baseline class. Notably, this was the only trauma variable to exhibit this effect. Moreover, a clear dose-response effect was present; only Class 2 marginally deviated from this trend. Experiencing violence in the home appeared to be associated with the more severe internal threat classes (2 and 3), although, its highest OR was with Class 4. Sexual abuse more clearly exhibited a dose-response effect, particularly at the severe end of the continuum. However, it was also significantly associated with membership to Class 5, suggestive of a potential linear trend. In contrast, running away from home and experiencing homelessness were only associated with the severe classes.

Psychiatric diagnoses

Using the combined psychiatric diagnoses variable (inclusive of panic disorder, GAD, OCD, specific phobia, social phobia and psychosis), elevated risk was found across all internal threat classes compared to the baseline class. This exhibited a dose-response linear trend, with Class 4 being the only outlier in this case.

3.5.3. SA regression

The association between the classes and a SA history is shown in Table 3.3. Compared with the baseline class (Class 7), lifetime SA was associated with Classes 1, 2, 3 and 6. The OR was extremely elevated for Class 1 compared with the other classes. However, Classes 2 and 3 also exhibited considerably elevated ORs. Within the classes that exhibited an association, a dose-response effect was present, although the inclusion of SI in Classes 2 and 3 drastically increased the odds of SA and similarly, the inclusion of SH in Class 1 drastically increased the OR again.

Table 3.3. Binary logistic regression showing associations between classes and SA (N = 8,580)

Class	OR (95% CI)
1	2743.87 (968.94-7770.15)***
2	346.51 (127.49-941.75)***
3	326.95 (120.97-883.67)***
4	3.50 (0.39-31.42)
5	2.99 (0.67-13.39)
6	16.15 (5.05-51.64)***

*** $p < .001$

3.6. Discussion

3.6.1. Graded model of internal threat

The purpose of this study was firstly to model differences in severity of internal threat among subgroups of individuals in the general population. FMM was utilised as an appropriate analytic technique to achieve this aim. The proposed internal threat

continuum was further established and supported from the FMM analysis. The analysis found subcategories of individuals in the general population that seemed to reflect a graded, hierarchical model of internal threat. Class 1 was the most severe class, it was notably the only class to be characterised by elevation on the SH dimension and further, it also had elevation on all other internal threat dimensions. This class was considered to lie at the upper end of the continuum. Class 7 on the other hand, were not elevated on any of the items with exception of the depressed item. The elevated probability of this item was only slight in comparison to the other classes and likely due to the proportion of individuals endorsing this item in the sample (41.7%). This class showed little-to-no probability of endorsement of the low self-worth and subordination factor, the SI factor, the SH factor and the remaining depression factor items. This class was considered to represent the lower end of the continuum, where most individuals were situated.

Between these two classes, five other classes emerged, also displaying a gradation in experience. Classes 5 and 6 were, respectively, characterised by low self-worth and subordination, and depressive experiences only. Class 4 was characterised by both of these factors. Class 3 suggested the presence of a group of individuals who seemed to transition from lower to more severe internal threat; SI was present alongside depression. Finally, Class 2 reflected the step below Class 1; they were characterised by the same profile with the exception that Class 2 was not characterised by SH. Thus, seven classes of graded severity were considered to have emerged from the data. Class composition suggested the presence of distinct groups capturing variation in internal threat.

Class proportions further supported the hierarchical group structure. The fewest individuals were in Class 1 (1.7%) while the most individuals were in Class 7 (55.4%). In general, a linear relationship between proportion of individuals and class severity emerged, though Class 3 and 4 were slight outliers here. The fact that more individuals were classified into the ‘depression and SI’ class than the ‘depression only’ class may reflect how strongly associated depression and passive and/or active suicidal thoughts are. Furthermore, almost 45% of the sample was elevated on at least one internal threat dimension and almost a quarter (22.1%) were elevated on two or more internal threat dimensions, meaning that these experiences were not just relevant to a small minority of the population.

3.6.2. Risk factors

Of all the risk factors, those most consistently and highly associate with class membership were being female, less than 24 years of age (although elevated ORs were also present in the 25-34 year age group), having experienced bullying, having experienced sexual abuse and meeting the criteria for a mental disorder. The demographic characteristics associated with class membership were not surprising; females tend to have lower self-esteem (Kling, Hyde, Showers & Buswell, 1999), lower self-compassion (Yarnell et al., 2015), are more likely to experience depression (Salk, Hyde & Abramson, 2017) and more frequently engagement in SH and SA (Hawton, Saunders & O'Connor, 2012) than males. Moreover, a vicious cycle between self-criticism and depression is present for girls but not boys during adolescence; self-criticism drives depression which in turn fuels self-criticism (Shahar, Blatt, Zuroff, Kuperminc & Leadbeater, 2004). Furthermore, SH is frequent during adolescence and young adulthood (Hawton et al., 2012). Gender difference in depression also peak during adolescence (Salk et al., 2017). Moreover, self-esteem increases with age, peaking at 60 (Orth, Erol & Lucian, 2018) and is associated with reduced likelihood of depression (Orth, Robins & Roberts, 2008).

The social disadvantage risk factors were moderately associated with internal threat, although not as consistently as expected. Unemployment, being out of work for more than a month and experiencing a major financial crisis were associated with classes mainly characterised by suicidality. Additionally, low income was associated with classes mainly characterised by NSE. This supports Kraus and Park's (2014) finding that perceptions of social class mediated the relationship between objective social class (measured by income and education) and low self-esteem even after controlling for neuroticism. Furthermore, low objective SES (determined by education, occupation and income) is associated with depressive symptomology (Hoebel et al., 2017). Furthermore, unemployment is associated with a 2-3-fold increased likelihood of suicide (Blakely, Collings & Atkinson, 2003; Kposowa, 2001). In adolescents, financial difficulties at home were significantly associated with SI and SH also (Mossige et al., 2016). Qualitative research suggests that in the context of adverse life circumstance, a job loss, debt, housing problems or benefits sanctions acted as a 'final straw' to trigger SH (Barnes et al., 2016). Thus, while low income may make an individual feel

worthless, inferior, defeated etc., it may take additional ‘final straw’ events for them to engage in SH.

Sexual abuse and bullying were particularly relevant to internal threat class membership in this study. This was not unexpected given that both have been associated with SH, SI and SA (Holt et al., 2015; Mossige et al., 2016; Zatti et al., 2017). Furthermore, it is consistently noted that interpersonal trauma can impact one’s self-perception, resulting in shame, low self-worth, etc. (Courtois, 2008). In the case of bullying, this finding may reflect the Social Mentality Theory’s proposition that external criticism may be mirrored internally. In addition, the finding that sexual abuse is particularly detrimental in terms of internal threat corroborates the literature that even among interpersonal traumas, sexual traumas appear to elicit more complex responses.

In this study, sexual abuse had the highest ORs of any of the traumas; individuals endorsing this item were almost 5.5 times more likely to be in Class 1 and 4.5 times more likely to be in Class 2, compared to the baseline class, when controlling for the effects of the other covariates. Kucharska (2017) found that among women who had recently experienced a trauma, those who had experienced a sexual trauma had higher levels of depression and lower self-esteem than those who experienced other types of trauma or no trauma. Sexual traumas are thought to hold a unique status in that they are “a toxic mix of an interpersonal harm, a violent exploitation of one’s body, and a transformation of an act of connectedness into an act of submission” (Keshet & Gilboa-Schechtman, 2017, p.545) . As elaborated by Keshet and Gilboa-Schechtman (2017), this combination of intentional threat and degradation, violation of bodily integrity and lack of connection as a result of the context of the act may promote thoughts of unworthiness, vulnerability and inferiority; self-disgust; and unlovability, respectively. Furthermore, societal stigma impedes help-seeking, exacerbating negative outcomes (Filipas & Ullman, 2001). Similar to Kucharska (2017), Keshet and Gilboa-Schechtman (2017) reported that women who had experienced a sexual assault had a more impaired self-concept than women who experienced a motor vehicle accident and those with no trauma, even when accounting for levels of posttraumatic distress.

Moreover, NSE may be highly influential in the trauma-suicidal behaviour relationship. For example, Jeon et al. (2014) reported that among individuals with a

diagnosis of major depressive disorder, more individuals who experienced a trauma attempted suicide than those who had not experienced a trauma. Furthermore, feelings of worthlessness was the only item (among 20 depression items) that was significantly associated with SA. Subgroup analysis showed that feelings of worthlessness were only associated with SA in those who had experienced a serious trauma (e.g. combat, witnessing a violent crime, rape or sexual assault, physical assault, etc.) but not those who had not experienced a serious trauma.

3.6.3. Demographic and aetiological validity

An additional aim of this chapter was to assess the continuity of risk along the proposed internal threat continuum. Firstly, it is important to restate here that the data modelled was not longitudinal, therefore, the hypothesis of transitioning along the proposed continuum was not tested. Thus, while this analysis could not test for potential predictive validity, demographic and aetiological validity were assessed. If a continuum of internal threat exists, it would be expected that the relationship between the classes at the upper end of the continuum (characterised by suicidality) should be characterised by the same demographic, environmental, social, clinical, etc. risk factors as those at the lower end of the continuum (characterised by NSE content). Importantly, given the class compositions, it was not expected that significant associations would need to be demonstrated with every class in order to support demographic and aetiological validity. Individuals may graduate through the continuum using alternative routes.

Given the classes which emerged from the FMM, it was expected that the highest ORs would be associated with the class characterised by all four internal threat dimensions (Class 1; notably the only class characterised by the SH factor) compared to the other classes. Of the 25 risk factors which presented an association with any of the internal threat classes, 15 of these presented their strongest association with Class 1. Moreover, it was expected that ORs would be significantly associated with, but reduced in size for, the other classes inclusive of suicidality (Classes 2 and 3; characterised by the SI but not SH factor). This trend was present in the majority of cases, although Class 2 did not always necessarily have higher ORs than Class 3. Furthermore, it was expected that ORs for less severe internal threat classes (particularly Classes 4 and 5 characterised by low-self-worth content) would exhibit a significant, but smaller, association with these variables compared to baseline. Again, this effect was

demonstrated in a substantial amount of cases, however, similar to above, in some cases, these classes had higher ORs than Classes 2 or 3. For example, having a drink problem was more strongly associated with Class 4 (low self-worth and depression, OR = 1.55) than it was with Class 3 (SI and depression, OR = 1.29).

Several outliers and unexpected results were evident from the results of the regression analysis. For example, ethnicity was the only variable included in the analysis which was differentially associated with the classes. That is, while non-white ethnicity was significantly associated with Class 4, white ethnicity was associated with Classes 1 and 2. Furthermore, based on the aforementioned relationship between social disadvantage and internal threat, it was expected that unemployment, being out of work for more than a month and experiencing a major financial crisis would be associated with the classes at the lower and upper end of the continuum. This, however, was not the case. These risk factors were only associated with Classes 1 and 3, classes characterised by suicidality but not low self-worth. It is possible however, that after controlling for income these experiences had no unique effect on NSE. Relatedly, low income was associated with all classes except Classes 1 and 3. Moreover, it exhibited a robust linear association with Classes 2, 4, 5 and 6. Thus, low income may prompt negative feelings about oneself as useless, worthless, and inferior and cause one to question whether life is worth living, but only in the context of unemployment (which could be considered a form of entrapment) may an individual engage in SH behaviour. Overall, the income ORs were highly supportive of the internal threat continuum, with the exception of transitioning to the most severe internal threat state.

Some of the risk factors, particularly the adverse experiences, were only associated with the severe suicidality classes. These were having experienced a serious illness, injury or assault, divorce or separation, being sacked or made redundant, looking for work unsuccessfully for more than a month, experiencing a major financial crisis, having run away from home and having experienced homelessness. Notably, these traumas are situational, whereas the interpersonal traumas (e.g. bullying, sexual abuse, violence in the home) were more consistent with risk across the internal threat spectrum. Indeed, the bullying and sexual abuse variables, along with meeting the criteria for being diagnosed with a mental disorder, best highlighted an evolution of risk across the continuum. Thus, the internal threat continuum may be most applicable to individuals who have experienced an interpersonal trauma. This compliments Gilbert's

(2014b) proposition that defeat may stem from loss of or failure to attain social or material resources; put downs from others, or one's own internal attacks. Accordingly, for those who have experienced situational/non-interpersonal trauma, their class membership may stem from feelings of defeat (captured by proxy by the items in the depression factor) and subsequent suicidality in the wake of failure to attain or loss of material or social resources (e.g. financial crisis, homelessness, being sacked/made redundant). On the other hand, those who have experienced an interpersonal trauma may internally attack, resulting in feelings of defeat and subsequent suicidality. Hence, they experience the full range of the internal threat continuum compared to individuals endorsing situational/non-interpersonal traumas.

3.6.4. Internal threat classes and suicide attempt history

SA acted, in part, as a validator for the proposed extended continuum as it represented the most extreme and severe outcome that could be considered for internal threat behaviour. Its association (or lack thereof), with each of the classes, indicated that while SA may be strongly associated with the most severe profiles of internal threat, it is not likely to be an outcome for all who occupy positions on the proposed continuum. There seemed to be a notable risk that was specifically relevant for those who were/had actively engaged in SH behaviour. Those who entertained thoughts of suicide but who did not SH also exhibited significantly elevated risk of SA. Moreover, the significant risk was also present for Class 6 (depression only); this was an interesting finding as Class 4 (low self-worth and depression) did not exhibit risk of SA.

The extremely elevated association between Classes 1, 2 and 3 and SA is not unexpected given the proposition of the suicidality continuum. Within the suicidality continuum, SA is usually anchored at the upper, severe end of the continuum, representing its most extreme outcome. Many studies have acknowledged the presence of SI and self-harming behaviours without suicidal intent before an individual engages in a SA. De Leo, Cerin, Spathonis and Burgis (2005) reported that, in their study, over 99% of individuals that had attempted suicide reported experiencing SI or suicide planning beforehand. SI also prospectively predicts SA (Ribeiro et al., 2016). Furthermore, NSSI prospectively predicts both SI and SA (Guan, Fox & Prinstein,

2012; Mortier et al., 2017; Ribeiro et al., 2016). It is associated with an increased risk of transitioning from SI to suicide planning and from suicide planning to making an attempt (Kiekens et al., 2018). Moreover, in a prospective cohort study, NSSI was found to be the strongest predictor of first time SA among adolescents experiencing SI (Mars et al., 2019). The SA regression findings also fit with Bryan and colleagues work on military samples (Bryan, Rudd et al., 2015; Bryan, Bryan et al., 2015) which suggest that NSSI may serve as a ‘stepping stone’ from SI to SA in a substantial number of cases. This fits with the extremely elevated odds in the SI and SH class (Class 1) compared to the classes characterised SI but not SH (Classes 2 and 3).

3.6.5. Limitations

Once again, it is important to reiterate that the use of cross-sectional data in this study did not afford opportunities to test the temporal and transitional assumptions that were proposed. As mentioned in Chapter 2, limitations associated with the preliminary nature of the study, study replication and incorporation of a broader selection of internal threat variables, potentially from recognised measures, are also applicable here. Moreover, due to secondary data constraints, some covariates were not included in the regression analysis. For example, eating disorders have been consistently linked to internal threat states (Fennig & Hadas, 2009; Stein & Corte, 2007; Troop, Allan, Serpel & Treasure, 2008), however, the BPMS did not screen for their presence. Therefore, it was not possible to control for eating disorders using the ‘any diagnosis’ variable. Additionally, the diagnoses of depression and mixed anxiety and depression were not included as part of the combined diagnoses variable; the selected internal threat items contained a screener question for depression.

FMM is a sophisticated analytic technique that was used in this study due to its advantages of LCA. The ability to classify individuals into distinct groups whilst allowing factor variation within the class is useful with psychological phenomena (Clark et al., 2013). Additionally, it is considered to result in a more parsimonious model than LCA. However, techniques such as FMM require subjectivity in the model building and class enumeration processes. Subjectivity arises from the interpretation of the fit indices. Model selection can be difficult if the fit statistics are not in agreement with one another. In this instance, however, a decision was made to accept the 7-class

structure on the basis of (i) the LRT result, (ii) the hypothesised class structure which related to a theoretically meaningful interpretation, (iii) parsimony and (iv) the qualitative distinctiveness of the classes in this model. However, the other fit indices were lower in the 8-class than the 7-class solution and had the potential to continue to decrease in size in 9-, 10-, etc. class models, although this was not tested. Accepting the 7-class model was deemed satisfactory based on the criteria outlined above. Other researchers, however, may have preferred to specify additional models, with more classes, in the hope of finding the fit indices ‘bottoming out’. Thus, it is important that these results are interpreted cautiously.

3.6.6. Future research

Future research may consider attempting to replicate the modelling of classes using prospective data. Growth mixture modelling may be utilised on prospective data to investigate longitudinal trajectories of the internal threat classes, potentially allowing for predictive validity of the continuum hypothesis to be demonstrated. That is, are individuals who occupy classes at the lower end of the continuum also at risk of transitioning through the classes, potentially to the most severe internal threat states.

A freely estimated (noninvariant) model was analysed in this study. In such a model, parameters are allowed to be freely estimated between the classes. This model converged and suggested a 7-class model was the best fit of the data. However, this model may not necessarily be the best fitting model; there is potential that more restrictive models better represent the data. When the analyses are more exploratory in nature, models should be tested with increasing restrictiveness (Lubke & Muthén, 2005). Thus, as this study tested a freely estimated model, future analyses may wish to replicate this model and compare models with differing levels of restrictiveness, i.e., noninvariant, partially invariant and invariant models, in order to find the best latent representation of the internal threat construct. While less restrictive models are beneficial for class differentiation, more restrictive models may be easier to estimate due to the reduced number of parameters to be estimated (Lubke & Muthén, 2007). Consequently, after further testing and replication of the internal threat continuum has been conducted, specific assumptions about the structure of internal threat models may

be theorised. These can then be used as a basis on which to selectively restrict parameters in competing models.

Furthermore, the results of the regression analysis suggested that the internal threat continuum may have been more applicable in the context of interpersonal than noninterpersonal/situational trauma. As mentioned in Chapter 1, internal threat states are already present within the existing diagnostic literature. Notably, the diagnoses of CPTSD and BPD are characterised by NSE and suicidality, respectively. Furthermore, both of these diagnoses have a trauma aetiology; for CPSTD this is integrated within the diagnostic criteria, for BPD a vast body of literature has linked the diagnosis to trauma history. Interpersonal traumas are more associated with both of these diagnoses than noninterpersonal traumas (Cloitre, Garvert, Brewin, Bryant & Maercker, 2013; Westphal et al., 2013). Therefore, there may be potential that the internal threat continuum may already exist within these trauma-based diagnoses. Additionally, in view of the interpersonal trauma history underpinning risk for these disorders, evolving states of internal threat may be considered to stem from external threat response symptomology. Chapter 4 will explore whether these diagnoses may capture transition from external to internal threat states. Replication of the internal threat continuum and associated interpersonal trauma risk will be attempted, specifically using external threat diagnostic symptomology to model the continuum.

3.7. Conclusion

Low self-worth and subordination, and depression, while representative of distinct groups in the population are also highly prevalent in those who entertain suicidal thoughts and engage in SH behaviour. A suicidality continuum, therefore, may extend beyond the most extreme thoughts and behaviours and incorporate a much wider array of phenomena related to NSE, that may vary in severity and may constitute a broader internal threat spectrum. Although the current study cannot infer temporal ordering, it similarly suggests that individuals in the classes characterised by experiences at the lower end of the continuum have the potential to transition or ‘graduate’ to increasingly severe experiences. Despite inconsistencies and mixed trends emerging from the risk variable regression, some variables reflected a dose-response pattern. Given the preliminary nature of this study, this was regarded as a significant, promising finding.

Additionally, SA history was most likely for those who had engage in suicidal thoughts. However, to a much lesser degree, individuals characterised by depression without SI or SH also exhibited elevated risk. Along with the results partially suggestive of demographic and aetiological validity, FMM class composition and class proportions further supported the continuum. Moreover, partial epidemiological and distributional validity was demonstrated in Chapter 2, as were factor correlations supportive of a continuum. Overall, these preliminary results suggested potential for a hierarchical structure of internal threat and a ‘graduation’ hypothesis from less to more severe internal threat experiences.

Chapter 4

From external to internal threat: Reconsidering the threat status of established, trauma related, psychiatric symptomology

Background and research aim: To date, researchers and clinicians interested in human threat response have almost entirely focussed on observable reactions to external sources of threat. Psychiatric disorders that have been shown to be commonly associated with such threat exposure have included complex posttraumatic stress disorder (CPTSD) and borderline personality disorder (BPD). Notably, established threat related disorders such as CPTSD and BPD are characterised by symptoms that seem to capture such variation in and vulnerability for internal threat states, which may represent the lower and upper ends of the proposed internal threat continuum, respectively. However to date, no known research has attended to the threat status of these symptoms. The current study sought to explore whether (i) variation from lower to more extreme levels of internal threat could be evidenced in distinct latent classes of symptom typology and (ii) particular types of trauma could differentiate between internal threat classes. The study also aimed to replicate the findings from Chapter 3, in this case modelling an internal threat continuum using established external threat symptomology.

Method: In two separate population-based samples; Israel ($N = 618$), and the United Kingdom (UK; $N = 505$), the ‘negative self-concept’ (NSC) symptoms from CPTSD and the more extreme suicidality symptoms from BPD were isolated from their constructs. Latent class analyses (LCAs) were conducted on these items in both samples. Furthermore, traumatic experiences, measured by the Life Events Checklist (LEC), were assessed and LCAs were also carried on the LEC items in both samples. Multinomial logistic regression was then conducted to determine associations between the trauma latent classes and the internal threat latent classes.

Results: In both samples, three internal threat classes were identified. Notably, these classes reflected similarity in internal threat variability across the samples. The classes that emerged in both samples were: (1) an NSC and suicidality class which had elevated probabilities on both sets of items, (2) a suicidality only class which was primarily characterised by elevated probability on the suicidality items but not the NSC items and (3) a baseline class with low-to-zero probability of endorsing any of the internal threat items. LCAs of the trauma items also revealed a 3-class structure in both samples, however, these differed in class content. In the Israeli sample, the trauma classes represented (1) a physical and sexual trauma class, (2) an accidents and physical trauma class and (3) a baseline class. In the UK sample, the trauma classes represented (1) a

physical and sexual trauma class, (2) an all trauma class and (3) a baseline class. Overall, regression analysis findings showed that trauma profiles inclusive of interpersonal trauma, particularly sexual trauma, were associated with internal threat Classes 1 and 2. ORs indicated that associations were stronger with internal threat Class 1.

Conclusions: The current study sought to explore whether an internal threat continuum could be identified using symptomology from psychiatric diagnoses that have been formulated to capture external threat response. This was a unique opportunity to exploit pre-existing external threat data to model the proposed internal threat continuum. Two classes characterised by elevated internal threat; one characterised by both NSC and suicidality (Class 1), and another by suicidality only (Class 2) were identified in both samples, and trauma profiles characterised by interpersonal trauma significantly predicted class membership. Class 1 was considered to reflect the severe end of the continuum. Furthermore, as expected from the results of Chapter 3 and the existing research literature, interpersonal trauma was most associated with this class. The findings suggest that while NSC and suicidality may commonly emerge after external threat exposure and inform extant diagnostic measures that describe external threat response, they may also constitute an entirely distinct form of threat.

4.0. Introduction to Chapter 4

The results of Chapters 2 and 3 suggest that the suicidality continuum, anchored at one end by self-injurious thoughts and at the other by suicide attempt (SA), may be extended. A broader spectrum of threat potentiated thoughts and beliefs, related to negative self-evaluation (NSE), may extend an individual's internal threat status beyond suicidality. Characterised by, for example, low self-esteem, self-criticism, submissiveness, feelings of inadequacy, defeat, shame, self-disgust and guilt, these NSE concepts are not only strongly related to one another but are highly associated with suicidality. The results of the factor analysis and factor mixture modelling (FMM) in the previous chapters suggest that there is potential for an extended continuum of suicidality, incorporating NSE, which reflects a continuum of internal threat within the general population.

In summary, four distinct dimensions of internal threat, ranging from 'low self-worth and subordination' to 'depression' to 'suicidal thoughts' to 'self-harm' were identified. Subsequent FMM identified seven homogeneous groups, or classes, each characterised by variation across these dimensions. This revealed a clear pattern of internal threat severity and furthermore, risk factors related to trauma and adversity, suggested continuity with the graded, hierarchical classes. However, while this is the first consideration of a transparent internal threat continuum within the research literature, evidence of variation in and vulnerability for such internal threat states, and their associated aetiological context, may have already been apparent in the clinical research literature.

Somewhat paradoxically, many of the constituent concepts that make up the internal threat continuum are also evident in commonly identified features of highly comorbid psychiatric diagnoses that are known to be associated with exposure to external threats such as complex posttraumatic stress disorder (CPTSD) and borderline personality disorder (BPD; Goodman et al., 2007; Maercker et al., 2013). Internal threat therefore may actually constitute a distinct form of threat that, until now, has not been considered as a potential risk factor for these disorders because of a myopic focus on external threat exposure and a failure to distinguish external threat response symptomology from evolving states of internal threat.

4.1. External threat response diagnoses

To date, researchers and clinicians studying human threat response have almost entirely focussed their attention on observable reactions to traumatic experiences such as war, natural disasters, assaults and abuse. This research has explored hyperactivity (e.g. fight/flight) and hypoactivity (e.g. freeze/collapse) in both physiological and psychological systems and has focussed entirely on external sources of threat. This research has led to the formulation of several psychiatric diagnoses associated with the activation of our threat response system in reaction to external threat, most notably posttraumatic stress disorder (PTSD). PTSD develops following exposure to a traumatic or stressful event(s) and it is characterised by three main symptom clusters: (i) re-experiencing of the trauma in the present, (ii) avoidance of traumatic reminders, and (iii) persistent sense of threat which manifests itself in increased arousal and hypervigilance (World Health Organization [WHO], 2018).

More recently, CPTSD has been included in latest revision of the International Classification of Diseases (ICD-11; WHO, 2018). CPTSD is characterised by the same three symptom clusters as PTSD as well as three additional clusters known collectively as Disturbances of Self-Organization (DSO). These 3 DSO symptom clusters are (i) affective dysregulation, (ii) negative self-concept (NSC) and (iii) disturbances in relationships (Maercker et al., 2013). As with PTSD, this diagnosis must be anchored to a specific trauma or series of traumatic events. Although not a prerequisite for diagnosis, a substantial body of research evidence has also linked trauma exposure to BPD, resulting in high comorbidity with PTSD (MacIntosh, Godbout & Dubash, 2015; Pagura et al., 2010; Scheiderer, Wood & Trull, 2015). BPD is a personality disorder characterized by instability in interpersonal relationships, identity and self-image disturbances, impulsivity, affective instability and self-harming behaviour which typically begin in early adulthood (American Psychiatric Association [APA], 2013). Both of these diagnoses, CPTSD and BPD have been subject to controversy (see Lewis & Grenyer, 2009; MacIntosh et al., 2015; Resick et al., 2012 for reviews on this topic). While BPD has been criticized due to the fact that it is “extraordinarily clinically heterogeneous” (Lenzenweger, Clarkin, Yeomans, Kernberg & Levy, 2008, p.326), CPTSD has also been questioned regarding its distinction from PTSD. However, much of the controversy has focused on the links and overlap between CPTSD and BPD in terms of symptomology and aetiology (Lewis & Grenyer, 2009; Resick et al., 2012).

4.1.1. CPTSD and BPD comorbidity

Cloitre, Garvert, Weiss, Carlson and Bryant (2014) conducted an LCA on data from 280 women with histories of childhood abuse who were being assessed for enrolment in a clinical trial for PTSD. Diagnostic criteria for PTSD, CPTSD and BPD were used in the LCA. Results revealed distinct profiles, a low symptom class and classes characterised by each of the individual diagnoses emerged. The authors suggested that these findings supported the construct validity of CPTSD as distinguishable from BPD. However, the study also found that among those who met the diagnostic criteria for BPD, a significant proportion also met the criteria for CPTSD (45.1%). A similar LCA was carried out on a general population sample of individuals endorsing experience of a sexual trauma (Frost, Hyland, Shevlin & Murphy, 2018). These results however, suggested less of a clear distinction between the three disorders. While CPTSD emerged in a distinct class, BPD did not, rather it was evident in two comorbid classes characterised by PTSD and CPTSD, respectively. Moreover, of those with a BPD diagnosis more than half (52.2%) had a CPTSD diagnosis. Similarly, Dorrepaal et al. (2012) reported 52% comorbidity for BPD among women with CPTSD in their study.

4.1.2. CPTSD and BPD symptom overlap

The overlap in symptoms between the CPTSD and BPD diagnoses have been consistently acknowledged in reviews on the topic (Ford & Courtois, 2014; Lewis & Grenyer, 2009; MacIntosh et al., 2015; Resick et al., 2012). The DSO symptom cluster, unique to the CPTSD diagnosis, is characterised by (i) affective dysregulation, (ii) NSC and (iii) disturbed relationships. Affective dysregulation includes difficulties with emotional regulation, heightened emotional reactivity or lack of emotions and lapses into dissociative states. This can result in behavioural disturbances such as violent outbursts or reckless or self-destructive behaviour. The NSC cluster is related to beliefs about oneself as diminished, defeated or worthless, accompanied by shame and guilt, for example. Disturbances in relationships are exhibited by difficulties feeling close to others, avoidance of relationships or alternatively, intense relationships which are difficult to sustain (Maercker et al., 2013). These DSO clusters clearly relate to BPD features of mood changes, anger, feelings of emptiness, transient dissociation, impulsivity, self-harm (SH), unstable sense of self and unstable relationships. Thus,

CPTSD symptoms overlap with the majority of BPD features. The Working Group involved in the classification of CPTSD for ICD-11, however, suggest that it is distinguishable from BPD on the basis of lower risk of SH, lack of fears of abandonment, a negative (rather than shifting) identity, and the necessity for these experiences to be related to trauma history (Maercker et al., 2013).

4.1.3. CPTSD and BPD trauma aetiology

Additionally, while trauma is a prerequisite for a CPTSD diagnosis, high levels of trauma exposure are also prevalent in BPD resulting in high comorbidity with PTSD (MacIntosh et al., 2015; Pagura et al., 2010; Scheiderer et al., 2015). Notably, similar trauma histories, characterised particularly by childhood interpersonal trauma, are associated with both CPTSD and BPD also. For example, using a Danish birth cohort, Hyland et al. (2017) explored the effect of trauma type on PTSD and CPTSD risk. Regression analysis found that childhood abuse, particularly childhood sexual abuse (CSA) and being unemployed were significantly associated with increased risk of CPTSD classification compared to PTSD. These associations were substantial; individuals with CSA histories and those who were unemployed were five times (OR = 4.98), and over four times (OR = 4.20) more likely to have CPTSD than PTSD, respectively. Moreover, with increasing levels of childhood trauma there was an increased risk of CPTSD compared to PTSD classification.

Similarly, a latent profile analysis of individuals seeking treatment for trauma (Cloitre, Garvert, Brewin, Byrant & Maercker, 2013) revealed three groups reflecting PTSD, CPTSD and low symptoms. The CPTSD class were more likely to report chronic interpersonal traumas such as CSA and childhood physical abuse while exposure to the 9/11 terrorist attacks was more likely for the PTSD class. Cumulative childhood trauma was also associated with CPTSD class membership compared to the PTSD or low symptom class. Furthermore, using three traumatised populations (sexual trauma, physical assault and bereaved parents), Elklit, Hyland and Shevlin (2014) found the sexual trauma sample had the highest PTSD and DSO symptoms and were most likely to be categorised into a CPTSD class.

Interpersonal, compared with noninterpersonal traumas have also been linked to BPD. Westphal et al. (2013) reported that of the individuals in their sample that

screened positive for BPD, 83% reported a history of interpersonal trauma. Furthermore, these individuals were more likely than non-BPD individuals to have experienced interpersonal trauma such as sexual or physical abuse/assault. BPD is more associated with childhood abuse and neglect than other personality disorders (Battle et al., 2004). Additionally, a recent systematic review (de Aquino Ferreira, Pereira, Benevides & Melo, 2018) concluded that sexual abuse plays a significant role in the development of BPD, for women especially. CSA may be a particularly important risk factor, but rates of adult sexual abuse are also significantly higher among BPD samples than other personality disorders. Furthermore, sexual abuse predicts more severe clinical presentations characterised by suicidality, PTSD and dissociation. A literature review by MacIntosh et al. (2015) suggested that a strong and consistent overall association between childhood trauma and BPD development was present.

4.2. External threat response symptomology or evidence of ‘evolving’ internal threat?

Thus, CPTSD and BPD are highly comorbid, characterised by notable symptomological overlap and are strongly influenced by similar forms of external threat. Of particular interest, however, is that while often framed in relation to external threat exposure, they are also distinctly characterised by variation in and vulnerability for a range of internal threat states. The CPTSD NSC symptom cluster is particularly relevant regarding internal threat. Specifically, this cluster includes information on beliefs about oneself as diminished, defeated or worthless, as well as feelings of guilt, shame and failure (Maercker et al., 2013). These thoughts and feelings reflect those which have been proposed to lie at the lower end of the internal threat continuum (in Chapters 2 and 3).

Indeed, before the ICD-11 conceptualisation of CPTSD, it was acknowledged that individuals may have more complex reactions; it was noted that some individuals with PTSD reported high levels of shame, self-criticism and low self-reassurance (Cox, MacPherson, Enns & McWilliams, 2004; Harman & Lee, 2010). It was theorised that interpersonal trauma in particular could result in a negative view of oneself (Courtois, 2004). Furthermore, although suicidality is more strongly associated with CPTSD than PTSD (Hyland, Shevlin, Fyvie & Karatzias, 2018; Karatzias et al., 2019), it is not part

of its diagnostic formulation. Therefore, the CPTSD NSC cluster may be a good representation of the lower end of the proposed internal threat continuum.

On the other hand, as aforementioned, BPD is in part characterised by suicidal and self-harming behaviours and prevalence of SH and SA are particularly high in this population. A recent study by Goodman et al. (2017) calculated the prevalence of SH and SA among adolescent and adult BPD inpatients at 90% and 75%, respectively. Moreover, chronic, severe, self-loathing is common in those with BPD and has been identified as a potential barrier to recovery (Krawitz, 2012a); self-compassion interventions may play a promising role in BPD recovery (Donald, Lawrence, Broadbear & Rao, 2019; Krawitz, 2012b). Indeed, Krawitz (2012a) notes that that this chronic severe self-loathing consists of “intense experiences of severe chronic self-hating, self-disgust and self-contempt that [exist] for many years and which they see as continuing permanently into the future. This includes but goes beyond situation-specific shame and having generally low self-esteem, feeling inferior, unlovable or incompetent to include deep experiences of self-disgust, self-revulsion, global shame and feeling fundamentally flawed that is pervasive across a range of settings, contexts and mind states” (p.419). Individuals with BPD endorse more negative self-attributes compared to individuals with depression and compared to nonclinical controls, they report these negative self-aspects as more important than positive ones (Vater, Schröder-Abé, Weißgerber, Roepke, Schütz, 2015). Additionally, women with BPD have been found to report higher levels of shame- and guilt-proneness and state dependent shame than women with social anxiety and healthy controls. Even after controlling for depression, shame proneness was negatively correlated with self-esteem in this sample (Rüsch et al., 2007).

Thus, phenomena already present within the clinical diagnostic literature (CPTSD and BPD) could be representative of the proposed internal threat continuum, with BPD reflecting the upper end and CPTSD reflecting the lower end of the continuum. That is, the internal threat continuum modelled in Chapters 2 and 3 may be reflected within these separate diagnoses. In this case, external threat response symptomology may present as evolving states of internal threat. Moreover, in Chapter 3, interpersonal trauma variables demonstrated aetiological validity for the continuum most clearly, further supporting the potential that responses to external threat may trigger an internal threat response which progresses in severity over time.

4.3. Aims and hypotheses

Given that CPTSD and BPD (i) are highly comorbid disorders (Cloitre et al., 2014; Dorrepaal et al., 2012; Frost et al., 2018), (ii) are strongly influenced by similar forms of external threat (de Aquino Ferreira et al., 2018; Hyland et al., 2017; Lewis & Grenyer, 2009; MacIntosh et al., 2015), (iii) are characterised by notable symptomological overlap (Ford & Courtois, 2014; Lewis & Grenyer, 2009; MacIntosh et al., 2015; Resick et al., 2012), and importantly, (iv) exhibit symptoms that reflect variability in internal threat severity, the current study sought to explore whether the proposed internal threat continuum was evident within these established psychiatric phenomena. Moreover, it sought to examine what the external threat context looked like for those at different points along this continuum. Specifically, it sought to isolate NSC symptoms from measures of CPTSD and the more extreme suicidality symptoms from a measure of BPD in two separate population-based samples: Israel and the United Kingdom (UK). This novel approach allowed for a replicable, transdiagnostic investigation of trauma-related internal threat.

The main aims were to explore (i) whether variation from lower levels of internal threat to more extreme levels could be evidenced in distinct latent classes of symptom typology and (ii) whether particular types of trauma could differentiate between classes. It was expected, based on the results from the previous chapter and the background literature, that several classes would emerge from a latent class analysis (LCA) of the data and that these classes, in turn, would represent qualitative and quantitative variation in internal threat. Specifically, groups characterised by (i) low internal threat, (ii) elevated probabilities of NSC items only and (iii) elevated levels of both NSC and suicidality items were expected to emerge. Moreover, typologies of trauma were expected to discriminate between internal threat classes. As informed by the research literature and the Chapter 3 findings, interpersonal traumas were expected to be more strongly associated with internal threat. It was expected that these analyses would replicate the findings from Chapter 3, garnering further support for the internal threat continuum.

4.4. Method

4.4.1. Participants and procedures

Data, collected from two separate community samples as part of the ICD-11 initial field surveys, one in Israel and the other in the UK, were analysed. See Table 4.1 for sociodemographic information on both samples.

Israeli data

Data from the Israeli sample were collected as part of a study conducted in January-February 2017 by researchers at Ariel University, Israel. Data were collected via an online survey which was advertised through various means including social media (mainly Facebook) and smartphone applications (e.g. Whatsapp). Informed consent was secured before participants started the anonymised survey. In total, 618 individuals responded, ranging in age from 17 – 80 years ($M = 33.39$, $SD = 11.95$), and included 482 women (78.0%). Approximately half lived in an urban area (49.5%) and almost three-quarters of the sample reported being in a committed relationship (73.1%). High rates of employment (85.0%) and higher education (76.7%) were present among the sample.

UK data

Participants were recruited from an existing online research panel. Panel members were randomly recruited through probability-based sampling to ensure representativeness to the UK population. Several inclusion criteria applied, participants had to (a) have been born in the UK, (b) be 18 years or older at the time of the survey, and (c) screen positive for at least one traumatic life event. Ethical approval was granted by the Research Ethics board of the National College of Ireland. No inducements or incentives were offered for participation. In total, 2,653 panel members were assessed to meet the inclusion criteria and 1,051 people qualified as valid cases (selection rate = 39.6%). To remain consistent with the measures used in the Israeli data, the current study utilised a random subsample of approximately half of the UK valid cases ($N = 505$) who completed a BPD measure with a binary response format. The mean age of the sample was 47.15 years ($SD = 15.01$, range = 18-90 years), the majority were female (67.7%) and currently in a committed relationship (73.3%). Just over half the sample was

employed (54.5%) and less than half lived in an urban area (42.7%). The majority of the sample had attended university or college (63.4%).

4.4.2. Measures

CPTSD

The International Trauma Questionnaire (ITQ; Cloitre, Roberts, Bisson, & Brewin, 2015; Cloitre et al., 2018) is a self-report measure of ICD-11 PTSD and CPTSD symptoms. The preliminary-stage version of the item was used in this study, as at the time of data collection the symptom formulations for both disorders had yet to be finalised by the ‘Working Group for Disorders Specifically Associated with Stress’ for ICD-11. Thus, this version of the measure contains more items than the finalised version of the ITQ. The preliminary stage ITQ initially assesses an index trauma, how long ago this trauma occurred, and whether the person possesses a clear memory of the index trauma. With this traumatic event in mind, respondents are instructed to indicate how much they have been bothered by each symptom in the past month, using a five-point Likert scale ranging from “Not at all” (0) to “Extremely” (4). To assess the DSO symptoms, participants are asked to respond to a set of questions reflecting how they typically feel, think about themselves, and relate to others, and how much they think each statement is true of them. This is scored on the same 5-point Likert scale as described above. Responses were dichotomised as “Extremely” (1), All other responses (0) in both samples.

Four of the DSO items measured NSC; these items related to feelings of failure (*I feel like a failure*), worthlessness (*I feel worthless*), shame (*I often feel ashamed of myself whether it makes sense or not*) and guilt (*I feel guilty about things I have done or failed to do*). Reliabilities for all DSO subscales, including NSC, have been reported as satisfactory (Cloitre et al., 2018; Shevlin et al., 2018) and each of the DSO symptom indicators in the preliminary measure were acceptable measures of their symptom cluster (Shevlin et al., 2018). The internal reliability of the DSO items was strong (Israeli $\alpha = .90$; UK $\alpha = .96$), as was the reliability of the NSC cluster (Israeli $\alpha = .87$; UK $\alpha = .95$).

BPD

BPD was assessed using 14 items based on the BPD screen module of the Structured Clinical Interview for DSM-IV Axis II Disorders (SCID-II; First, Spitzer, Gibbon, Williams & Benjamin, 1994). Items related to fears of abandonment, unstable relationships, identity problems, affective instability, impulsivity and SH; three of the 14 items were used in this study which reflected suicidality. These were: i) Do you often feel empty inside? (Empty); ii) Have you ever cut, burned, or scratched yourself on purpose? (Self-harm); iii) Have you tried to hurt or kill yourself or threatened to do so? (Hurt/Kill). Factor analytic studies have found inconsistent results regarding BPD dimensions, however, the 3-factor model report by Sanislow et al. (2002) is widely accepted. Under this dimensional representation, these three items fall under the dimensions of ‘disturbed relatedness’ and ‘suicidal or self-mutilative behaviour’. These items were coded “Yes” (1) and “No” (0) in both samples. Acceptable internal consistency has been demonstrated (Sanislow et al., 2002). Internal consistency for these items was acceptable in the UK sample ($\alpha = .71$), however it was lower in the Israeli sample ($\alpha = .51$).

Trauma exposure

The Life Events Checklist (LEC; Gray, Litz, Hsu & Lombardo, 2004; Weathers et al., 2013) is a 17-item self-report measure designed to screen for potentially traumatic events in a respondent’s lifetime. The LEC assesses lifetime exposure to 16 traumatic events (e.g., natural disaster, physical assault, life threatening illness/injury) and the 17th item, “Any other very stressful event/experience”, can be used to describe exposure to a trauma that is not listed. It possesses good psychometric properties (Gray et al., 2004). The Israeli sample utilised the LEC developed for the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) while the UK sample used the LEC for DSM-IV. The Israeli sample contained an extended version of the LEC which included two additional items relating to abuse which specifically occurred during childhood: childhood physical abuse and childhood sexual abuse or molestation. For each item, respondents check whether an event (1) ‘Happened to me’, (2) ‘Witnessed it happening to somebody else’, (3) ‘Learned about it happening to someone close to me’, (4) ‘Not sure it applies’, (5) ‘Doesn’t apply to my experience’. Each item was recoded as (1) ‘Happened to me’ and (0) all other responses, except for the items

relating to ‘sudden violent death’ and ‘sudden accidental death’. For these items, responses of (2) ‘Witnessed it’ were coded as (1). Although not possible, a number of individuals responded ‘Happened to me’ for these two items (sudden violent death $n = 28$; sudden accidental death $n = 79$). For the purposes of this analysis, individuals with this response were coded as missing. All other responses were coded (0).

In the UK sample participants completed the LEC twice; once to indicate traumas that had been experienced as a child and another for adult traumas. LEC items in this sample were coded “Yes” (1), “No” (0). Differences in the LEC for DSM-IV and DSM-5 are minimal; LEC item 15 “sudden, unexpected death of someone close to you” appeared in the DSM-IV version used in the UK study, this was changed to “sudden accidental death” in the DSM-5 version which was used in the Israeli study. To maintain consistency in the LEC items across both the Israeli and UK samples, the childhood physical abuse variable in the Israeli sample was combined with the physical assault variable; individuals endorsing either or both of these experiences were coded as endorsing physical abuse or assault in their lifetime. Childhood sexual abuse or molestation was combined with the sexual assault variable in the same manner. Moreover, in the UK sample, individuals who endorsed a trauma on the adult version, child version or both versions of the LEC were coded as endorsing that experience in their lifetime.

Background variables

Based on previously reported associations with internal threat a number of covariates were controlled for in the analysis. These were: sex (male, female), neighbourhood (rural/not urban, urban), relationship status (in a committed relationship, not in a committed relationship), employment status (employed, unemployed), education (college/university, less than college/university) and age (continuous variable).

4.4.3. Analytic plan

Three linked phases of analyses were conducted concurrently on both samples. First, LCAs were conducted using the NSC items from the CPTSD measure and the suicidality items from the BPD measure to determine the structure of, and variation in,

internal threat. LCA is a statistical method used to identify homogeneous groups, or classes, from categorical multivariate data. Six models (a 1-class model through to a 6-class model) were estimated for both data sets. Second, LCAs of trauma experience were conducted using the items from the LEC. Again, the fit of six models (a 1-class model through a 6-class model) was assessed in both data sets. All LCA models were estimated using robust maximum likelihood (Yuan & Bentler, 2000). To avoid solutions based on local maxima, 500 random sets of starting values were used initially with 100 final stage optimisations. The relative fit of the models was compared by using three information theory-based fit statistics: the Akaike information criterion (AIC; Akaike, 1987), the Bayesian information criterion (BIC; Schwarz, 1978) and sample size-adjusted Bayesian information criterion (ssa-BIC; Sclove, 1987). The model that produced the lowest values was judged to be the best fitting model. In addition, the Lo-Mendell-Rubin adjusted likelihood ratio test (LRT; Lo, Mendell & Rubin, 2001) was used to compare models with increasing numbers of latent classes. When a non-significant value ($p > .05$) occurred, this suggested that the solution with one less class should be accepted. Higher log-likelihood values also reflected good model fit. Third, multinomial logistic regression analyses were conducted. In both samples, the dependent variable was the multiple category internal threat classes generated from the LCAs; the predictors were the trauma classes generated from the trauma LCAs and the sociodemographic background variables also. In both samples, there were no missing data on the measures used in this study. All models were specified and estimated using Mplus version 7.4 (Muthén & Muthén, 1998-2015).

4.5. Results

NSC, suicidality, trauma and background variables response frequencies for both samples are shown in Table 4.1.

Table 4.1. Frequencies of internal threat, trauma and background variables

	Israeli (%) (<i>N</i> = 618)	UK (%) (<i>N</i> = 505)	X^2 (df), <i>p</i>
NSC items			
I feel like a failure	7 (1.1)	69 (13.7)	69.16 (1), <i>p</i><.05
I feel worthless	11 (1.8)	58 (11.5)	45.39 (1), <i>p</i><.05
I often feel ashamed of myself whether it makes sense or not	13 (2.1)	54 (10.7)	36.55(1), <i>p</i><.05
I feel guilty about things that I have done or failed to do	28 (4.5)	88 (17.4)	49.89 (1), <i>p</i><.05
Suicidality items			
Have you tried to hurt or kill yourself or threatened to do so?	57 (9.2)	158 (31.3)	87.40 (1), <i>p</i><.05
Have you ever cut, burned, or scratched yourself on purpose?	42 (6.8)	128 (25.3)	74.44 (1), <i>p</i><.05
Do you often feel empty inside?	165 (26.7)	254 (50.3)	66.16 (1), <i>p</i><.05
Traumatic Events			
Natural disaster	54 (8.7)	73 (14.5)	9.06 (1), <i>p</i><.05
Fire or explosion	75 (12.1)	83 (16.4)	4.25 (1), <i>p</i><.05
Transportation accident	287 (46.4)	200 (39.6)	5.29 (1), <i>p</i><.05
Serious accident at work, home, or during recreational activity	66 (10.7)	84 (16.6)	8.51(1), <i>p</i><.05
Exposure to toxic substance	38 (6.1)	36 (7.1)	0.43 (1), <i>p</i> >.05
Physical abuse or assault ^a	172 (27.8)	246 (48.7)	51.56 (1), <i>p</i><.05
Assault with a weapon	55 (8.9)	75 (14.9)	9.62 (1), <i>p</i><.05
Sexual abuse or assault ^a	125 (20.2)	125 (24.8)	3.29 (1), <i>p</i> >.05
Other unwanted or uncomfortable sexual experience	206 (33.3)	175 (34.7)	0.22 (1), <i>p</i> >.05
Combat or exposure to a war-zone (in the military or as a civilian)	215 (34.8)	33 (6.5)	128.94(1), <i>p</i><.05
Captivity	2 (0.3)	20 (4.0)	19.14 (1), <i>p</i><.05
Life-threatening illness or injury	55 (8.9)	132 (26.1)	59.51 (1), <i>p</i><.05
Severe human suffering	39 (6.3)	38 (7.5)	0.64 (1), <i>p</i> >.05
Sudden violent death	94 (15.9)	65 (12.9)	2.05 (1), <i>p</i> >.05
Sudden accidental/unexpected death ^b	145 (26.9)	281 (55.6)	89.17 (1), <i>p</i><.05
Serious injury, harm, or death you caused to someone else	18 (2.9)	30 (5.9)	6.23 (1), <i>p</i><.05
Any other very stressful event or experience	213 (34.5)	98 (19.4)	31.48 (1), <i>p</i><.05
Background variables			
Female	482 (78.0)	342 (67.7)	15.01 (1), <i>p</i><.05
Living in urban area	306 (49.5)	215 (42.7)	5.11 (1), <i>p</i><.05
In a committed relationship	452 (73.1)	370 (73.3)	0.00 (1), <i>p</i> >.05
Employed	525 (85.0)	275 (54.5)	126.14 (1), <i>p</i><.05
Attended university/college	474 (76.7)	320 (63.4)	23.85 (1), <i>p</i><.05

Note: Statistically significant (*p* <.05) in bold; ^a Combined variable in Israeli sample; ^b Israeli sample: 'Sudden accidental death', UK sample: 'Sudden unexpected death of someone close to you'

4.5.1. Internal threat LCA

The LCA fit statistics for the internal threat LCAs for both samples are presented in Table 4.2. A 3-class solution was considered the best fitting model in both samples. The BIC and ssaBIC fit indices were lower in the 3-class solutions than the other solutions, therefore it was accepted on the basis of parsimony. The entropy values (Israeli = .85, UK = .88) indicated acceptable classification of participants in each model. As the BIC is considered the most reliable of the fit indices (Nylund, Asparouhov, & Muthen, 2007), model selection was based on this fit statistic. The profile plot and probabilities for the 3-class internal threat solutions are shown in Figure 4.1.

Table 4.2. Fit statistics for LCA of internal threat items

Class	Log-likelihood	AIC	BIC	ssaBIC	Entropy	LRT	<i>p</i>
Israeli sample							
1	-972.800	1959.601	1990.586	1968.363	-	-	-
2	-830.737	1691.474	1757.872	1710.249	0.896	278.705	<.001
3	-803.979	1653.959	1755.768	1682.747	0.852	52.494	.002
4	-792.824	1647.648	1784.869	1686.450	0.893	21.885	.028
5	-786.245	1650.490	1823.123	1699.305	0.882	12.907	.035
6	-782.737	1659.474	1867.519	1718.302	0.987	6.882	.401
UK sample							
1	-1736.486	3486.972	3516.544	3494.326	-	-	-
2	-1342.498	2714.997	2778.365	2730.753	0.925	772.463	<.001
3	-1240.679	2527.357	2624.522	2551.518	0.881	199.630	<.001
4	-1228.669	2519.338	2650.299	2551.902	0.901	23.546	.199
5	-1215.121	2508.241	2672.999	2549.209	0.921	26.563	<.001
6	-1204.435	2502.870	2701.424	2552.242	0.912	20.950	.059

AIC Akaike information criterion, *BIC* Bayesian information criterion, *ssaBIC* sample size-adjusted BIC, *LRT* Lo-Mendell-Rubin adjusted likelihood ratio test. *Note:* selected model in bold.

Class profiles were strikingly similar in both samples. Class 1 (Israeli: 2.4%; UK =14.3%), labelled ‘NSC and suicidality’ class, was characterized by the highest probabilities on all items. In the Israeli sample, the items with the highest probabilities were feeling ashamed, guilty, empty and trying to/threatening to hurt or kill oneself, whereas in the UK sample, feelings of failure and worthlessness also had very high probabilities. Class 2 (Israeli: 10.9%; UK: 25.0%), was characterized by high endorsement of suicidality items mainly. These classes were similar to the baseline class in relation to the four NSC items. Finally, Class 3 (Israeli: 86.7%; UK = 60.7%) was the largest class and represented a baseline group who had low-to-zero probability of endorsing any of the NSC or suicidality items with the exception of chronic feelings of emptiness, which had slightly elevated probabilities. Overall, the UK sample generally had higher endorsement probabilities on the items compared to the Israeli sample.

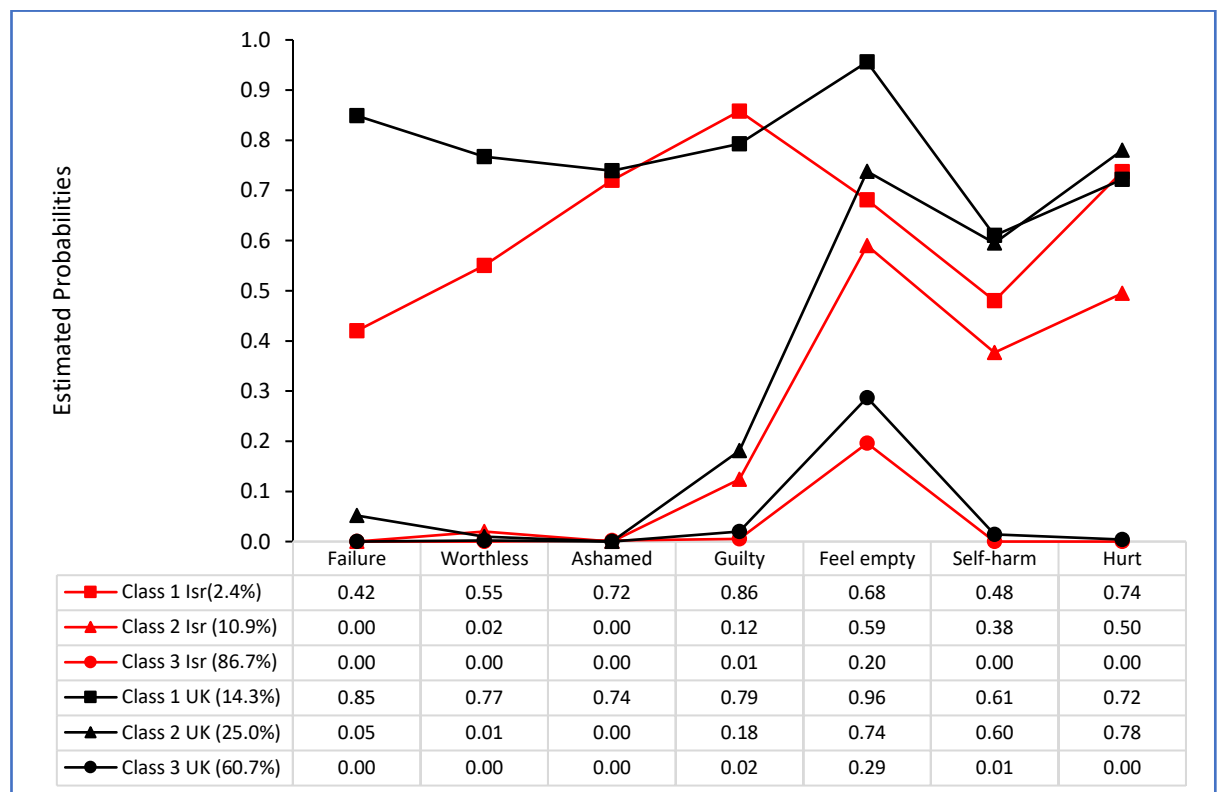


Fig 4.1. LCA profile plot displaying class response probabilities to internal threat indicators

4.5.2. Trauma LCA

Similarly, for the trauma LCA a 3-class solution was considered the best fit in both samples (Table 4.3). In the Israeli sample, the BIC was lowest in the 3-class solution. The LRT also became non-significant in the 4-class model and the entropy for a 3-class model was acceptable (0.72). The profile plot and probabilities for the Israeli 3-class trauma solution are shown in Figure 4.2a. Since a difference of >10 indicates very strong model superiority in the BIC, the 3-class solution is clearly the strongest (Raftery, 1995). Fit statistics also suggested a 3-class solution in the UK sample. Again, the BIC and the LRT indicated that the 3-class solution was the best fit in this sample. Entropy was acceptable also (0.84). The UK profile plot and probabilities are shown in Figure 4.2b.

Table 4.3. Fit statistics for LCA of trauma items

Class	Log-likelihood	AIC	BIC	ssaBIC	Entropy	LRT	<i>P</i>
Israeli sample							
1	-4242.529	8519.058	8594.309	8540.337	-	-	-
2	-4060.345	8190.691	8345.618	8234.499	0.617	361.245	<.001
3	-3980.859	8067.719	8302.323	8134.057	0.718	157.609	.006
4	-3938.939	8019.879	8334.160	8108.747	0.791	83.121	.072
5	-3914.793	8007.587	8401.544	8118.985	0.760	47.878	.462
6	-3896.081	8006.161	8479.796	8140.090	0.729	37.105	.162
UK sample							
1	-3834.893	7703.786	7775.604	7721.644	-	-	-
2	-3528.591	7127.183	7275.042	7163.949	0.890	607.184	<.001
3	-3454.686	7015.372	7239.274	7071.046	0.838	146.503	.022
4	-3399.820	6941.640	7241.583	7016.222	0.849	108.762	.090
5	-3376.453	6930.906	7306.891	7024.396	0.856	46.320	.475
6	-3352.443	6918.885	7370.913	7031.284	0.874	47.595	.466

AIC Akaike information criterion, *BIC* Bayesian information criterion, *ssaBIC* sample size-adjusted BIC, *LRT* Lo-Mendell-Rubin adjusted likelihood ratio test. *Note*: selected model in bold.

Israeli trauma Class 1 (20.7%) was the labelled 'Physical and Sexual Assault' class. This class had the highest probabilities of lifetime physical assault, sexual assault and unwanted/uncomfortable sexual experience. This class also had elevated probabilities of exposure to combat or warzone, life-threatening illness or injury, severe human suffering, witnessing a sudden violent or accidental death and other stressful experiences compared to the baseline class. Class 2 (19.6%) was characterized by the highest probabilities for the majority of the traumatic events. Compared to the baseline class, it had substantially higher endorsement of being in a fire or explosion, transportation accident, serious accident at work, home, etc., physical assault, assault with a weapon, exposure to combat or warzone, life-threatening illness or injury, severe human suffering, witnessing a sudden violent or accidental death and experiencing any other traumas. This class was labelled the 'Accidents and Physical Assault' class. Lastly, the baseline class (59.7%) were a low-risk trauma group that had low-to-zero probabilities for the majority of the traumas with the exception of transportation accidents, physical assault, unwanted/uncomfortable sexual experience, exposure to combat or warzone, witnessing a sudden accidental death and any other trauma.

As previously stated, the UK sample also produced a 3-class solution, however the configuration of these classes was slightly different to that of the Israeli sample. Class 1 (22.4%) was an intermediate trauma class characterised by elevated probabilities compared to the baseline class on physical assault, assault with a weapon, sexual assault and unwanted/uncomfortable sexual experience. It also had the highest probability of transportation accident. Therefore, this class was labelled the 'Physical and Sexual Assault' class. Class 2 (3.2%) had the highest probabilities for all the items except transportation accident. This class was labelled the 'All Traumas' class. The third class (74.5%) was the baseline class, who had low probabilities of experiencing any of the traumatic events. However, this class did have slightly elevated probabilities on transportation accident, physical assault, unwanted/uncomfortable sexual experience, life threatening illness or injury and witnessing a sudden accidental or unexpected death.

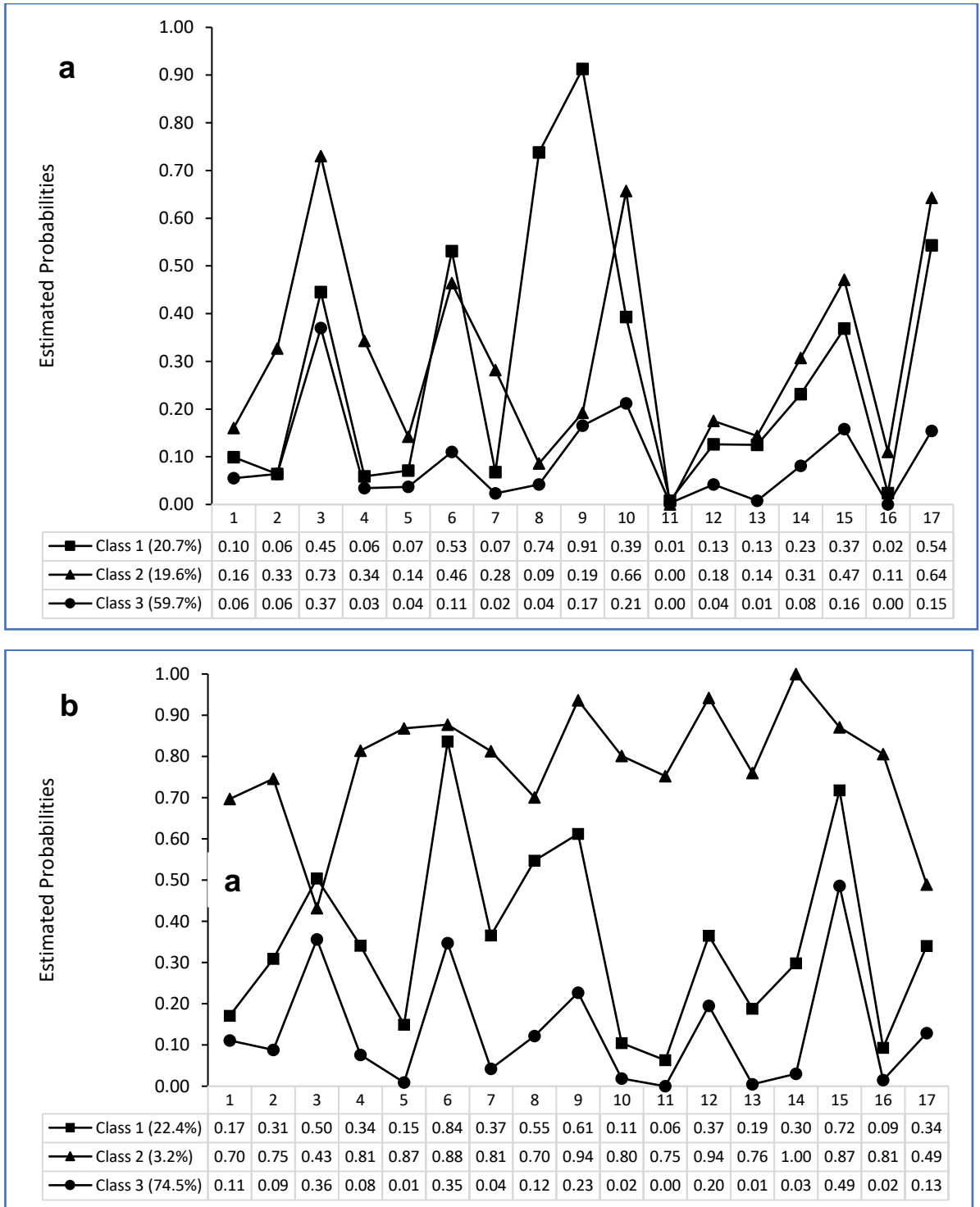


Fig 4.2. LCA profile plots displaying class response probabilities to trauma items in (a) Israeli and (b) UK samples

1 Natural disaster 2 Fire or explosion 3 Transportation accident 4 Serious accident at work/home 5 Exposure to toxic substance 6 Physical assault 7 Assault with a weapon 8 Sexual assault 9 Unwanted/uncomfortable sexual experience 10 Combat/Warzone 11 Captivity 12 Life-threatening illness or injury 13 Severe human suffering 14 Sudden violent death 15 Sudden accidental/unexpected death 16 Serious harm/death you caused to another 17 Any other very stressful event

4.5.3. Logistic regression

Using multinomial logistic regression, associations between the internal threat classes and the trauma classes were analysed using the respective baseline classes as comparisons, while controlling for a series of background variables (Table 4.4). In the Israeli sample, compared to the baseline trauma class, individuals in the Physical and Sexual Trauma class were over 6.5 times more to be in NSC and suicidality class than the baseline internal threat class (odds ratio [OR] = 6.58). Furthermore, these individuals were almost 3 times more likely to be in the suicidality only class compared to the baseline class (OR = 2.87). There was no significant association between the Accidents and Physical Assault trauma class and either of the internal threat classes.

Similarly in the UK sample, compared to the baseline trauma class, the Physical and Sexual Trauma class were 3.5 times more likely to be in the NSC and suicidality (OR = 3.49) class and over twice as likely to be in the suicidality only class (OR = 2.33) compared to the baseline internal threat class. Moreover, there was a significant association between the All Trauma class and the NSC and suicidality group; individuals in the All Trauma class were almost 4 times more likely to be in this internal threat class compared to the baseline class (OR = 3.81). There was no significant association between the All Trauma class and the suicidality only class. Significant relationships between the latent classes and background variables were also present. Lower levels of education, living in an urban neighbourhood, female sex, younger age and being unemployed each had significant relationships with one or both of the internal threat classes in both samples.

4.6. Discussion

The purpose of this study was threefold; firstly, the study aimed to further explore the internal threat continuum identified in Chapters 2 and 3 using extant psychiatric diagnosis symptomology; second, to reconsider the threat status of established trauma-related symptomology and third, to explore the external threat (trauma) context of internal threat. Rather than solely consider NSC and suicidality as consequences of, or reactions to external threat exposure, this study sought to examine these phenomena as graded representations of an underlying internal threat continuum.

Table 4.4. Odds ratios for trauma latent classes and background risk variables predicting internal threat classification

Israeli sample		
Covariate	OR (95% CI)	
	Class 1 (NSC & Suicidality)	Class 2 (Suicidality only)
Trauma Class 1 (Physical and Sexual)	6.58 (1.78-24.31)**	2.87 (1.55-5.29)***
Trauma Class 2 (Accidents and Physical)	2.44 (0.47-12.80)	2.03 (0.98-4.21) ^a
Sex: female	0.39 (0.09-1.70)	2.11 (0.90-4.92)
Age	1.01 (0.98-1.04)	0.97 (0.94-1.01)
Urban neighbourhood	4.94 (1.39-17.59)*	1.32 (0.76-2.27)
Not in a committed relationship	3.03 (0.89-10.32)	1.72 (0.93-3.17)
Unemployed	0.85 (0.22-3.22)	0.77 (0.35-1.71)
Less than university/college education	2.98 (1.10-8.11)*	1.96 (1.05-3.66)*
UK sample		
Covariate	OR (95% CI)	
	Class 1 (NSC & Suicidality)	Class 2 (Suicidality only)
Trauma Class 1 (Physical and Sexual)	3.49 (1.96-6.21)***	2.33 (1.45-3.73)***
Trauma Class 2 (All Traumas)	3.81 (1.12-12.89)*	0.86 (0.26-2.86)
Sex: female	2.11 (1.04-4.30)*	0.92 (0.56-1.51)
Age	0.99 (0.97-1.01)	0.96 (0.95-0.97)***
Urban neighbourhood	1.23 (0.72-2.09)	1.09 (0.71-1.69)
Not in a committed relationship	0.81 (0.44-1.49)	1.39 (0.86-2.23)
Unemployed	1.80 (1.05-3.11)*	1.00 (0.64-1.57)
Less than university/college education	0.79 (0.45-1.41)	1.03 (0.66-1.63)

Reference classes are baseline internal threat class and baseline trauma class for both samples. *OR* Odds ratio, *CI* Confidence interval. * $p < .05$, ** $p < .01$, *** $p < .001$. Note: ^a is approaching significance ($p = .056$).

4.6.1. Structure of and variation in internal threat

The LCA results produced extremely similar class profiles for each sample. As hypothesised, both baseline (Class 3) and combined NSC and suicidality (Class 1) classes emerged. The NSC only class that had been hypothesised however did not emerge; rather a suicidality only class (Class 2) was identified. While based on two established trauma related diagnoses and fewer indicators, these 3-class solutions seemed to reflect the more extreme end of the graded internal threat continuum

identified in the previous chapters. Most notably SH and SI either emerged along with NSC or existed independently from it. This suggested that, for some, suicidality was accompanied (possibly preceded) by beliefs about oneself as diminished, defeated or worthless, as well as feelings of guilt, shame and failure. Class 1 therefore may have represented a group whose negative feelings towards themselves evolved into more extreme self-injurious thoughts or behaviours, consistent with the propositions in Chapter 2 and 3. Others (Class 2) seemed to be characterised by suicidality only. While it is possible that this distinct suicidality only class reflected the differences between the two underlying diagnoses, the traumas that predicted this class seemed to differentiate it from Class 1 in ways that would explain non-NSE suicidality.

4.6.2. The external threat context of internal threat

Traumatic experiences were also categorised using LCA and a 3-Class model was the best representation of the data for each sample. Unlike the internal threat classes, differences were apparent between the Israeli and UK samples. In the Israeli sample, classes reflected a Physical and Sexual trauma group, an Accidents a Physical Assault group and a baseline group. In the UK sample, classes reflected a Physical and Sexual trauma group, an All Trauma group and a baseline group. In the regression analyses, membership of the Physical and Sexual trauma groups in both samples predicted membership to Class 1 (NSE & suicidality). These findings corroborate the large body of evidence demonstrating associations between trauma, particularly interpersonal trauma, and both NSC and suicidality. For example, heightened rates of childhood trauma are present in those who SH (Saçarçelik, Türkcan, Güveli & Yeşilbaş, 2013) and women with a history of CSA have been shown to be more likely to have histories of SA or SH than those without, despite similar levels of depression (Gladstone et al., 2004).

Moreover, a recent review of studies on adolescent samples concluded that a significant association was present between CSA and SI or SA in 49 out of 52 studies (Miller, Esposito-Smythers, Weismoore & Renshaw, 2013). In a Northern Irish community sample, Dyer et al. (2009) found that those currently experiencing more complex PTSD symptomology, as measured by the Structured Interview of Disorders of Extreme Stress, had higher levels of physical aggression and SH than those currently

experiencing PTSD. Moreover, the symptom domain ‘alterations in self-perception’, measuring feelings of shame, guilt, ineffectiveness, responsibility, isolation and permanent damage, significantly predicted aggression and SH history. These types of posttraumatic schemas (defectiveness/shame and failure) in particular appear to be the most strongly related to SI, suicide plans and SA (Dutra, Callahan, Forman, Mendelsohn & Herman, 2008). Additionally, the strong association between sexual trauma and internal threat states compliments the recent findings of Kucharska (2017) and Keshet and Gilboa-Schechtman (2017) as described in Chapter 3.

Furthermore, several NSC concepts have been found to mediate the relationship between interpersonal traumas and SH or SI (Dyer, Dorahy, Shannon & Corry, 2013; Glassman, Weierich, Hooley, Deliberto & Nock, 2007; Jones, Bilge-Johnson, Rabinovitch & Fishel, 2014). For example, a study examining pathways from CSA to SH found two associations; a minor pathway linked CSA to SH via reduced self-esteem, while another major path linked them through dissociation (Low, Jones, MacLeod, Power & Duggan, 2000). The self-esteem pathway may reflect Class 1 (NSC & suicidality) in this study. Indeed, negative feelings towards oneself is a commonly endorsed motivation for SH (Laye-Gindhu & Schonert-Reich, 2005) and NSSI has been conceptualised as a coping strategy to regulate these unpleasant affective states and to self-punish (Klonsky, 2009; 2011). Furthermore, qualitative studies have noted internal self-disgust as a precursor and potential motivator to acts of SH (Benson, Boden & Vitali, 2015).

Additionally, Yates (2004) proposed a model grounded within a developmental psychopathology framework to explain the association between traumatic experiences and SH. The model proposes that trauma negatively impacts normal development, causing deficits in functioning in a number of areas. One of these areas, attitudinal competence, refers to the ‘foundations of self-worth’. Traumatic experiences which disrupt the development of this competency are internalised as feelings of worthlessness, shame, self-blame and these individuals act overly critical and hostile towards themselves which over time form part of the individual’s identity. Self-harm may represent a physical manifestation of this negative self-image and emerges as a compensatory strategy against the regulatory and relational deficits. Over time, this becomes relied on as an effective coping mechanism to deal with these negative cognitions (Yates, 2004). This model is consistent with the evolutionary-cognitive

research discussed in Chapter 1. Self-attacking may result as an adaptive, protective strategy, however, over time and in combination with a lack of self-compassion it can have determinantal effects (Gilbert & Procter, 2006). Submissive states and feelings of defeat may be generated; rumination on these feelings and self-critical thoughts can leave the individual in an unbearable psychological state (Gilbert, 2002). They may SH as an attempt to regulate their negative emotions or as a form of self-punishment (Klonsky, 2009; 2011). Moreover, suicide may be increasingly viewed as a favourable solution to their internal pain (Baumeister, 1990; Williams, 2001). However, Laye-Gindhu and Schonert-Reich's (2005) study found that while negative affective states (e.g. depressed, angry) reduced during and after a SH episode, self-conscious emotions (e.g. shame, guilt and disgust) increased. Therefore, it could be suggested that SH is not an effective way of dealing with NSE which, in turn, may drive an individual to engage in more severe behaviours aimed at ending life.

While the regression findings indicated that the Physical and Sexual Trauma groups in both the Israeli and UK data predicted Class 2 membership, ORs were smaller than those observed for Class 1. Similarly, the Accidents and Physical Assault group had no significant association with either Class 1 or 2 compared to the baseline class. Interestingly, the All Trauma group was not associated with Class 2. This is especially notable given that the Physical and Sexual Trauma group in the UK sample was associated with Class 2 and the All Trauma group had higher probabilities for the sexual and physical assaults compared to the Physical and Sexual Trauma class. It may be the case that the individuals in the All Trauma group lived through more adverse circumstances. This cumulative adversity and trauma exposure may have resulted in a gradual 'wearing down' of their self-worth, which, over time, may have led to suicidality (as proposed with Class 1).

However, in some instances, suicidality may have been reactive. For instance, the individuals in the Physical and Sexual Trauma class may not have experienced much trauma or adversity up until the point of their assault, the shock of which may have shaken their world view so much that it pushed them to experience suicidality quickly. As noted by Lee (2006), humans are resilient and the majority of individuals who face a trauma do not go on to develop PTSD or any other trauma-related condition. It appears that particular traumas challenge an individual's view of the self, world or others so much that they cannot integrate it into their pre-existing beliefs (Janoff-Bulamn, 1989).

In this sense, despite accumulating more traumas, the All Trauma group may have a less difficult time integrating their trauma as their pre-existing beliefs already view the world and others as dangerous and themselves as worthless, inferior, etc.

4.6.3. Limitations

Two separate general population samples, one more recognised as trauma exposed, were utilised; therefore, the findings are limited to a general population context and cannot with certainty be applied to specific traumatised populations. Additional study of both community and trauma-specific samples is necessary. Importantly, cross-sectional data was used which unfortunately did not allow for opportunities to explicitly explore the temporal assumptions proposed. However, this thesis maintains that it is viable to suggest a meaningful temporal ordering within the framework of the internal threat continuum. These specific temporal assumptions will, however, require further testing using longitudinal data in future.

This study chose to focus on NSE and suicidality, however, it is important to acknowledge that other symptoms of CPTSD and BPD, such as affect dysregulation and dissociation, may also be considered adaptive defences in the face of traumatic or adverse experiences. However, these items were not considered to constitute an ‘internally-generated and self-directed’ threat and therefore were not included as a focus of this study. It is also necessary to acknowledge that while this study was concerned with NSC and suicidality in the context of trauma, both of these phenomena can be expressed independently of trauma exposure. Furthermore, there were some differences in the coding of the trauma variables between the two samples (as discussed in the methodology) which may account in part for the differences observed in the frequencies and trauma LCA.

Moreover, due to low cell counts, analysis of the association between individual trauma experiences and the internal threat classes was not possible. For this reason, LCA was also conducted on the traumatic experiences to afford the opportunity to test the associations between grouped traumatic experience and internal threat. However, as a result of this process information on the specificity between traumatic experience and internal threat was lost. Furthermore, important advantages exist that resulted in the use of FMM rather than LCA in Chapter 3. However, as this chapter was using prespecified

items from the BPD and CPTSD diagnoses, only seven indicators of internal threat were available. With such few items, it was not considered worthwhile to replicate the elaborate analytic framework needed to produce a FMM. In this instance, LCA was deemed to be an appropriate technique for the first aim of the chapter: to examine whether variation from lower to more extreme levels of internal threat could be evidenced from the CPTSD and BPD symptomology. Additionally, the LEC did not include an item on bullying or peer victimisation, thus, associations between this variable and internal threat could not be evidenced in this analysis. Given that the strong association between sexual trauma and internal threat in Chapter 3 was replicated in this analysis, it may have been interesting to assess for replication with the bullying variable also.

4.6.4. Future research

Importantly, research in this area and findings from this Chapter 4 may potentially support the Suicidal Drive Hypothesis. The introduction to this chapter highlighted that the diagnoses of CPTSD and BPD are highly comorbid, strongly influenced by similar forms of external threat (i.e. childhood and/or interpersonal trauma), are characterised by notable symptomological overlap and exhibit symptoms reflecting variability in internal threat severity. The results of the LCA suggest that Class 1 is representative of the severe end of the proposed internal threat continuum (characterised by both NSE and suicidality phenomena) and notably, this class was most highly associated by trauma classes characterised by interpersonal, particularly sexual trauma. Significantly, these same associations can be applied to psychosis:

(i) Comorbidity

There are high rates of comorbidity between psychosis and PTSD (Sareen et al., 2005) and PTSD is a predictor for the development of a range of psychotic disorders (ORs ranging between 2 – 4; Okkels et al., 2017). Moreover, both disorders have been considered as lying on a trauma-spectrum (Morrison, Frame & Larkin, 2003). As the diagnostic formulation for CPTSD in ICD-11 was only recently finalised, few studies have analysed its comorbidity, in this current conceptualisation, with psychosis. Frost et al. (2019) however, found in an LCA analysis that psychosis symptoms did not emerge independently from CPTSD or PTSD. Rather, two comorbid classes were present,

reflecting a psychosis and CPTSD class and an intermediate class with moderate probabilities of PTSD and DSO symptoms and varying psychosis endorsement probabilities.

The relationship between psychosis and BPD is a historical one. The term ‘borderline’ originated from the idea that the symptoms it represented were on the border between neurosis and psychosis (Stern, 1938). Indeed, BPD loads onto both internalising and externalising factors (Eaton et al., 2011; Kotov et al., 2011). Slotema, Blom, Niemantsverdriet, Deen and Sommer (2018) reported that psychotic disorders were present in 38% of individuals with BPD in their study. Furthermore, between 20-54% of BPD samples report PEs (Schroeder, Fisher & Schäfer, 2013; Slotema et al., 2018). It has also been suggested that BPD be reconceptualised as a trauma-spectrum disorder (Gunderson & Sabo, 1993).

(ii) Symptom overlap

Hallucinations, typically considered the core symptom of schizophrenia, are not unique to this diagnosis. The majority of features of hallucinations exhibited in schizophrenia are common to hallucinatory experiences within other mental disorders such as bipolar disorder, depression, PTSD, eating disorders and personality disorders (Waters & Fernyhough, 2017). Furthermore, hallucinations and paranoia in psychosis may mirror flashbacks and hypervigilance in PTSD, respectively (Morrison et al., 2003). McCarthy-Jones and Longden (2015) provide a comprehensive review of AVHs in schizophrenia and PTSD. They suggest that both are phenomenologically similar and both are associated with traumatic events. Moreover, AVH content relates to earlier traumatic experiences in both disorders. They conclude by noting that a subset of those with psychosis with AVHs have the same phenomenological and aetiological experiences as those with PTSD who hear voices. Moreover, hallucinations are common in those with a BPD diagnosis and are mainly experienced as verbal abuse and perceived as distressing (Niemantsverdriet et al., 2017). They are not considered to be distinguishable from AVHs experienced in schizophrenia (Tschoeke, Steinert, Flammer & Uhlmann, 2014).

Furthermore, dissociative experiences are common to both psychosis and BPD. It has been conceptualised as a coping mechanism utilised in times of severe distress (Bichescu-Burian, Steyer, Steinert, Grieb, & Tschöke, 2016; Vermetten & Spiegel,

2014). Dissociation is moderately associated with trauma exposure and severity (Carlson, Dalenberg & McDade-Montez, 2012) and further, has been strongly linked to suicidality and other self-destructive behaviours (Rodriguez-Srednicki, 2002; Tolmunen et al., 2008; Zoroglu et al., 2003). In particular, dissociation is associated with a history of CSA (Schroeder, Langeland, Fisher, Huber & Schäfer, 2016). Moreover, dissociation and posttraumatic stress disorders may mediate the relationship between trauma and suicidality (Ford & Gómez, 2015).

(iii) Childhood and interpersonal trauma aetiology

Trauma is a significant risk factor for psychosis (Bendall, Jackson, Hulbert & McGorry, 2008; Varese et al., 2012). A strong dose-response effect is present between child adversity and psychosis (Trauelsen et al., 2015). CSA has been reported as having a particularly strong association with psychosis (Bebbington, 2011; Coughlan & Cannon, 2017). While some specificity between traumatic experiences and PEs has been noted (Bentall et al., 2014; Sitko, Bentall, Shevlin & Sellwood, 2014; Shevlin, McAnee, Bentall & Murphy, 2015), for example between sexual trauma and AVH, others suggest a large shared effect of adversities on psychosis risk (Trauelsen et al., 2015).

These findings are supportive of the Suicidal Drive Hypothesis' assertion that psychosis could manifest as an adaptive response to high levels of internal threat; the relationship between the diagnoses of CPTSD, BPD and psychosis may be reflecting this threat response in action. A threat response spectrum could exist; while PTSD may reflect a response to external forms of threat, CPTSD, BPD and psychosis may be reactions to increasing levels of severity of internal threat. The internal threat continuum may be specific to those who have experienced interpersonal trauma and develop negative self-evaluations focussed on feelings of worthlessness, inferiority and shame (CPTSD), which, over time, may increase in intensity and result in SI or SH (BPD). While individuals may have used dissociative defences against this distress, at the highest severity of internal threat, externalisation may be utilised as an adaptive threat response (psychosis). Strict adherence to diagnostic boundaries may have prevented investigation of these phenomena. Investigation of the relationship between internal threat states and psychosis, within the context of the Suicidal Drive Hypothesis, will be considered in Chapter 5.

4.7. Conclusions

The current study sought to explore whether an internal threat continuum could be identified using symptomology from psychiatric diagnoses that have been formulated to capture external threat response. In doing so, the current study also sought to re-evaluate the threat status of these symptoms and to identify the external threat context associated with their expression. Two classes characterised by elevated internal threat; one characterised by both NSC and suicidality, and another by suicidality only were identified in both samples, and trauma profiles characterised by interpersonal trauma significantly predicted class membership. The findings suggest that while NSE and suicidality may commonly emerge after external threat exposure and inform extant diagnostic measures that describe external threat response, they may also constitute an entirely distinct form of threat. Researchers exploring threat responsivity in future therefore may wish to consider the threat status of trauma exposed individuals while practitioners may wish to be cognisant of internal threats states that may emerge after traumas have been disclosed, diagnoses have been formulated and treatments have been considered. Chapter 5 will examine the association between psychosis and the internal threat continuum.

Chapter 5

Assessing the link between internal threat and psychosis

Background and research aim: The second aim of this thesis is to examine how psychosis varies in relation to internal threat. The Suicidal Drive Hypothesis proposes that suicidality may play an aetiological role in psychosis onset and expression. Several other bodies of research, including cognitive theories of psychosis, have proposed that negative self-evaluation (NSE) may also play an aetiological role in psychosis. This chapter will explore whether psychosis is associated with internal threat only at the extreme end of the continuum or whether it is meaningful along the entire continuum. Furthermore, relationships between the classes and a range of other non-psychotic diagnoses may further establish the validity of the continuum and its utility as a transdiagnostic construct.

Methods: The internal threat continua modelled using the British Psychiatric Morbidity Survey (BPMS) in Chapter 3 ($N = 8580$; 7-class solution) and the UK trauma sample in Chapter 4 ($N = 505$; 3-class solution), were used as a basis for the current series of analyses. In the BPMS, the Psychosis Screening Questionnaire (PSQ) was used as a measure of subclinical psychotic experiences (PEs). Moreover, a range of mental disorder diagnoses, including psychotic disorder, were determined using the Clinical Interview Schedule-Revised and the Schedules for Clinical Assessment in Neuropsychiatry in this sample. In the UK trauma sample, items from the Adolescent Psychotic-Like Symptom Screener (APSS) were used to model associations between the classes and subclinical PEs. Multivariate logistic regression analyses were carried out to examine the relationships between the internal threat classes and subclinical PEs, psychotic disorder diagnosis and a range of other non-psychotic diagnoses.

Results: In the BPMS, all of the internal threat classes, compared to the baseline class, were associated with several, if not all of the PSQ items; odds ratios (ORs) ranged from 2.35 – 25.93. However, only the classes at the severe end of the continuum and a class characterised primarily by depression (Classes 1, 2, 3 and 6) were associated with psychotic disorder status (ORs 9.20 – 121.35). This was similar to the suicide attempt regression findings in Chapter 3. In the UK trauma sample, both of the internal threat classes were significantly associated with all of the APSS items, compared to the baseline class; ORs ranged from 1.72 – 7.53. Generally, the magnitude of these associations reflected a graded continuum of psychosis risk. Associations between the classes and a range of common mental disorders also highlighted internal threat as a transdiagnostic phenomenon.

Conclusion: The presence of significant associations between classes reflective of the lower end of the internal threat continuum and PEs suggest that future Suicidal Drive research should include a broader conceptualisation of internal threat, inclusive of NSE. Overall, this chapter demonstrated that there may be potential, in some cases, for self-attacking as well as suicidal thoughts to be the driving force behind the development of PEs.

5.0. Introduction to Chapter 5

Chapters 2, 3 and 4, modelled a continuum of internal threat and attempted to establish its validity. This chapter, along with Chapter 6, will focus on the second aim of the thesis, to examine how psychosis varies in relation to internal threat. These chapters will utilise the continuum framework, generated from the findings of the previous chapters, to examine whether there is any foundational support for an extension to the Suicidal Drive Hypothesis. Specifically, it will examine whether psychosis is associated with the severe end of the internal threat continuum only or whether it is possible that psychosis could manifest to less severe internal threat, before an individual considers talking their own life/harming themselves. Associations between psychosis and the upper end of the continuum would corroborate previous Suicidal Drive findings, further establishing its empirical basis. Furthermore, associations with the negative self-evaluation (NSE) component of the continuum would set a precedent to begin investigating the Suicidal Drive Hypothesis, inclusive of lower levels of internal threat, longitudinally. Moreover, by examining the relationship between the internal threat classes and a range of common mental disorders, the internal threat continuum may be further validated.

5.1. Suicidal Drive Hypothesis summary

This thesis proposes an extension to the Suicidal Drive Hypothesis (Murphy et al., 2018; Murphy et al., under review) whereby the conceptualisation of internal threat is broadened to be inclusive of both NSE and suicidality; these constructs are considered to exist on a continuum of internal threat, reflecting low to high levels, respectively. Modelling of such a continuum provides an opportunity to investigate whether lower levels of internal threat have the potential to trigger psychosis. Before beginning to discuss the potential role of less severe internal threat in psychosis development and maintenance, it may be useful, firstly, to briefly restate the position of the Suicidal Drive Hypothesis.

In summary, the Suicidal Drive theorises that suicidality may, in some cases, act as a risk factor for psychosis. This is in contrast to conventional assumptions about the framing of these variables, which traditionally view suicidality as an outcome of psychosis. Within the context of this hypothesis, suicidality represents an internal threat to which psychosis operates as a threat response. When faced with an internal threat

such as suicidality, conventional external threat responses (e.g. fight, flight, etc.) may prove ineffective since the source of threat is within. In this case, processes which allow individuals to gain psychological distance from the source of threat may be beneficial. Murphy and colleagues (2018; under review) suggest that externalisation may represent such a process, activated in response to suicidality. Externalisation would involve attributing the source of threat to an external, outside source; for example, thoughts of taking one's life may be externalised and attributed to an external voice (AVHs), a group of individuals (paranoid/persecutory delusions) or to some form of external, potentially supernatural force (delusions of control). From an evolutionary perspective, the positive symptoms of psychosis, therefore, may represent an adaptive, advantageous strategy to protect oneself from thoughts of and engagement in behaviours which would ultimately end one's life, by externalising the source of this threat. In doing so, individuals may engage alternatively, with processes designed to protect them from harm for example, hypervigilance and safety-seeking. Additionally, the distressed state that this induces is likely to alert others and prompt them to engage in supportive behaviour. These processes would ultimately aid the distressed individual's survival.

As discussed in Chapter 1, the authors cite several strands of research as potentially supportive of their hypothesis. Firstly, threatening content is evident within positive psychosis symptoms (Corstens & Longden, 2013; Upthegrove et al., 2016) and attentional and attributional biases towards threat appear to be common among individuals with psychosis (Savulich, Shergill & Yiend, 2012). Moreover, externalisation is a key component of positive psychosis symptomology and externalising biases are also present (Brookwell, Bentall & Varese, 2013). Finally, not only is suicidality frequently present among those with psychosis, but research suggests that greatest risk is in the early stages of the condition (Pompilli et al., 2011; Ventriglio et al., 2016). Taken together and applied to the Suicidal Drive Hypothesis, these bodies of literature suggest that for some individuals, suicidality may trigger an internal threat response as a defensive mechanism. Consequentially, their internal threat is externalised and they develop a heightened sensitivity to detecting threat within their environment, manifesting itself as positive symptoms of psychosis. This would explain the presence of suicidality earlier, rather than later in the condition; PEs begin to manifest in response to an individual's internal threat state. Additionally, the lack of threat content in the negative symptoms of psychosis and their lack of association with externalising

biases (Humpston, Linden & Evans, 2017), further supports the position of the hypothesis that it is positive symptoms that operate as a threat response.

5.2. The association between NSE and psychosis

As discussed in Chapter 1, there is a large body of research dedicated to the relationship between psychosis and suicidality. Other than the Suicidal Drive Hypothesis and its associated empirical testing (Murphy et al., 2018; Murphy et al., under review), no consideration to date has been given to the potential that a bidirectional association may operate between these variables and that, in some cases, suicidality may precede psychosis. However, a large body of research has consistently reported associations between psychosis and the constructs that this thesis proposes lie at the lower end of the internal threat continuum, i.e., NSE. Furthermore, some of this research suggests that psychosis may be consequential in part to NSE.

The association between NSE and psychosis appears to be particularly relevant in relation to paranoia, persecutory delusions and AVHs. Moreover, it is present across the continuum of psychosis (i.e. in both clinical and non-clinical populations; Taylor et al., 2014). While positive evaluations of self and others and levels of self-esteem have been shown to be similar amongst psychosis and nonclinical groups, individuals with psychosis tend to hold extremely negative evaluations of themselves and others (Fowler et al., 2006). Using the Brief Core Schema Scale (Fowler et al., 2006), Addington and Tran (2009) found the negative self-subscale to be associated with unusual thought content, suspiciousness and total positive symptom score in an at-risk sample. Similarly, high risk individuals, compared to healthy controls, hold fewer positive and more negative self-schemas even after controlling for depression (Cowan, McAdams & Mittal, 2019; Stowkowy et al., 2016). Furthermore, when controlling for depression and low self-esteem, Smith et al. (2006) reported negative-self but not negative-other schemas to be independently associated with persecutory delusions. Negative self-schemas are also associated with PE severity (Taylor et al., 2014).

Paranoia has been most consistently linked with NSE (Tiernan, Tracey & Shannon, 2014). In both nonclinical and mixed clinical samples, paranoid beliefs/ideation have been found to be associated with the forms and functions of self-criticism, particularly self-hating and self-persecution, a lack of self-kindness and self-

reassurance, submissive behaviour, low social comparison (e.g. feeling inferior, incompetent and left out) and shame (Allan & Gilbert, 1997; Freeman et al., 2005; Gilbert, Boxall, Cheung & Irons, 2005; Hutton, Kelly, Lowens, Taylor & Tai, 2013; Matos, Pinto-Gouveia & Gilbert, 2013; Mills, Gilbert, Bellew, McEwan & Gale, 2007; Pinto-Gouveia, Matos, Castilho & Xavier, 2014; Smith et al., 2006). Mills et al. (2007) reported that self-hating remained associated with paranoia even after controlling for depression and self-reassurance. Moreover, Freeman et al. (2014) used a novel virtual reality experiment to investigate the impact of social rank/status on paranoia. Females experiencing paranoia took part in a virtual reality simulation twice, once with a normal height avatar and again with a reduced height avatar as a proxy for lower social rank. The reduced height simulation resulted in more negative views of oneself and increased paranoia. This increase was fully mediated by changes in social comparison. Experimental manipulations of self-confidence have also been found to lead to more negative social comparison and higher levels of paranoia (Atherton et al., 2016). Furthermore, the association between negative schemas (self and other) and delusional ideation has been demonstrated prospectively (Oliver, O'Connor, Jose, McLachlan & Peters, 2012).

Moreover, a recent systematic review on shame and psychosis (Carden, Saini, Seddon, Watkins & Taylor, 2018), reported specific links between shame and psychosis generally, as well as paranoia and affiliation with voices. Furthermore, levels of shame were higher in those with psychosis compared to controls. Indeed, feeling subordinate to voices is strongly linked to feeling subordinate in other social relationships (Birchwood, Meaden, Trower, Gilbert & Plaistow, 2000; Gilbert et al., 2001). Feelings of self-disgust (Ille et al., 2014) and lower self-compassion (Eicher, Davis & Lysaker, 2013; Scheunemann, Schlier, Ascone & Lincoln, 2018) are also associated with PEs and PE distress. Moreover, qualitative investigation of voice content in AVHs found that in 98% of cases the voices were critical, in 73% were commanding and in 64% made threats (Cortsens & Longden, 2013). Underlying problems considered to embody the voice(s) included low self-worth and self-esteem (93%) and shame and guilt (60%). Negative self-schemas are strongly correlated with believing voices to be malevolent and omnipotent (Thomas, Farhall & Shawyer, 2015). While most research studies have investigated NSE concepts in isolation, Collett, Pugh, Waite and Freeman (2016) examined several of these constructs together in their study. They found that, compared

to a non-clinical group, a clinical group experiencing persecutory delusions had lower self-compassion, low self-esteem, increased fears of being mad, beliefs of inferiority to others, negative self-schemas and low positive self-schemas. These effect sizes were large and the negative self-concepts were strongly correlated with one another. It is clear, therefore, that a robust relationship exists between various forms of NSE and psychosis.

5.3. Understanding the association between NSE and psychosis

While it is acknowledged that NSE and psychosis demonstrate a strong association with one another across a large number of studies, the underlying mechanism perpetuating this association is not as clearly understood. Several bodies of literature using existing theories and models, however, have attempted to explain, in part, the relationship between NSE and psychosis. These theories suggest that NSE may play an aetiological role in psychosis development and may also contribute to its maintenance. In line with the aim of this chapter, to examine the relationship between the internal threat continuum and psychosis, it may be useful to review the existing theoretical basis for which NSE may operate as a risk factor for psychosis. Social Mentality Theory, cognitive theories of the positive symptoms of psychosis, research on the link between depression and psychosis and the Social Defeat Hypothesis for schizophrenia will be discussed below, regarding the aetiological role of NSE in psychosis.

5.3.1. Social Mentality Theory

This thesis utilised a Social Mentality framework to suggest that internal threat may manifest itself in other, less severe, forms than suicidality. Notably, a Social Mentality perspective has previously been applied to explain some of the abovementioned research finding a strong association between NSE and psychosis (e.g. Gilbert et al., 2001; Hutton et al., 2013). As previously discussed, traumatic experiences, particularly those which are early and/or interpersonal in nature, can lead to a toxic mix of hostility towards oneself in the form of self-attacking (via overactivation of threat systems) and an inability to self-soothe when distressed (via underdevelopment of warmth systems; Gilbert, 2004). Individuals with psychosis are more likely to come from adverse backgrounds (Bentall et al., 2014; Varese et al., 2012) where this overactivation of threat and underdevelopment of warmth is likely to have developed. Indeed, research has found that NSE partially mediates the relationship between trauma and psychosis

(Appiah-Kusi et al., 2017; Gibson, Reeves, Cooper, Olino & Ellman, 2019; Gracie et al., 2007). Application of this hostile-dominant mentality inwards may leave an individual feeling defeated and submissive. Although triggered as a non-aggressive self-defence tactic (Allan & Gilbert, 1997, Gilbert, 2000a), repeated activation may produce a threat-focussed 'mentality' (Gilbert, 1989; Gumley & Schwannauer, 2006). Resultingly, perceptions of oneself as vulnerable and inferior may be a building block to mistrust people, to be hypervigilant and to avoid others; this heightened sensitivity to threat cues may result in misattribution of threat to an external source but also optimise the chance of survival (Gumley & Schwannauer, 2006; Hutton et al., 2013).

Furthermore, Gilbert (1989) posited on the potential that if an individual is not able to recognise the source of their hostile internal dialogue, they may be left in a paranoid state. Gilbert et al. (2001) also applied this framework in a comparison of voice hearers and individuals with depression and self-critical thoughts. They suggested that internal attacks and subsequent submissive defences can leave individuals feeling defeated, belittled and want to escape from these thoughts, but that this can similarly apply to the relationship an individual has with their voices. The reported content of depressive thoughts in this study (e.g. being worthless, a failure, hating oneself, harming oneself) was phenomenologically very similar to reported voice content in other studies. For the voice hearers, depression was highly associated with feeling inferior to the voice and feeling inferior to voices was associated with feeling inferior to others. Furthermore, the more powerful the voice and the more inferior one feels to it, the greater desire to escape from it and fight it. Similar findings were reported for the depressed group and their self-critical thought. Again, these authors cite misattribution of self-critical thoughts to an external source as a potential basis for AVHs.

Interventions aimed at improving depression, developing compassion towards oneself and promoting help-seeking have been developed for individuals with psychosis as a relapse prevention tool (Gumley, Braehler, Laithwaite, MacBeth & Gilbert, 2010; Laithwaite et al., 2009). Application of these interventions have reported improvements in depression, social comparison, shame and self-esteem (Laithwaite et al., 2009). They have focused on targeting NSE in individuals who have experienced psychosis, as NSE may impede their recovery and lead to relapse (Gumley et al., 2010). Indeed, many individuals experience shame, humiliation, embarrassment, stigma, depression and

posttraumatic symptoms after psychosis (Turner, Bernard, Birchwood, Jackson & Jones, 2013; Iqbal, Birchwood, Chadwick & Trower, 2000) which have the potential to hinder their recovery process. Gumley et al. (2010) suggest that these affective states may emerge as a response to the reappearance of PEs which, although at attenuated level, may be interpreted as signalling impending relapse. Thus, the prospect of relapse may be considered a source of threat, as relapsing may further result in perceived loss of social rank, stigma, shame, depression, entrapment etc. (Gumley et al., 2006; Gumley et al., 2010). Relevantly, qualitative studies of psychosis recovery suggest that self-criticism maintained distressing experiences in psychosis and self-compassion promoted recovery (Waite, Knight & Lee, 2015).

The abovementioned research and the current research both utilise a Social Mentality framework, in part, to explain the relationship between NSE and psychosis, there are important differences in these perspectives. Firstly, previous Social Mentality – psychosis research has not considered a continuum of internal threat, inclusive of suicidality. Furthermore, the aforementioned research suggests that the misattribution of threat to an external source is the by-product of a threat focussed mentality. The current research, in line with the Suicidal Drive Hypothesis, proposes that the externalisation process is not simply a misattribution; it operates as a functional, adaptive process to distance an individual from a source of threat. Moreover, interventions that have been developed around Social Mentality theory and applied to psychosis have specifically focussed on preventing relapse. The current research does not oppose this application, positive self-to-self relating is undoubtedly an important process for individuals recovering from psychosis. This research, however, theorises that internal threat plays an aetiological role in psychosis and as such, advocates for the potential utilisation of interventions targeting NSE in a preventative capacity also. This is discussed in greater detail in Chapter 7.

5.3.2. Cognitive theories of psychosis

NSE has also been involved in both cognitive theories of depression (Beck, Rush, Shaw & Emery, 1979) and psychosis (Bentall, Kinderman & Kaney, 1994; Freeman, Garety, Kuipers, Fowler & Bebbington, 2002; Garety, Kuipers, Fowler, Freeman & Bebbington, 2001) and as an important factor in the onset and maintenance of both disorders. As

mentioned in Chapter 1, Bentall and colleague's theory of persecutory delusions (Bentall et al., 1994; Bentall, Corcoran, Howard, Blackwood & Kinderman, 2001) suggest that they arise from attempts to bridge gaps between self-perceptions and self-ideals which defend oneself from low self-esteem. These individuals have negative self-representations that when triggered by threatening events, rather than being internalized, are instead externalized; others are blamed for the situation/event and viewed as threatening while the self remains protected. While this serves to protect the individual from low self-esteem, it also results in persecutory ideation. Freeman et al. (2002) and Garety et al. (2001) build upon these ideas in their models of persecutory delusions and positive symptoms, respectively. Within their models PEs are not conceptualised as defences against negative self-beliefs, but rather as direct reflections of negative self, other and world beliefs. Positive symptoms are considered to develop through cognitive and affective changes or through affective changes only (Garety et al., 2001). In the aftermath of a triggering event, cognitive disturbance and dysfunction may lead to anomalous conscious experience (e.g. externalising bias, jumping to conclusions). Emotional disturbances (e.g. depression, anxiety, anger) then occur in response to these anomalous experiences and the triggering event. The authors propose that these processes are facilitated by cognitive vulnerabilities related to negative schemas of the world as dangerous and the self as vulnerable to threat, which are drawn upon in the search for meaning for anomalous experiences. Importantly, as suggested by Carden et al. (2018), disturbed affect could be inclusive of shame. Therefore, both pathways proposed by Garety and colleagues may be characterised by NSE in some form.

Moreover, Beck, Himelstein and Grant (2017) recently reviewed the evidence for the application of the cognitive model of depression (Beck et al., 1979) to the positive and negative symptoms of psychosis. They concluded that for both types of symptoms there was evidence to suggest oneself is viewed as weak, vulnerable, ineffective and worthless; others as controlling, dangerous and rejecting and the future as uncertain or forbidding which plays a role in the development, maintenance and content of psychosis. These cognitive models also acknowledge the role trauma and adverse experiences play in the formation of negative self-beliefs (Garety et al., 2001; Beck et al., 2019). Beck and Rector (2002; 2003) also note that NSE is evident within delusion and hallucination content. They suggest that dysfunctional negative schemas can contribute to the content of positive PEs.

5.3.3. Depression and psychosis research

Notably, major depressive disorder is characterised by many elements of NSE such as suicidal thoughts, feelings of worthlessness, defeat, failure and guilt. Therefore, in examining the relationship between NSE and psychosis, it is important to consider the body of research that has specifically focussed on depression and psychosis. More than just similarities within the cognitive frameworks for depression and psychosis, depression, by many, has been considered to hold a special status with psychosis. There is a high rate of comorbidity between depression and psychosis, with depression commonly occurring before, during and after psychotic episodes (Birchwood, Iqbal, Chadwick & Trower, 2000; Buckley, Miller, Lehrer & Castle, 2009; Häfner et al., 2005; Upthegrove et al., 2010; Vorontsova, Garety & Freeman, 2013). For example, Upthegrove et al. (2010) found that in the 6-month prodromal phase leading up to first-episode psychosis, 56% had a clinically significant depressive episode, 59% in the acute phase and 37% in the post-psychosis phase. However, others have reported even higher rates, reaching between 70-80% during different stages of psychosis (Birchwood et al., 2000; Häfner et al., 2005). Depression has been implicated as a vulnerability factor for psychosis; it appears to be one of the first symptoms to emerge in those with a diagnosis of schizophrenia, occurring on average 4 years before first admission for a psychotic episode (Häfner et al., 2005). Häfner and colleagues work in particular has promoted the viewpoint that the two disorders share a core pathology and are not distinct entities. They suggest that both disorders start with the same prodromal phase of depressive symptoms (a ‘depressive core syndrome’ and a ‘negative syndrome in combination with early indicators of functional impairment’), at the end of which there is potential to transition to psychotic symptoms. When the transition does not occur, progression continues to unipolar depression; it is not until positive symptoms emerge that the two constructs are distinguishable (Häfner et al., 2005; Häfner, Maurer & an der Heiden, 2013). Similarly, Mulholland and Cooper’s (2000) detailed review concludes that the proposition that depression is merely a reaction to psychosis is not supported but rather that depression is “an integral part of the schizophrenic process” (p. 169). Several other studies have supported this assertion (Upthegrove et al., 2010).

Depression has been found to predict paranoia longitudinally (Moritz, Göritz, McLean, Westermann & Brodbeck, 2016; Vorontsova et al., 2013). The depression symptoms that best predicted later paranoia were guilt/worthlessness, trouble

concentrating, feeling slowed or restless and suicidal thoughts (Mortiz et al., 2016). Furthermore, Yung et al. (2007) found that among help-seeking adolescents with depression, remitting from depression was associated with significantly less PEs compared to individuals who remained depressed. Additionally, a longitudinal study using structural equation modelling reported plausible pathways from negative cognition (inclusive of negative self-schemas) and depressed mood to paranoia whereas there was no support for pathways in the opposite direction. The link between depressed mood and paranoia was mediated by negative cognition (Fowler et al., 2012). However, other prospective research has reported pathways from PEs to depression as stronger than the opposite directionality (Sullivan et al., 2014; Zavos et al., 2016).

5.3.4. The Social Defeat Hypothesis for schizophrenia

The Social Defeat Hypothesis for schizophrenia (Selten & Cantor-Graae, 2005; 2007; Selten, van der Ven, Ruten & Cantor-Graae, 2013) unifies a large body of research on risk factors for psychosis. It suggests that long-term exposure to social defeat is the common denominator for a number of risks for psychosis, namely urban upbringing, migration, childhood trauma, low intelligence and drug abuse. It is thought that these socially defeating experiences lead to a perception of a subordinate position or outsider status which may disturb dopamine functioning in the brain, resulting in PEs. Support for this model comes from the strong evidence for associations between the ‘defeating’ experiences and psychosis (Selten et al., 2013). Models of depression and suicidality have previously considered feelings of defeat and entrapment as of central importance (Gilbert & Allan, 1998; Taylor, Gooding, Wood & Tarrier, 2011; Taylor, Wood & Schulz, 2015).

Using the Netherlands Mental Health Survey and Incidence Study (NEMESIS-2) data, van Neiroop and colleagues (2014) reported that childhood trauma was associated with both psychosis and a range of items indexing social defeat, including, feeling discouraged, hopeless about the future, loss of self-confidence, feeling inferior, feeling worthless, thinking one was better off dead and suicidal ideation. This measure of social defeat was also associated with psychosis. Social defeat mediated the relationship between childhood trauma and both PEs and psychotic disorder. Individuals with higher social defeat scores were also more likely to be unemployed, less likely to have a

university education, had a lower income, less likely to live with a partner and more likely to be female. Similarly, Stowkowy and Addington (2012) assessed the role of social defeat and negative self-schemas on positive symptoms in a clinically high-risk group. In this study, social defeat was measured using a composite score from 3 scales, an internal entrapment scale ('I would like to get away from who I am and start again'; 'I feel powerless to change my thoughts and feelings'); an external entrapment scale ('I can see no way out of my current situation', 'I am in a situation I feel trapped in') and defeat ('I feel powerless', 'I feel like one of life's losers') (Gilbert & Allan, 1998). They reported significant associations among social defeat, negative self and other schemas and positive symptomology. Furthermore, social defeat was not significantly associated with positive symptoms once negative schemas were controlled for, suggesting that negative schemas may be the driving force behind this relationship.

Additionally, Valmaggia et al. (2015) reported that social defeat predicted paranoid appraisals in relation to a virtual reality simulation in an ultra-high-risk group. Moreover, a study by Jaya, Ascone and Lincoln (2016) reported that while social rank, loneliness and negative schemas were found to mediate the social adversity – negative symptom relationship, only negative schemas mediated the social adversity – positive symptoms relationship when controlling for the other potential mediators. It appears therefore, that socially defeating experiences may in certain circumstances create an environment for internal threat to thrive in the form of feelings of inferiority, worthlessness, defeat, suicidality, etc.

5.4. Aims and hypotheses

In summary, the Suicidal Drive Hypothesis proposes that suicidality may operate as a risk factor for psychosis. The abovementioned research suggests that NSE may also operate as a risk factor for psychosis; several theories have supported this proposition. This thesis has modelled NSE and suicidality together on a continuum of internal threat within the general population. Notably, in clinical psychosis samples, NSE has been found to be associated with suicidality (Fialko et al., 2006; Collett et al., 2016). Additionally, prospective research (Jaya, Ascone & Lincoln, 2018) reported a unidirectional path from negative self-schemas to positive symptoms and bidirectional paths from negative self-schemas to negative affective and vice versa. Additionally,

negative affect mediated the path from negative self-schemas to positive symptoms. Thus, it is possible that the internal threat continuum operates in relation to psychosis; the lower, as well as the upper end of the continuum, may have the potential to activate a psychosis threat response. However, it is important to examine where along the continuum a psychosis threat response might manifest. Is it, as the Suicidal Drive Hypothesis currently suggests, when an individual begins to engage with suicidal thoughts, or could it be triggered before then, when an individual engages with thoughts which are critical, degrading, shaming and belittling of themselves?

Therefore, the main aim of this chapter was to examine the relationship between the internal threat continuum and psychosis. Importantly, given that psychosis lies on a continuum from subclinical PEs to psychotic disorder (see Chapter 1), it was important to consider the relationship with both (i.e. individual subclinical PEs and psychotic disorder status) in this analysis. Firstly, in line with the position of the Suicidal Drive Hypothesis, it was expected that classes characterised by suicidality would be associated with psychosis. Furthermore, it was also expected that the internal threat classes representing the lower end of the continuum (i.e. not inclusive of suicidality) would also be associated with psychosis. The classes at the upper end of the continuum were expected to be more strongly associated than the classes at the lower end of the continuum, reflecting an increased risk of psychosis moving up through the internal threat continuum. Moreover, opportunities to further validate the internal threat continuum were also utilised by examining its association with a number of distinct psychiatric disorders.

5.5. Method

5.5.1. Sample

The analyses were carried out using the factor mixture model (FMM) classes derived from the British Psychiatric Morbidity Survey (BPMS) in Chapter 3. Examination of the association between internal threat and PEs was also conducted using the latent classes derived from Chapter 4.

BPMS: FMM classes

The BPMS was used to conduct the factor analyses and subsequent FMM in Chapters 2 and 3. In summary, the BPMS contains a large, general population sample; it was designed to be representative of the adult population, aged 16-74, living in private households in Britain with the aim to estimate the prevalence and correlates of mental health problems. Eight thousand five hundred and eighty adults successfully completed the phase one assessment interviews (55% female). Mean age was 45.37 ($SD = 15.61$) years. See Chapter 2 and Singleton, Bumpstead, O'Brien, Lee and Meltzer (2001) for further information on the BPMS sample.

Results of the FMM analysis in Chapter 3 suggested the presence of a 7-class model of internal threat which was based on the four internal threat dimensions established in Chapter 2. In brief, these classes represented groups characterised by elevated probabilities of endorsing:

- Class 1 ($N = 149$, 1.7%): Low self-worth and subordination, depression, suicidal ideation and self-harm.
- Class 2 ($N = 571$, 6.7%): Low self-worth and subordination, depression and suicidal ideation.
- Class 3 ($N = 829$, 9.7%): Depression and suicidal ideation.
- Class 4 ($N = 340$, 4.0%): Low self-worth and subordination and depression
- Class 5 ($N = 1193$, 13.9%): Low self-worth and subordination
- Class 6 ($N = 745$, 8.7%): Depression
- Class 7 ($N = 4753$, 55.4%): Baseline class with low elevation on all of the dimensions.

See Chapter 3 for further details on the composition of the classes.

UK trauma data: Latent classes

Internal threat latent classes were derived from Chapter 4. This sample contained participants recruited through an online research panel. Panel members were randomly recruited through probability-based sampling to ensure representativeness to the UK population. Several inclusion criteria applied, participants had to (a) have been born in the UK, (b) be 18 years or older at the time of the survey, and (c) screen positive for at

least one traumatic life event (assessed using the Life Events Checklist-Revised, see Chapter 4). In total, 1,051 individuals qualified as valid cases based on these criteria. As a result of the analysis in Chapter 4, the latent classes were derived from a random subsample of approximately half of the valid cases ($N = 505$). The mean age of the sample was 47.15 years ($SD = 15.01$, range = 18-90 years) and the majority were female (67.7%). These classes were specifically formed using items from the diagnostic criteria of complex posttraumatic stress disorder (CPTSD) and borderline personality disorder (BPD). The classes represented:

- Class 1 ($N = 72$, 14.3%): Negative self-concept and suicidality
- Class 2 ($N = 127$, 25.1%): Suicidality only
- Class 3 ($N = 306$, 60.6%): Baseline class

5.5.2. Measures

Subclinical PEs were measured differently in the BPMS and UK trauma datasets.

Psychosis Screening Questionnaire (PSQ) – BPMS

In the BPMS, the PSQ (Bebbington & Nayani, 1995) was used. It was administered during the first phase of data collection to assess psychotic symptoms within the past year. The PSQ consisted of five main questions inquiring about mania, thought insertion, paranoia, strange experiences and hallucinations (P1–P5), their subsidiary questions (a and b), and sections to record verbatim descriptions of the symptoms. Analysis of the current study was based solely on selected subsidiary questions to attempt to capture PEs more reliably within the study. The hallucination item was the only exception to this; the main question (PSQ5) was deemed more suitable than its subsidiary question (PSQ5a) as it enquired about auditory and visual hallucinations rather than auditory hallucinations only. Therefore, the PSQ items utilised in this study were:

- Mania: (1b) Did people think it was strange?
- Thought insertion: (2a) Did it come about in a way that many people would find hard to believe, for instance, through telepathy?
- Paranoia: (3b) Have there been times when you felt that a group of people was plotting to cause you serious harm or injury?

- Strange experiences: (4a) Was it so strange that other people would find it very hard to believe?
- Hallucinations: (5) Have there been times when you heard or saw things that other people could not?

Responses to each of the selected questions were coded 1 = endorsed, 0 = rejected. Participants were only asked the subsidiary questions if they endorsed the main item, consequently, many individual's responses were missing to these items. Therefore, missing data as a result of screening out processes were recoded as 0. Moreover, an "unsure" response to any of the items was recoded and treated as missing data.

Adolescent Psychotic-Like Symptom Screener (APSS) – UK trauma data

A modified version of the Adolescent Psychotic-Like Symptom Screener (APSS; Kelleher, Harley, Murtagh & Cannon, 2011) was administered to assess lifetime psychotic symptoms in the UK trauma sample. The APSS is a brief self-report screening instrument, consisting of 7 items, which is used to assess for the presence of a range of positive psychotic symptoms. These were:

- Some people believe that their thoughts can be read by another person. Have other people ever read your mind? (mind reading)
- Have you ever had messages sent just to you through the TV or radio? (special messages)
- Have you ever thought that people are following or spying on you? (spying on you)
- Have you ever heard voices or sounds that no one else can hear? (auditory hallucinations)
- Have you ever felt you were under the control of some special power? (under control)
- Have you ever seen things that other people could not see? (visual hallucinations)
- Have you ever felt like you had extra-special powers? (special powers)

Responses to each of the items were scored as (1) ‘Never’, (2) ‘Sometimes’, (3) ‘Often’, and (4) ‘Nearly always’. For the purposes of this study, an item was considered endorsed if a participant responded ‘Sometimes’, ‘Often’ or ‘Nearly always’. There was no missing data present on any of the APSS items. Kelleher et al. (2011) found that the measure provided good sensitivity and specificity in identifying PLEs in young, general population adolescents. They found the question on auditory hallucinations, visual hallucinations and paranoid thoughts to be particularly predictive.

Psychiatric diagnoses

A selection of psychiatric diagnoses were used as outcome variables. The relationship between the FMM classes and the diagnoses of panic disorder, generalised anxiety disorder (GAD), obsessive compulsive disorder (OCD), specific phobia, social phobia and psychotic disorder were assessed. The presence of these diagnoses, except psychotic disorder, was determined using the Clinical Interview Schedule-Revised (CIS-R; Lewis, Pelosi & Dunn, 1992). A two-stage approach was used to assess for psychotic disorders in the BPMS. Individuals were considered to have screened positive in the stage one interview if they endorsed a self-reported diagnosis or self-reported symptoms (e.g. hearing voices) indicative of a psychotic disorder, receiving anti-psychotic medication, having a history of admission to a psychiatric hospital or answered positively to PSQ item 5a (auditory hallucination item). All individuals who screened positive were selected to take part in a second stage clinical interview using the Schedules for Clinical Assessment in Neuropsychiatry (SCAN v.21) to determine presence of a psychotic disorder. Those who screened negative at stage one were not considered to have a psychotic disorder. Further details on this method are available (Singleton et al., 2001).

5.5.3. Analytic plan

A series of regression analyses were conducted. Firstly, using the FMM classes derived from the BPMS, multivariate logistic regression analyses were used to investigate whether class membership predicted (i) diagnostic outcomes including a psychotic disorder and (ii) individual PEs (measured using the PSQ). Additionally, the

relationship between the latent classes and individual PEs (measured using the APSS) was examined in the UK trauma sample. This technique is particularly useful as not only does it identify whether there is a significant relationship between the variables, it also calculates the strength of this relationship. That is, it calculates the probability (odds ratio [OR]) of an individual meeting the criteria for a diagnosis or endorsing a PE depending on the class they have been assigned to. Significant ORs can then be compared to identify the strongest associations.

Moreover, the use of multivariate logistic regression allowed for the unique effect of the diagnoses and PEs to be assessed. For example, the probability of an individual in Class 1, compared to the baseline class, being categorised as having a psychotic disorder could be examined while controlling for the effects of GAD, panic disorder, social phobia, specific phobia and OCD. Similarly, the relationship between Class 4 and paranoia could be examined while controlling for the relationship between Class 4 and mania, thought insertion, strange experiences and hallucinations. For the analyses utilising the BPMS sample, Class 7 was used as the reference group while Class 3 was used as the reference group in the UK trauma sample analysis. Robust maximum likelihood estimation was used.

5.6. Results

5.6.1. Descriptive statistics

Table 5.1 presents the items endorsement rates for the overall sample and by class. In the BPMS sample, strange experiences and hallucinations were the most frequently endorsed PEs. In the UK trauma sample, spying and mind reading were the most frequently endorsed items. Overall, PE endorsement was much lower in the BPMS (range 0.6 – 4.4%) compared to the UK trauma sample (range 8.9 – 24%). Of the diagnoses examined, GAD (5.0%) was the most frequent, while psychotic disorder was the least (0.3%).

Table 5.1. Item frequencies and relative percentages for total sample and by class

Count (%)								
BPMS								
	Total sample (<i>N</i> = 8580)	Class 1 (<i>N</i> = 149)	Class 2 (<i>N</i> = 571)	Class 3 (<i>N</i> = 829)	Class 4 (<i>N</i> = 340)	Class 5 (<i>N</i> = 1193)	Class 6 (<i>N</i> = 745)	Class 7 (<i>N</i> = 4753)
Mania	48 (0.6)	4 (8.3)	9 (1.6)	9 (1.1)	1 (0.3)	6 (0.5)	1 (0.1)	18 (0.4)
Thought insertion	97 (1.1)	4 (4.1)	22 (3.9)	26 (3.1)	10 (3.0)	8 (0.7)	13 (1.7)	14 (0.3)
Paranoia	146 (1.7)	19 (13.0)	39 (6.9)	28 (3.4)	11 (3.3)	10 (0.8)	14 (1.9)	25 (0.5)
Strange experiences	284 (3.3)	33 (11.6)	68 (12.0)	37 (4.5)	33 (9.7)	30 (2.5)	30 (4.0)	53 (1.1)
Hallucinations	371 (4.4)	24 (6.5)	67 (11.9)	70 (8.5)	30 (8.8)	34 (2.9)	43 (5.8)	103 (2.2)
Panic disorder	69 (0.8)	4 (2.7)	16 (2.8)	12 (1.4)	8 (2.4)	8 (0.7)	11 (1.5)	10 (0.2)
GAD	431 (5.0)	40 (26.8)	118 (20.7)	66 (8.0)	50 (14.7)	38 (3.2)	64 (8.6)	55 (1.2)
OCD	114 (1.3)	13 (8.7)	49 (8.6)	15 (1.8)	13 (3.8)	5 (0.4)	14 (1.9)	5 (0.1)
Social phobia	67 (0.8)	17 (11.4)	26 (4.6)	5 (0.6)	11 (3.2)	2 (0.2)	4 (0.5)	2 (0.0)
Specific phobia	86 (1.0)	13 (8.7)	29 (5.1)	12 (1.4)	12 (3.5)	8 (0.7)	5 (0.7)	7 (0.1)
Psychotic disorder	27 (0.3)	7 (4.7)	5 (0.9)	9 (1.1)	1 (0.3)	1 (0.1)	2 (0.3)	2 (0.0)
UK Trauma sample								
	Total sample (<i>N</i> = 505)	Class 1 (<i>N</i> = 72)		Class 2 (<i>N</i> = 127)		Class 3 (<i>N</i> = 306)		
Mind reading	123 (24.4)	27 (37.5)		37 (29.1)		59 (19.3)		
Special messages	45 (8.9)	11 (15.3)		20 (15.7)		14 (4.6)		
Spying on you	137 (27.1)	42 (58.3)		47 (37.0)		48 (15.7)		
Aud-hallucinations	116 (23.0)	34 (47.2)		46 (36.2)		36 (11.8)		
Under control	63 (12.5)	21 (29.2)		20 (15.7)		22 (7.2)		
Visual hallucinations	100 (19.8)	31 (43.1)		37 (29.1)		32 (10.5)		
Special powers	74 (14.7)	20 (27.8)		25 (19.7)		29 (9.5)		

Examining the class proportions for the PE variables, a greater relative proportion of individuals in the severe internal threat classes endorsed the PEs compared to the low internal threat classes. Similarly, a greater proportion of the low internal threat classes endorsed the PEs compared to the baseline class. This trend was also present for a psychotic disorder diagnosis. Almost 5% of individuals in Class 1 met this criterion, for Classes 2 and 3, this was approximately 1%, while for the remaining classes this ranged between 0.3 – 0.0%. Graded proportioning was also reflected in the remaining psychiatric disorder diagnoses.

5.6.2. Psychotic disorder and other psychiatric diagnoses

Table 5.2 presents the ORs for membership to the internal threat classes compared to the baseline class, based on the presence of a range of diagnoses. Significant associations emerged between the majority of the classes and diagnoses. Again, higher ORs were evident for the more severe internal threat classes. Particularly strong associations were observed for the diagnoses of social phobia, OCD and psychotic disorder. No significant association was present between Class 5 and panic disorder, Class 5 and psychotic disorder and Class 4 and psychotic disorder. No clear trend was present between the classes and panic disorder. GAD, specific and social phobia demonstrated a dose-response effect throughout, with the exception of the association with Class 3. A more mixed trend was present for OCD as Class 2 had a stronger association than Class 1. For psychotic disorder, a dose-response effect was evident in the significant associations, particularly at the upper end of the continuum.

5.6.3. Subclinical PEs

Table 5.3 presents the associations between the internal threat classes and PEs in the BPMS and UK trauma sample. Using the PSQ items from the BPMS, all classes were associated with the thought insertion and strange experiences items. Class 5 was not associated with mania, paranoia or hallucinations. Additionally, Classes 4 and 6 were also not associated with mania. For the most part, a linear trend was present among the significant class associations, although there were some exceptions. Classes 1, 2 and 3 exhibited a linear trend with mania. Thought insertion had a dose-response effect with

Table 5.2. Multivariate logistic regression using BPMS showing associations between classes and diagnoses ($N = 8,580$)

Class	OR (95% CI)					
	Psychotic disorder	GAD	OCD	Panic disorder	Specific phobia	Social phobia
1	121.35*** (22.84 – 644.76)	28.00*** (17.09 – 45.89)	107.62*** (35.24 – 328.66)	9.10*** (2.64 – 31.41)	67.04*** (25.32 – 177.48)	573.01*** (127.15 – 2582.32)
2	31.86*** (5.66 – 179.47)	24.45*** (17.04 – 35.08)	115.29*** (42.97 – 309.37)	11.53*** (4.91 – 27.07)	32.98*** (13.84 – 78.63)	217.97*** (50.82 – 934.97)
3	25.98*** (5.15 – 131.15)	8.02*** (5.41 – 11.87)	24.36*** (8.07 – 73.55)	7.05*** (2.82 – 17.63)	10.39*** (3.88 – 27.82)	28.82*** (5.34 – 155.45)
4	8.69 (0.75 – 100.41)	14.08*** (9.17 – 21.62)	45.13*** (14.86 – 137.09)	11.28*** (4.22 – 30.17)	22.71*** (8.33 – 61.94)	111.78*** (24.31 – 514.04)
5	2.59 (0.22 – 29.87)	3.07*** (1.97 – 4.78)	3.89* (1.04 – 14.49)	2.50 (0.94 – 6.63)	5.30** (1.86 – 15.13)	9.72* (1.34 – 70.46)
6	9.20* (1.23 – 69.06)	7.92*** (5.31 – 11.81)	24.27*** (8.15 – 72.27)	6.14*** (2.42 – 15.59)	4.10* (1.23 – 13.72)	26.57*** (4.73 – 149.40)

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 5.3. Multivariate logistic regression showing associations between classes and diagnoses in BPMS and UK trauma sample

		OR (95% CI)					
BPMS							
Class	Mania	Thought insertion	Paranoia	Strange experiences	Hallucinations		
1	9.66*** (3.52 – 26.55)	11.91*** (4.23 – 33.51)	24.63*** (12.98 – 46.74)	25.93*** (15.94 – 42.17)	9.15*** (5.65 – 14.80)		
2	6.49*** (3.13 – 13.42)	18.66*** (9.83 – 35.41)	13.50*** (8.04 – 22.54)	11.03*** (7.48 – 16.26)	5.96*** (4.31 – 8.25)		
3	3.41** (1.56 – 7.47)	11.89*** (6.23 – 22.69)	6.64*** (3.85 – 11.45)	4.09*** (2.63 – 6.36)	3.95*** (2.87 – 5.44)		
4	0.83 (0.11 – 6.25)	10.29* (4.54 – 23.34)	6.91*** (3.44 – 13.88)	10.29*** (6.53 – 16.22)	4.33*** (2.82 – 6.64)		
5	0.94 (0.31 – 2.79)	2.57*** (1.11 – 5.94)	1.59 (0.76 – 3.33)	2.35*** (1.48 – 3.73)	1.34 (0.90 – 1.99)		
6	0.37 (0.05 – 2.81)	6.96*** (3.34 – 14.47)	4.13*** (2.20 – 7.78)	3.69*** (2.31 – 5.89)	2.67*** (1.84 – 3.86)		
UK trauma sample							
Class	Mind reading	Special messages	Spying on you	AVHs	Under control	Visual hallucinations	Special powers
1	2.51*** (1.44 – 4.38)	3.76** (1.63 – 8.68)	7.53*** (4.30 – 13.18)	6.71*** (3.76 – 11.97)	5.32*** (2.73 – 10.37)	6.47*** (3.58 – 11.72)	3.67*** (1.93 – 6.98)
2	1.72* (1.07 – 2.77)	3.90*** (1.90 – 7.99)	3.16*** (1.97 – 5.07)	4.23*** (2.58 – 7.04)	2.41** (1.27 – 4.60)	3.52*** (2.07 – 5.98)	2.34** (1.31 – 4.19)

* $p < .05$, ** $p < .01$, *** $p < .001$

the exception of Class 1. The strongest ORs were observed with the paranoia (ORs 24.63 – 4.13) and strange experiences items (ORs 25.93 – 2.35). For these two items and the hallucinations item, Class 4 had a stronger association than Class 3.

In the UK trauma sample, all of the items were associated with Classes 1 and 2 compared to Class 3. The latent classes demonstrated a dose-response effect with all of the APSS items with the exception of ‘special messages’. This had a marginally stronger effect with Class 2, however, this difference was minor. The strongest ORs were observed for ‘spying on you’ (OR = 7.53), ‘AVHs’ (OR = 6.71), ‘under control’ (OR = 5.32) and ‘visual hallucinations’ (OR = 6.47). Overall, relationships between the APSS items and the latent classes were markedly lower than between the PSQ items and the FMM classes.

5.7. Discussion

This study aimed to investigate the association between the internal threat continuum and psychosis. It was predicted, based on the research described in the introduction to this chapter as well as the assertions of the Suicidal Drive Hypothesis, that all internal threat classes would be associated with both a psychotic disorder diagnosis and individual PEs. Furthermore, it was expected that probability of endorsing these experiences would increase with increasing severity of internal threat. That is, the internal threat continuum would map onto a continuum of psychosis/PE risk. Moreover, these analyses were utilised to further validate the continuum by analysing its associations with a range of other, non-psychotic mental disorders.

5.7.1. Internal threat classes and psychosis

Psychotic disorder

Despite the widespread associations with common mental disorder diagnoses (discussed below), much of the focus of this chapter was directed towards a psychotic disorder diagnosis. Classes 1, 2, 3 and 6 were associated with a diagnosis of a psychotic disorder. Importantly, the associations with the other diagnoses were controlled for in this analysis. With its significant associations, a linear effect was demonstrated. Class 1,

however, exhibited an extremely strong effect, its association was almost four times stronger than that of Class 2. This indicates that the addition of self-harm (SH) over and above suicidal ideation (SI) may have notable significance for psychosis expression. It is also notable that the classes associated with clinical psychotic disorder in this chapter were those significantly associated with SA history in Chapter 3.

Furthermore, there was a lack of association between psychosis and Classes 4 and 5, characterised by low self-worth and depression and low self-worth only, respectively. This would suggest that, at a clinical level, independent of suicidality, NSE may not play a role in psychosis expression. The significant association with Class 6 (depression only) was of particular interest; there were no significant associations with Classes 4 and 5 and moreover, Class 4 (low self-worth and depression) was characterised by greater endorsement probabilities than Class 6 on both the depression factor and all other factors (see Figure 3.1, Chapter 3). This unexpected and unusual finding will need to be further investigated to determine whether it is unique to this study or replicable.

Subclinical PEs

Since psychosis is also proposed to lie on a continuum (van Os, Linscott, Myin-Germeys, Delespaul & Krabbendam, 2009), it was important to examine the association between these variables at subclinical level. This was accomplished by using the PSQ items from the BPMS and the APSS items from the UK trauma sample. Using the PSQ items, it can be seen that there was a much broader effect than at the clinical level. Thought insertion and strange experiences were associated with all classes. Paranoia and hallucinations were associated with all classes except Class 5. Mania was only associated with the severe internal threat classes. Generally, there was a dose-response effect, although there were some exceptions; for example, Class 1 and thought insertion and Class 3 and paranoia, strange experiences and hallucinations. The stronger association with Class 4 over Class 3 may be indicative of low self-worth playing an important role at a subclinical level.

ORs for the APSS items on the UK trauma sample were overall slightly lower but in a mostly similar range to the PSQ items. All items were significant with the two internal threat classes compared to the baseline class. In all cases except special

messages, Class 1 was more strongly associated than Class 2. Spying, AVHs, under control and visual hallucinations had the strongest ORs.

5.7.2. Interpretation of associations based on existing models of psychosis

These results can be interpreted in light of the aforementioned theories. Hutton et al. (2013) applied Social Mentality Theory to suggest that repeated self-attacking and subsequent activation of defeated and submissive defences may activate a ‘threat-focussed mentality’ (Gumley & Schwannauer, 2006) and furthermore, that mistrust, hypervigilance and avoidance may be consequential to this. The strong association between the paranoia items: believing others are following or spying on you and plotting to cause you harm, and the internal threat classes is supportive of this proposal. Similarly, Gilbert and colleagues (Gilbert et al., 2001) examined AVHs from a Social Mentality standpoint, comparing them to self-critical thoughts observed in individuals with depression. These results would also suggest that with growing levels of internal threat, the greater the potential for depressogenic self-critical thoughts to be externalised in the form of PEs, as seen by the general dose-response trend in the regressions.

Moreover, Garety et al. (2001) suggest that there may be different pathways to psychosis; through cognitive and affective changes and through affective changes only. It could be suggested that Classes 1, 2, 3 and 4 are characterised by both cognitive and affective items in this study, whereas Class 5 and Class 6 are more aligned with cognitive only and affective only changes, respectively. Therefore, the lack of association between several of the PEs and Class 5 may indeed support Garety’s hypothesis that while affective changes have the potential to develop a pathway to psychosis, cognitive changes do not, unless in combination with affective changes. Additionally, the strong associations between internal threat and psychosis/PEs is also supportive of several cognitive perspectives (Beck & Rector, 2002, 2003; Freeman et al., 2002; Garety et al., 2001) proposing that positive PE content may directly reflect negative feelings towards oneself.

Research on major depressive disorder and schizophrenia has posited that a special relationship may exist between the diagnoses; that they share a core depressive pathology. The strong relationships between the classes elevated on the depression dimension and psychosis is relevant to this suggestion, particularly Class 6, which may

indeed suggest that depression is “an integral part of the schizophrenic process” (Mulholland & Cooper, 2000, p.169). Furthermore, these bodies of literature acknowledge that trauma and adversity may have a role in the development of self-attacking, self-criticism, depressive negative self-schemas etc. and may help explain the strong association between trauma and psychosis. Indeed, van Neiroop et al. (2014) reported that their measure of social defeat (inclusive of low self-worth, defeat and SI items) mediated the relationship between childhood trauma and psychosis. Although the trauma items used in Chapters 3 and 4 did not specify the developmental stage at which they occurred, the strong associations between sexual abuse and bullying and the classes in those chapters and the strong associations between the classes and psychosis in this chapter, are in line with van Nierop et al. (2014). Finally, prospective analysis (Jaya et al., 2018) suggesting that negative affect mediates the relationship between negative self-schemas and positive symptoms is also corroborated here, given Class 5’s lack of association with psychotic disorder and some of the PEs.

5.7.3. Interpretation of associations based on the Suicidal Drive Hypothesis

Firstly, it is important to reiterate that these findings are not based on prospective data, therefore, an extended Suicidal Drive Hypothesis has not been directly tested. Despite this, these cross-sectional results are useful for highlighting associations that would be expected to be present if psychosis operated as a response to internal threat. Furthermore, it is a valuable opportunity to consider whether lower as well as severe levels of internal threat may have the ability to trigger a threat response. If this was the case, significant associations between psychosis and classes across the continuum would be expected, as well as a graded strength of ORs.

At a clinical level, the results would suggest that low self-worth and subordination are not severe enough to trigger a psychotic disorder; it is only when an individual begins to entertain thoughts of whether their life is worth living that clinically defined psychosis may potentially be triggered. The Class 6 association, however, appears to be an exception to this. At the subclinical level, however, less severe internal threat was associated a range of PEs. For example, Class 5 (low self-worth and subordination only) was associated with both thought insertion and strange experiences (ORs approximately 2.5). Furthermore, depression only (Class 6) and low self-worth and depression classes

(Class 4) were associated with all PEs except mania. ORs generally increased moving through the continuum. In the UK trauma sample, for six out of the seven PEs, stronger associations were present for Class 1 than Class 2. Again, this could potentially indicate that NSE, over and above suicidality, has psychosis triggering capability.

Taken together, the clinical and subclinical results suggest that for some individuals, feelings of defeat, subordination, inferiority, worthlessness, shame etc. may trigger a threat externalisation process which manifests itself as subclinical PEs. In isolation or with little accompanying distress, these experiences may not constitute a clinical diagnosis. However, with growing intensity of internal threat, manifesting as suicidality alongside NSE, there may be an increased likelihood of experiencing multiple PEs. Moreover, externalisation of this more severe form of internal threat may result in PEs with more severe threat content; it is likely that this threat content would be perceived as more distressing. The combination of multiple PEs and the distress associated with them is then likely to increase an individual's likelihood of being diagnosed with a psychotic disorder. Indeed, this aligns with research highlighting distress associated with PEs is one of the main differentiators between clinical and nonclinical status (Peters, Joseph, Day & Garety, 2004). Therefore, the lack of associations between psychotic disorder and the lower end of the continuum do not necessarily disprove an extended Suicidal Drive Hypothesis. Rather, these results may suggest that the internal threat continuum maps onto the psychosis continuum.

Mania was the PE least consistently associated with the classes. The Suicidal Drive claims that the externalisation of internal threat can result in positive PEs; it cites externalising and threat-based attentional biases as well as threat content in PEs as potential evidence for this. Mania, however, unlike, thought insertion, hallucinations or paranoia for example, does not clearly reflect an externalisation process nor is it clearly characterised by threat content. Therefore, this result was not surprising. Items which exhibited the strongest associations were paranoia and strange experiences in the BPMS and spying on you, AVHs, under control and visual hallucinations in the UK trauma sample. Again, in line with the position of the Suicidal Drive Hypothesis, these experiences clearly exhibit an externalisation component and are commonly characterised by threat content. Importantly, these results also support the pre-existing Suicidal Drive findings (Murphy et al., 2018; under review); all classes characterised by suicidality were associated with both subclinical PEs and clinical psychotic disorder.

5.7.4. Internal threat classes and other psychiatric diagnoses

Firstly, the findings of the diagnostic outcome regression support the proposition that internal threat is not just relevant to disorders whose diagnostic formulation contain its elements, e.g. depression, BPD and CPTSD. Both moderate and severe levels of internal threat evidenced associations with all of the diagnoses. Internal threat, therefore, is unlikely to be diagnostic specific but may instead be transdiagnostic, a relevant construct for psychopathology more generally. Indeed, the role of specific forms of NSE such as low self-esteem (Zeigler-Hill, 2011), self-criticism (Schanche, 2013; Warren, Smeets & Neff, 2016) and lack of self-compassion (Warren et al., 2016) have been highlighted as relevant across the spectrum of psychopathology, potentially in a causal capacity. Furthermore, the diagnoses were associated with the majority of internal threat classes and generally exhibited a dose-response trend, supporting psychopathological validity. That is, if suicidality and NSE lie on a continuum of internal threat, it would be expected that they would show a similar pattern of comorbidity (van Os et al., 2009).

Along with psychosis, the diagnoses of OCD and social phobia were also very strongly associated with the internal threat classes. For OCD, Classes 1 and 2 exhibited ORs >100. Furthermore, Class 4 (low self-worth and depression) demonstrated an OR almost double that of Classes 3 (depression and SI) and 6 (depression only). This may suggest that it is the low self-worth component of internal threat that is most relevant to OCD. Cognitive theories of OCD have posited that its development is facilitated through dysfunctional negative appraisals of intrusive thoughts, particularly when they are considered revelatory of character flaws/deficiencies (Clark, 2004). Compared to student and mixed clinical samples, individuals with OCD have a poor self-image, characterised by elevated self-harm scores and very low entitlement scores, indicating that they do not believe they are worthy of special consideration or deserving of good outcomes (Wu, Clark & Watson, 2006). Moreover, individuals with OCD have below average self-compassion scores (Wetterneck, Lee, Smith & Hart, 2013) and shame is considered to be closely related to the disorder (Weingarden & Renshaw, 2015).

Social phobia expressed the strongest association of all the disorders. This was not unexpected given its significant role in theories of social anxiety. In short, Clark and Well's (1995) cognitive model of social phobia indicates that NSE is central in the

processing of social situations. Upon entering such situations socially anxious individuals tend to engage in negative-self processing, focusing their attention on unconditional negative beliefs about themselves (e.g. I'm odd, I'm stupid, etc.) and use this self-focused style to try to determine what other people think of them. Unfortunately, this results in internal monitoring only and external disconfirming evidence for their negative self-beliefs (e.g. other people's reactions) go unnoticed (Clark, 2001). This perspective has gained much empirical support (Clark, 2001). For example, Stopa and Clark (1993) found that compared to non-anxious controls and anxious controls, social phobics had more negative self-evaluative thoughts during a videotaped conversation situation. Social anxiety has also been found to be associated with shame, social rank, submissive behaviour and feelings of inferiority (Gilbert, 2000b). Again, the fact that the OR for the relationship between social phobia and Class 4 was almost four times stronger than its relationship with Class 3 again potentially highlights that the low self-worth, rather than suicidality component of internal threat, is the driving force behind its development.

Furthermore, analysis of the National Comorbidity Survey Replication found social anxiety disorder to be a unique predictor of SI and suicide attempt (SA) when controlling for sociodemographics and comorbid disorders (Cogle, Keough, Riccardi & Sachs-Ericsson, 2009). Investigating all anxiety disorders, Kanwar et al. (2013) found that compared to individuals without an anxiety disorder, those with one are significantly more likely to have SI (OR=2.89), SA (OR=2.47) and completed suicide (OR=3.34). This risk for SA was present for all subtypes of anxiety disorders, with the exception of OCD. Similar results have been demonstrated even when controlling for sociodemographics and mood disorders (Sareen et al., 2005). Overall, these results support the associations between the disorders and the classes at the upper end of the internal threat continuum. The lack of association between OCD and SA is notable given the strong association between OCD and Class 1 in this study, as well as the strong association between Class 1 and SA in Chapter 3.

5.7.5. Limitations

Firstly, it is important to reiterate previously cited limitations. Firstly, this analysis could not explicitly explore the temporal associations proposed by the 'psychosis as an

internal threat response' framework. Although this was an unfortunate limitation of using a large cross-sectional dataset, this analysis has been able to provide the first testing of psychosis's association with a continuum of internal threat. Although these results were interpreted from a threat response context, it is acknowledged that alternative interpretations and explanations are possible. Moreover, the PE regressions were conducted on two separate UK samples; one was a representative general population sample while the other was a general population trauma-based sample. As different methodologies and items were used to model the internal threat continuum in each of the samples, direct comparisons cannot be made. For example, the BPMS sample generally had stronger associations with the PEs than the trauma sample; this may be as a result of the sample inclusion criteria. In the UK trauma sample, participants had to endorse at least one trauma on the LEC to be included. Therefore, even individuals in the baseline internal threat class (Class 3) of this sample had endorsed a lifetime traumatic experience. This was not the case with the BPMS. Given the association between trauma and psychosis, the baseline comparison class in the UK trauma sample may have been at an elevated risk of endorsing PEs; this may explain the more attenuated ORs when comparing this sample to the BPMS. Additionally, the PSQ items (except hallucinations) were follow-up items which may have been more difficult to endorse than the APSS items, which were not follow-up questions. Also, scoring for the PSQ items were binary yes/no responses; an unsure response was recoded as missing. For the APSS, however, items were scored on a 4-point Likert scale which was subsequently dichotomised to represent a 'never' versus 'any other response'.

Due to the sampling and screening procedures in the BPMS, it is possible that individuals with a psychotic disorder were not screened into the stage two psychotic disorder assessment. Individuals were only considered to screen positive at stage one if they endorsed a self-reported diagnosis, receiving ant-psychotic medication, having a history of admission to a psychiatric hospital or endorsing the PSQ item on hearing voices. Therefore, there is potential that individuals with first-episode psychosis, who have not been formally diagnosed, hospitalised or treated with antipsychotic medication and who do not hear voices were overlooked in the screening process. Furthermore, as previously discussed, the BPMS did not screen for the presence of eating disorders, therefore their associations with the internal threat classes could not be examined in the

mental disorder regression. Consequently, it was not possible to account for the effect of eating disorders on the other results.

5.7.6. Future research

These results will need to be replicated and verified on other samples. In particular, utilising prospective data to temporally order internal threat and psychosis is a necessary future step. Moreover, it may be of interest to specifically examine the unexpected Class 4 and Class 6 associations found in this study to assess whether or not they are unique to this sample/study. A psychotic disorder diagnosis was significantly associated with Class 6 (depression) but not Class 4 (low self-worth and depression). This was unanticipated given that Class 4 had higher probabilities on all factors/items, including depression. Furthermore, this replicated the association between the internal threat classes and SA history in Chapter 3. Thus, the results of these chapters suggested that low mood alone was associated with SA and psychotic disorder, while low mood in combination with feelings of low self-worth and subordination was not. Different risk factors for class membership may account for these differences, for example, in Chapter 3 several variables were associated with Class 6 but not Class 4 (e.g. divorce or separation, drug dependence). This may be an avenue for future research. Overall, however, clarification regarding the reliability of these findings is needed when proceeding with this area of research.

Utilising alternative analytic frameworks to corroborate the internal threat – psychosis findings reported in this chapter would also be useful. Chapter 6 will use network analysis, a recently developed analytic technique to examine the relationship between PEs across the classes. From a network perspective, symptoms are not the function of an underlying latent disorder, but rather, are due to the reciprocal interactions between a set of experiences which form a complex network. Graphical mapping of these networks can allow for the most important associations in the network to be discovered. By mapping interactions between PEs across internal threat classes, the expression of psychosis across a continuum of internal threat severity may be illustrated.

5.8. Conclusions

The FMM and latent classes derived from the previous chapters provided an opportunity to assess the relationship between psychosis and the continuum of internal threat. Multivariate logistic regression was utilised as an appropriate analytic strategy which allowed for both the presence of significant associations and the strength of these associations to be examined. The results demonstrated that all levels of internal threat, compared to the baseline class were associated with endorsing subclinical PEs. Only the severe end of the internal threat continuum, however, was associated with being categorised as having a psychotic disorder. The strength of these association, for the most part, reflected a gradation of psychosis risk moving through the internal threat continuum; the more severe the internal threat class, the greater the risk of PEs/psychotic disorder. These findings were demonstrated across two, separate, UK-based general population samples. Notwithstanding the cross-sectional nature of the data, support for an extension to the Suicidal Drive's conceptualisation of internal threat was indicated. The presence of associations between PEs and the lower half of the internal threat continuum suggest that future, prospective Suicidal Drive research should consider modelling internal threat on a continuum and including NSE elements alongside suicidality. Moreover, the continuum of internal threat was highlighted a transdiagnostic phenomenon. Overall, this chapter demonstrated that there may be potential, in some cases, for self-attacking as well as suicidal thoughts to be the driving force behind the development of PEs.

Chapter 6

Psychosis experience connectivity across the internal threat continuum

Background and research aim: Network analysis is a novel analytic technique which has been recently popularised in psychological research. It is based on the network theory perspective which assumes that mental disorders arise from complex networks of self-sustaining symptoms. Unlike latent variable modelling it does not assume a common cause perspective. The previous chapter established the presence and strength of associations between psychosis and the internal threat continuum. In the current chapter, network analysis was used to map changes in interactions among PEs across the continuum of internal threat to more accurately profile psychosis expression along it. It was proposed that psychosis would ‘grow’ and ‘develop’ in relation to internal threat which could be demonstrated through increased network connectivity, increased relative importance of threat-related items in the network and lack of distinct PE clusters with increasing levels of internal threat.

Methods: The FMM classes derived from Chapter 3 served as the sample for this analysis. Due to methodological issues (low class sample sizes), the seven original FMM classes were collapsed to form three distinct groups; these reflected High ($N = 1514$, 18%), Moderate ($N = 2265$, 27%) and Baseline ($N = 4613$, 55%) internal threat. Items from the Psychosis Screening Questionnaire (PSQ) and a measure of schizotypal personality disorder were represented as nodes in the network. Ellasso regularised Ising networks were estimated on the total sample and on the High, Moderate and Baseline internal threat groups. Centrality estimates, node clustering, network comparison tests (NCTs) and accuracy and stability estimates were calculated for each of these groups.

Results: The High network was the most densely connected while the Baseline was sparsely connected. NCTs, however, revealed that there were no significant differences in the global strength of the networks. Further, the Baseline network held a significantly stronger maximum edge weight than the other networks. Inspection of the centrality estimates indicated that nodes *Force*, *Sixth* and *Watched* had the highest strength values in all three networks. Moreover, nodes *Watched*, *Sixth*, *Shadows*, *Hallucinations* and *Nervous* increased in strength centrality moving from the Baseline through to the High network. Three non-random clusters were indicated, reflecting Paranoia, Bizarre Experiences and Magical Thinking, and PSQ items.

Conclusions: Findings were mixed in relation to the stipulated hypotheses. There was some support for increased network connectivity and increased importance of threat-

related items at the more severe end of the continuum. However, not all findings supported these proposals. It is clear that given both the novelty of the hypothesised relationships between these variables and the potential modelling issues associated with network analysis, replication of these findings is needed. It is recommended that a more refined analysis, using only items which have a direct internal threat phenomenology, be conducted in future.

6.0. Introduction to Chapter 6

Chapter 5 demonstrated a general dose-response effect between the internal threat continuum and a range of mental health disorders. Regarding a diagnosis of a psychotic disorder in particular, however, the association was mainly present at the upper end of the continuum. Nevertheless, subclinical PEs were found to be associated, in a largely dose-response manner, with all internal threat classes. These results were derived from logistic regression analyses which indicated the presence of significant associations between individual PEs and the internal threat classes as well as the strength of these associations. However, the PEs which were modelled with internal threat individually in Chapter 5 are known to emerge together. The utilisation of alternative modelling techniques, such as network analysis, may afford an opportunity to examine how these individual PEs ‘become connected’ as one’s internal threat status changes moving through the continuum.

6.1. Network theory: An alternate perspective

The purpose of classification and diagnosis in medicine is to identify the most appropriate treatment, to inform prognosis, to accurately communicate the problem to other professionals and to conduct accurate research on aetiology, prevalence, treatment, etc. (Surís, Holliday & North, 2016). It would appear that, for the most part, psychiatry’s adoption of this diagnostic model has not led to the same advantageous outcomes as that of medicine. Adoption of alternative ways of thinking about the mechanisms behind mental disorders may lead to a better understanding of their cause and potential intervention. In recent years, a paradigm shift away from diagnosis classification and medical model perspectives has been endorsed (Insel et al., 2010; Kupfer, First & Reiger, 2002). As a result of this, changes in research methodologies have occurred, including support for more symptom-based research and the mainstream introduction of network theory.

The foundation of the network approach is simple: instead of interpreting symptoms as a function of a set of underlying/latent disorders, the network approach conceptualizes symptoms as mutually interacting, often reciprocally reinforcing, elements of a complex network. The sustained interactions within a network produce psychological distress and lead clinicians to categorise an individual as having a

disorder (Borsboom, 2017; Borsboom & Cramer, 2013; Boschloo et al., 2015; Cramer & Borsboom, 2015; Schmittmann et al. 2013). This is what explains the correlational relationship among ‘symptoms’ of a ‘disorder’. As such, rather than sleep disturbance, fatigue and difficulty concentrating being highly associated because they share the common cause of generalised anxiety disorder (GAD), the network approach proposes that it is more likely that sleep disturbance causes fatigue, which causes lack of concentration, etc. Local independence is not an issue with the network approach as it is purely a consequence of adopting a common cause model (Borsboom, 2008).

The network approach aligns with ‘clinical intuition’ (Borsboom, 2017). Although clinicians work with the diagnostic latent variable approach, they also acknowledge the intuitive sense of the network approach in their practice. If a network is densely connected, it is likely that the activation of one symptom will trigger the activation of many more. However, if the connections in the network differ in strength or there is an absence of connections then a small cluster of activation would be expected. A disorder could then be seen to arise when a group of symptoms mutually maintain each other in a strongly connected, self-sustaining network (Borsboom, 2017; Cramer & Borsboom, 2015). Indeed, cognitive behavioural therapy (CBT), a commonly used therapeutic approach for anxiety and depression, focusses on breaking the vicious cycle of thoughts, feelings and behaviours maintaining an individual’s depressed/anxious state. This has led some to argue that the network approach aligns with the reality of mental disorders (Cramer, Waldorp, van der Maas & Borsboom, 2010; Schmittmann et al. 2013).

6.2 Application of network theory

Just as the latent variable approach has accompanying statistical analyses (e.g. factor analysis, latent class analysis, etc.), network theory has network analysis. It was developed as a result of theoretical work and statistical methodology by Borsboom and colleagues (Borsboom, 2008; Cramer et al., 2010). Network analysis can be carried out using the freely available statistical software *R* (R Core Team, 2013) in combination with the *RStudio* programme. It graphically illustrates nodes (points in space representing observed variables) and their associations between one another (edges depicting strength of association). It aims to map the symptom-symptom associations directly rather than focussing on underlying latent disorders (Fried & Cramer, 2017).

Statistical indices allow one to calculate the importance of a symptom (node) in a network. Although a relatively recent addition to psychological research's statistical repertoire, since its conception it has been applied to a range of fields including psychological disorders (e.g. Armour, Fried, Deserno, Tsai & Pietrzak, 2017; Mullarkey, Marchetti & Beevers, 2019); personality (Costantini et al., 2015); comorbidity (Afzali et al., 2017; McElroy, Shevlin, Murphy & McBride, 2018) and social psychology (Dalege, Borsboom, van Harreveld & van der Maas, 2017).

6.3. Overview of previous psychosis network analyses

Previous studies have used network analysis to investigate psychosis. These studies have examined both clinical psychotic symptoms as well as subclinical PEs. Furthermore, they have utilised a range of frameworks to examine the connections among PEs themselves or alongside other psychological phenomena. Strong interconnectivity between PEs has been reported (Murphy, McBride, Fried & Shevlin, 2018; van Rooijen et al., 2017) and paranoia has been classified as one of the most important symptoms in the network (Murphy et al., 2018; Bak, Drukker, Hasmi & van Os, 2016). Moreover, Murphy and colleagues (2018) partition their network analysis depending on whether individuals were distressed by their PEs or not. Similar network structures were observed, however, the distressed network was characterised by greater PE interconnectivity. Network analysis of psychotic symptoms as a 'case study' revealed a reinforcing cycle of 'feeling down' and 'paranoia' (Bak et al., 2016). Studies focussing specifically on schizotypal personality traits in the general population (Fonseca-Pedrero et al., 2018; Dodell-Feder, Saxena, Rutter & Germine, 2019) have also reported strongly interconnected networks. Items related to odd speech and behaviour, difficulties making/maintaining friendships, social anxiety, paranoia ideation and ideas of reference were found to be the most important schizotypy traits in these networks.

Furthermore, other studies have specifically looked at how psychosis interacts with other phenomena within a network analysis framework. For example, Núñez et al. (2018) used network analysis to examine the connections between PEs and SI in general population adolescents. They found SI was most associated with perceptual abnormalities and bizarre experiences. The link between self-compassion and PEs has

also been examined via network analysis (Scheunemann, Schlier, Ascone & Lincoln, 2018). In this study, global self-compassion score was only linked to hallucinatory or delusional experiences via negative connections to both hallucination and delusion distress. Utilising network analysis as a new means of investigating the childhood trauma – psychosis relationship, Isvoranu et al. (2017) conducted analysis of the positive and negative symptoms of psychosis and five separate forms of childhood trauma among individuals diagnosed with a psychotic disorder. General psychopathology symptoms, mainly anxiety but also poor impulse control and motor retardation, connected all types of childhood trauma to psychosis. Furthermore, in another study, these researchers (Isvoranu, Borsboom, van Os & Guloksuz, 2016), reported specific pathways between environmental risk factors and PEs. Cannabis use, developmental trauma and urbanicity all impacted on symptomology; however, main connective paths were via cannabis use. Moreover, Wigman, de Vos, Wichers, van Os and Bartels-Velthuis (2017) used a network approach to investigate transdiagnostic connectivity differences between children with and without AVHs.

6.4. Aims and hypotheses

Previous psychosis network studies have tended to focus on connections among PEs solely in a sample or connections between PEs and risk variables within a network. This allows for the connections between the items to be mapped for the entire sample. However, this static representation of PE connectedness for all individuals only tells part of the story. Instead, by imposing a context of variation within the sample (e.g. change in internal threat status), changes within the network in relation to this variation can be mapped. Thus, this study will utilise network analysis to map the changes and development in psychosis across the internal threat continuum. Networks will be generated for separate subsamples representing low, medium and high positions on the internal threat continuum and will be compared with one another. Few other psychological studies have examined the expression and functioning of one variable in relation to variation of another, however, this method is becoming more commonplace (e.g. McElroy et al., 2019; McGlinchey, McElroy, Kirby & Murphy, personal communication).

If, according to the Suicidal Drive Hypothesis, psychosis symptoms emerge in the context of internal threat, then several predictions based on the principles of network theory may be formulated. It would be expected that PE connectivity can not only be mapped at varying stages of internal threat severity but more importantly, that it can be shown to ‘evolve’ as a defence construct. Several hypotheses were formulated: it was predicted that network connectivity would increase moving through the continuum, indicated by the presence of more and stronger connections. This would potentially demonstrate the presence of self-sustaining network, prolonged activation of which would be considered as clinically relevant (Borsboom, 2017). While for those with little to no internal threat, connections would be fewer and weaker resulting in a sparsely connected network. Moreover, it was expected that PEs which could be more clearly characterised by threat content (e.g. paranoid ideation, persecutory delusion) would be of greater importance to the networks; their importance was expected to increase with increasing internal threat severity. Finally, it was expected that, at the highest levels of internal threat, fewer PE clusters would be identifiable compared to the lower end. It was assumed that a more ‘unified’, homogeneous psychosis construct would be indicative of a more clinically significant experience.

6.5. Method

6.5.1. Sample

Similarly to Chapter 5, this study utilised the FMM classes which were modelled using the BPMS sample. These classes were derived from the initial factor analyses conducted in Chapter 2, finding four factors of internal threat and the subsequent FMMA in Chapter 3, which reported a 7-class solution. See previous chapters for more detail.

6.5.2. Measures

Psychosis Screening Questionnaire

As in Chapter 5, the Psychosis Screening Questionnaire (PSQ; Bebbington & Nayani, 1995) was used to assess PE occurrence within the past year. The PSQ consisted of five main questions inquiring about mania, thought interference, paranoia, strange

experiences and hallucinations (PSQ1-PSQ5), their subsidiary questions (a and b), and sections to record verbatim descriptions of the PEs. Due to the lack of associations between the lower end of the internal threat continuum and mania in Chapter 5, analysis of the current study focussed specifically on PSQ items 2 – 5. Analysis of the current study was based solely on selected subsidiary questions to attempt to capture more clinically relevant PEs within the sample. The hallucination item was the only exception to this; the main question (PSQ5) was deemed more suitable than its subsidiary question (PSQ5a) as it enquired about auditory and visual hallucinations rather than auditory hallucinations only. Therefore, the PSQ items utilised in this study were:

- Thought insertion: (2a) Did it come about in a way that many people would find hard to believe, for instance, through telepathy? (Thought)
- Paranoia: (3b) Have there been times when you felt that a group of people was plotting to cause you serious harm or injury? (Paranoia)
- Strange experiences: (4a) Was it so strange that other people would find it very hard to believe? (Strange)
- Hallucinations: (5) Have there been times when you heard or saw things that other people could not? (Hallucinations)

Responses to each of the selected questions were coded 1 = endorsed, 0 = rejected. Participants were only asked the subsidiary questions if they endorsed the main item, consequently, many individual's responses were missing to these items. Therefore, missing data as a result of the screening out processes were recoded as 0. Furthermore, due to the use of listwise deletion in this analysis, attempts were made to minimise the presence of missing cases. Therefore, in this analysis an 'unsure' response was recoded and treated as a rejected response.

Schizotypal Personality Disorder

The Structured Clinical Interview for DSM-IV Axis II (SCID-II; First, Gibbon, Spitzer, Williams & Benjamin, 1997), screening questionnaire was used in the phase one interview to assess for the presence of personality disorders. It consisted of 116 questions, prefaced with "Are you the kind of person who..." to determine the presence of certain personality characteristics. Participants are instructed to respond to these

considering how they have usually felt or behaved over the past several years.

Responses to the items were used to screen for the presence of 10 personality disorders including borderline, obsessive-compulsive and avoidant. Computer-assisted self-interviewing procedures were used when conducting this section of the interview.

Sixteen items were used in the BPMS to screen for the presence of schizotypal personality disorder. These items related to ideas of reference, suspiciousness, unusual perceptual experiences, odd beliefs of magical thinking, lack of close friends and excessive social anxiety. One item, "Have you often suspected that your spouse or partner has been unfaithful?" was not included in the analysis as this question was only relevant to those individuals who had a spouse/partner. Thus, only fifteen of the schizotypal personality disorder items were used in this analysis. These were:

- When you are out in public and see people talking, do you often feel that they are talking about you? (Talking)
- Do you often get the feeling that things that have no special meaning to most people are really meant to give you a message? (Message)
- When you are around people, do you often get the feeling that you are being watched or stared at? (Watched)
- Have you ever felt that you could make things happen just by making a wish or thinking about them? (Wish)
- Have you had personal experiences with the supernatural? (Supernatural)
- Do you believe that you have a 'sixth sense' that allows you to know and predict things that others can't? (Sixth)
- Do you often think that objects or shadows are really people or animals or that noises are actually people's voices? (Shadows)
- Have you had the sense that some person or force is around you, even though you cannot see anyone? (Force)
- Do you often see auras or energy fields around people? (Auras)
- Are there very few people that you're really close to outside of your immediate family? (Close)
- Do you often feel nervous when you are with other people? (Nervous)
- Do you often have to keep an eye out to stop people from using you or hurting you? (EyeOut)

- Do you spend a lot of time wondering if you can trust your friends or the people you work with? (Trust)
- Do you find that it is best not to let other people know much about you because they will use it against you? (Against)
- Do you often detect hidden threats or insults in things people say or do? (Threats)

Responses to each of the selected items were coded 1 = endorsed, 0 = rejected. A response of 'don't know/does not apply' was coded and treated as a rejected response.

6.5.3. Analytic plan

Originally, it was planned that the psychosis network analysis would be conducted on each of the seven subgroups of individuals, derived from the FMM, in an attempt to compare the network structures across the continuum of internal threat. Multiple attempts were made to carry out this analysis, however, as a result of limited power associated with the small sample size of some class, this was unsuccessful. In light of this, it was decided to collapse some of the classes together to overcome the limited power issues. Table 6.1 outlines the manner in which the classes were collapsed together.

An empirical rationale was used for combining the classes in this manner. First, a natural qualitative distinction was apparent in the classes; Classes 1, 2 and 3 were the only classes characterised by suicidality and have been considered throughout this thesis to represent the upper, more severe end of the internal threat continuum (High internal threat group). Similarly, Classes 4, 5 and 6 were all characterised by depression and low self-worth and subordination, either jointly or solely; these classes were considered to represent a cluster of individuals positioned somewhere in the middle of the internal threat continuum (Moderate internal threat group). The unique status of Class 7 as the baseline, along with its sufficient sample size meant that collapsing it into another class was not necessary.

Secondly, in Chapter 5, a multivariate logistic regression was conducted between the classes and a range of psychiatric diagnoses, including a psychotic disorder. It found that only Classes 1, 2, 3 and 6 significantly predicted psychosis as an outcome; the OR

for Class 6 (OR = 9.20) was substantially lower than that of Classes 1 (OR = 121.35), 2 (OR = 31.86) and 3 (OR = 25.98). Therefore, when specifically considering psychosis, membership of these classes appeared to be unique risk factors, particularly Classes 1, 2 and 3. Given the much higher ORs for Classes 1, 2 and 3 and their clear qualitative distinction, preference was given to combining them in the absence of Class 6. An unfortunate consequence of this method is the loss of important, class-specific information. However, this step was deemed necessary in order to overcome the multitude of modelling issues faced in previous iterations of this analysis.

Table 6.1. Original 7-class solution and combined class description

Class	Description	Combined classes
Class 1 (<i>N</i> = 149, 1.7%)	Low self-worth and subordination, depression, SI and SH	
Class 2 (<i>N</i> = 571, 6.7%)	Low self-worth and subordination, depression and SI.	High internal threat (<i>N</i> = 1549, 18.1%)
Class 3 (<i>N</i> = 829, 9.7%)	Depression and SI	
Class 4 (<i>N</i> = 340, 4.0%)	Low self-worth and subordination and depression	
Class 5 (<i>N</i> = 1193, 13.9%)	Low self-worth and subordination	Moderate internal threat (<i>N</i> = 2278, 26.6%)
Class 6 (<i>N</i> = 745, 8.7%)	Depression	
Class 7 (<i>N</i> = 4753, 55.4%)	Baseline class with low elevation on all dimensions.	Baseline internal threat (<i>N</i> = 4753, 55.4%)

Based on the proportion of individuals in the combined groups, power was less likely to be an issue. Although there are no clearly-defined rules regarding sample size for network analysis, simulation studies with binary data suggest that for networks consisting of 10-30 nodes, a sample size of 500 is generally sufficient (van Borkulo et

al., 2014). An appropriate strategy to handle missing data in network analysis has not yet been indicated. However, for Ising models, listwise deletion is typically used (Epskamp, 2017). After deleting cases with missing data ($n = 188$, 2.2%), complete data were available for 8,392 individuals in this study.

6.5.4. Network estimation and visualisation

In psychology, Pairwise Markov Random Field (PMRF; Costantini et al., 2015; van Borkulo et al., 2014) is a popular method to estimate networks. A PMRF consists of nodes (points in space representing observed variables) and edges (connecting lines indicating degree of association between variables). PMRF edges are undirected; they do not indicate the direction of the relationship, only that some association exists between the variable and can be interpreted as partial correlation coefficients, i.e., the relationship between two variables when all other variables in the network are accounted for (Epskamp, Borsboom & Fried, 2018). Thicker edges indicate a stronger connection with blue edges indicating a positive edge and red indicating a negative edge. The Fruchterman-Reingold algorithm (Fruchterman & Reingold, 1991) is a visualisation technique implemented in the *qgraph* package (Epskamp, Cramer, Waldorp, Schmittmann & Borsboom, 2012) to place nodes which are strongly connected closer together. When using binary data, a PMRF called an Ising model is used (van Borkulo et al., 2014) which can be estimated using the *IsingFit* (van Borkulo, Epskamp & Robitzsch, 2016) package. The `cor_auto` function within the R-package *qgraph* deciphers variable type and is able to produce the appropriate correlation type (polychoric, polyserial or Pearson's; Epskamp & Fried, 2018). Networks using continuous data assume normal distribution in the variables whereas binary based networks do not work on this assumption (van Borkulo et al., 2014)

When conducting network analysis, a large number of parameters are estimated which increase proportional to the number of nodes in the network. Correlations of exactly zero are highly unlikely in a partial correlation network, as such, many very small, irrelevant edges will be present in the network (Costantini et al., 2015). In order to have a more parsimonious network which is easier to interpret and to avoid obtaining false positive associations, regularization techniques are used (Epskamp et al., 2018; Costantini et al., 2015; Epskamp & Fried, 2018). The least absolute shrinkage and

selection operator (LASSO; Tibshirani, 1996) shrinks small correlations (edges) to exactly zero, thus they disappear from the network, reducing the amount of ‘background noise’ as only the most relevant edges are present. Applying LASSO also helps with the problem of small sample size which is common in psychological research (Epskamp et al., 2018). The ‘tuning parameter’ which controls to what degree regularization is applied to the network is selected by minimising the Extended Bayesian Information Criteria (EBIC; Chen & Chen, 2008) LASSO with EBIC has been implemented within the R-packages to help simplify the process; *IsingFit* includes LASSO estimation with EBIC (‘*elasso*’). Individual dataframes, denoting membership to each internal threat group (High, Moderate, Baseline) were specified in order to conduct the network analyses.

6.5.5. Centrality Estimation

Centrality estimates are used to quantify and rank the importance of nodes in a network. The three most common measures of centrality: strength, closeness and betweenness (Opsahl, Agneessens & Skvoretz, 2010) were calculated. Strength measures the degree to which a node is directly connected to other nodes; it is the sum of all the partial correlation coefficients between one node and all other nodes in the network. High strength centrality suggests that this activation in this node will likely lead to the activation of other nodes (Epskamp et al., 2018; McNally, 2016). Closeness measures to what degree a node is indirectly connected to other nodes in the network; it is the inverse sum of all the shortest paths between one node and all other nodes in the network (Epskamp et al., 2018) A node with a high closeness index may be more likely to be affected, directly or indirectly, by changes in other nodes (Costantini et al., 2015; McNally, 2016). Betweenness measures how important a node is in the average path between two other nodes; it calculates how often a node lies on the shortest path between two other nodes, thus connecting symptoms (Epskamp et al., 2018). If a node high on betweenness is removed from a network, the paths between other nodes will likely increase (Costantini et al., 2015), high betweenness nodes are also thought to bridge often-comorbid disorders (McNally, 2016).

Additionally, a more recently developed centrality index: expected influence (EI) was calculated. EI was developed in order to overcome issues associated with strength

centrality; strength calculates the total edge weight based on their absolute magnitude (ignoring the sign of the edge), however, it does not counterbalance for the presence of negative edges. EI takes into account both positive and negative edges when calculating the strength of a node (Robinaugh, Miller & McNally, 2016). Thus, EI is a more reliable measure of strength when negative edges are present in the network (Robinaugh et al., 2016). Centrality indices are presented as standardised z-scores. Higher values on each of these estimates/indices indicate greater importance in the network.

6.5.6. Node Clustering

‘Walktrap’ is an algorithm designed to detect clusters or ‘communities’ within a network (Pons & Latapy, 2005). Its name is derived from the process involved in the detection of clusters: performing random walks in the network will likely lead to the walks staying in the same communities, i.e., becoming ‘trapped’ in areas that are dense with only a few edges leading outside of that community (Pons & Latapy, 2005). Even in completely random networks, the algorithm is likely to produce communities even though they have no meaningful value. Therefore, the modularity ratio (also known as the Q-index) can be utilized to evaluate the goodness-of-fit of the communities; it does so by comparing the density of edges within a community to the density of edges outside a community (Blondel, Guillaume, Lambiotte & Lefebvre, 2008). Modularity ranges from 0-1 but in practice values typically fall between 0.3 - 0.7. Higher values indicating the number of within-community edges is larger than expected at random, and therefore represent a strong community structure (Newman & Girvan, 2004).

Walktrap is considered one of the most reliable forms of community detection (Gates, Henry, Steinley & Fair, 2016; Pons & Latapy, 2005). It operates using the *igraph* (Csardi & Nepusz, 2006) package. Tutorials on using Walktrap are available (Dalege et al., 2017)

6.5.7. Network connectivity

In order to compare overall network connectivity and structure, the Network Comparison Test (NCT) was utilised (van Borkulo et al., 2017). The NCT assesses for the differences between two networks by comparing the summed edge weights within a

network (global strength) and changes in the relationships between nodes (structural invariance). The structural invariance test specifically tests for the largest individual difference in edge weights across the two networks. Networks can be compared using the ‘NetworkComparisonTest’ package in R (van Borkulo, Epskamp & Miller, 2016). Networks were compared using 1000 random permutations in this study.

6.5.8 Accuracy and stability of networks section

A number of additional, supplementary tests were also carried out to test for the accuracy of edge weight rankings (from strongest to weakest) and the stability of the centrality statistics. The bootstrapped difference test was used to determine the accuracy of the edge weights. It computes the 95% confidence intervals (CIs) around the edge weights and calculates whether edges differ significantly from each other (Epskamp et al., 2018). If the CI crosses zero it suggests the edge weights are not statistically different from one another. Using the subsetting bootstrap method, centrality estimate stability can be estimated (Epskamp et al., 2018). This involves dropping cases and re-estimating the networks. Centrality values are considered stable if there is a high correlation between rank order of these estimates in the original network and a network in which many cases have been dropped. The centrality stability coefficient (CS-coefficient) indicates whether this was the case; CS-coefficients should be at least above 0.25 and preferably above 0.5 to be interpreted as stable (Epskamp et al., 2018). These tests were conducted using the *bootnet* (Epskamp et al., 2018) package with 2,500 bootstrapped samples.

6.6. Results

6.6.1. Descriptive statistics

Descriptive statistics are presented in Table 6.2. A graded distribution was present such that the highest proportion of individuals endorsed the schizotypy and PSQ items in the High group, then the Moderate group and finally the Baseline. Chi-square tests revealed these differences were significant; follow-up z-tests (adjusted for multiple testing, Bonferroni p-value) indicated that the differences were significant between each group

on every item with the exception of *Close* (Are there very few people that you're really close to outside of your immediate family?). In this case, the High and Moderate groups did not differ significantly from each other. The schizotypy items related to paranoia and social anxiety were the most commonly endorsed.

6.6.2. Network structure

The elasso regularised Ising network for the total sample is presented in Figure 6.1(a). The networks for the High, Moderate and Baseline internal threat groups are presented in Figures 6.2(a), 6.3(a) and 6.4(a), respectively. Network presentation was restricted to an 'average layout' setting to ease interpretation. Although not the main focus of this study, the total sample network provides a useful starting point. This graph maps out the PE connections for the sample as a whole. In this network, of 171 potential edges in the network ($19 \times 18 / 2$), 97 were above zero indicating a densely connected network. Edge weights ranged from 2.42 – 0.10. The strongest edge in this network was between *Talking* and *Watched*.

In the High network, 36% of potential edges were above zero, 33% in the Moderate network and 25% in the Baseline network, indicating moderate-to-sparsely connected networks. Edge weights ranged from 2.20 – 0.10 in the High group, 2.08 – 0.09 in the Moderate group and 2.95 – 0.10 in the Baseline group. Of these edge weights, 37% were moderate-to-strong (i.e., >0.6) in the High group, 36% in the Moderate group and 62% in the Baseline class. *Talking* and *Watched*, and *Supernatural* and *Force* were among those with the strongest edges in all networks. In the High group, *Sixth* and *Auras* also had a strong edge; edges between PSQ items *Thought* and *Strange*, and *Thought* and *Paranoia*, were among the strongest in the Moderate and Baseline groups, respectively. Importantly, the bootstrapped difference test (See Appendix A) revealed that bootstrapped CIs were wide. This indicates that it is likely that some of the edge weight do not significantly differ from one another. Therefore, there is difficulty in accurately interpreting the order of edge weights. As such, the edge weight should be interpreted with caution.

The case-dropping subset bootstrap method (see Appendix B) indicated that the betweenness and closeness values were not reliable, however the strength values were (*CS coefficient*: High = 0.52, Moderate = 0.59, Baseline = 0.36). Therefore, this centrality measure will be the focus of interpretation. However, these values should be

Table 6.2. Item frequencies and relative percentages for total sample and by group

Nodes	N (%)			χ^2	
	Total	High	Moderate		Baseline
Schizotypal PD items					
Talking	577 (6.9)	268 (17.7)	246 (10.9)	63 (1.4)	552.249 (2), $p < 0.001$
Message	527 (6.3)	214 (14.1)	213 (9.4)	100 (2.2)	328.958 (2), $p < 0.001$
Watched	853 (10.2)	360 (23.8)	392 (17.3)	101 (2.2)	755.365 (2), $p < 0.001$
Wish	1470 (17.5)	421 (27.8)	549 (24.2)	500 (10.8)	324.323 (2), $p < 0.001$
Supernatural	1062 (12.7)	371 (24.5)	273 (12.0)	418 (9.1)	247.195 (2), $p < 0.001$
Sixth	1027 (12.2)	303 (20.0)	331 (14.6)	393 (8.5)	156.646 (2), $p < 0.001$
Shadows	240 (2.9)	107 (7.1)	89 (3.9)	44 (1.0)	166.214 (2), $p < 0.001$
Force	1524 (18.2)	510 (33.7)	471 (20.8)	543 (11.8)	383.166 (2), $p < 0.001$
Auras	188 (2.2)	69 (4.6)	65 (2.9)	54 (1.2)	65.359 (2), $p < 0.001$
Close	4540 (54.1)	988 (65.3)	1405 (62.0)	2147 (46.5)	239.608 (2), $p < 0.001$
Nervous	1465 (17.5)	543 (35.9)	703 (31.0)	219 (4.7)	1163.324 (2), $p < 0.001$
EyeOut	2460 (29.3)	785 (51.8)	933 (41.2)	742 (16.1)	915.271 (2), $p < 0.001$
Trust	1352 (16.1)	495 (32.7)	544 (24.0)	313 (6.8)	709.998 (2), $p < 0.001$
Against	1918 (22.8)	625 (41.3)	705 (31.1)	588 (12.7)	647.083 (2), $p < 0.001$
Threats	1579 (18.8)	536 (35.4)	678 (29.9)	365 (7.9)	815.250 (2), $p < 0.001$
PSQ items					
Thought	97 (1.1)	52 (3.4)	31 (1.4)	14 (0.3)	99.496 (2), $p < 0.001$
Paranoia	146 (1.7)	86 (5.6)	35 (1.5)	25 (0.5)	176.936 (2), $p < 0.001$
Strange	284 (3.3)	138 (8.9)	93 (4.1)	53 (1.1)	227.519 (2), $p < 0.001$
Hallucinations	371 (4.3)	161 (10.4)	107 (4.7)	103 (2.2)	192.235 (2), $p < 0.001$

Note: significant differences in endorsement proportions present between the three groups for all items except *Close*; High and Moderate did not differ on this item.

interpreted with caution also, particularly for the Baseline group which had the lowest value. Strength values are reported in Figures 6.2(b), 6.3(b) and 6.4(b). EI counterbalances for the presence of negative edges when calculating strength centrality estimates. As there were no negative edges in any of the networks, the strength and EI values were the same and thus EI was not reported. *Force*, *Sixth* and *Watched* had some of the highest strength values in all three networks, suggesting that activation of these nodes will likely lead to the activation of other nodes (McNally, 2016). *Shadows*, *Threats* and *Trust* had high strength in the High, Moderate and Baseline networks, respectively. Consistently low strength values were found for *Close* and *Thought*.

6.6.3. Node clustering

The Walktrap community detection algorithm found three clusters throughout each of the internal threat networks. These clusters comprised of a Paranoid cluster, made up of items related to suspiciousness, ideas of reference, paranoid ideation and social anxiety; a Bizarre Experiences and Magical Thinking cluster comprised of items related to perceptual anomalies, extra-sensory experiences and magical thinking; and finally, a cluster comprised of the PSQ items. In each of the networks, there were some minor changes regarding which nodes grouped in which cluster. For example, *Paranoia* was not connected to, nor did it cluster with any other node in the Moderate network, *Messages* belonged to the Paranoid cluster in the Baseline network, but to the Bizarre cluster for the Moderate and High networks, and similarly, *Hallucinations* belonged to the PSQ cluster in the Baseline but to the Bizarre cluster in the other two networks. Overall, however, these changes were few and did not affect the general interpretation the cluster. Modularity (Q-index) indicated satisfactory grouping for the clusters, i.e., that they were not random (High = 0.42, Moderate = 0.40 and Baseline = 0.51).

6.6.4. Network connectivity

Results of the NCTs indicated that there were no significant difference in global strength values (summed totals of the edge weights indicating overall connectivity) between the three networks (Δ GS (High vs. Moderate) = 2.86, $p > 0.05$; Δ GS (Moderate vs. Baseline) = 5.42, $p > 0.05$; Δ GS (High vs. Baseline) = 2.57, $p > 0.05$). Thus, although

from viewing the graphs there appeared to be connectivity difference, these were not significantly different. The structural invariance test indicated no significant difference between the High and Moderate groups ($M = 1.44, p > 0.05$). However, structural differences were observed between the Moderate and Baseline groups ($M = 2.95, p < 0.05$). Moreover, the differences between the High and Baseline groups approached significance ($M = 2.25, p = 0.051$). Therefore, while the overall connectivity of the three networks were similar in strength, there were differences in the largest edge weight in the Baseline network compared to the High and Moderate networks.

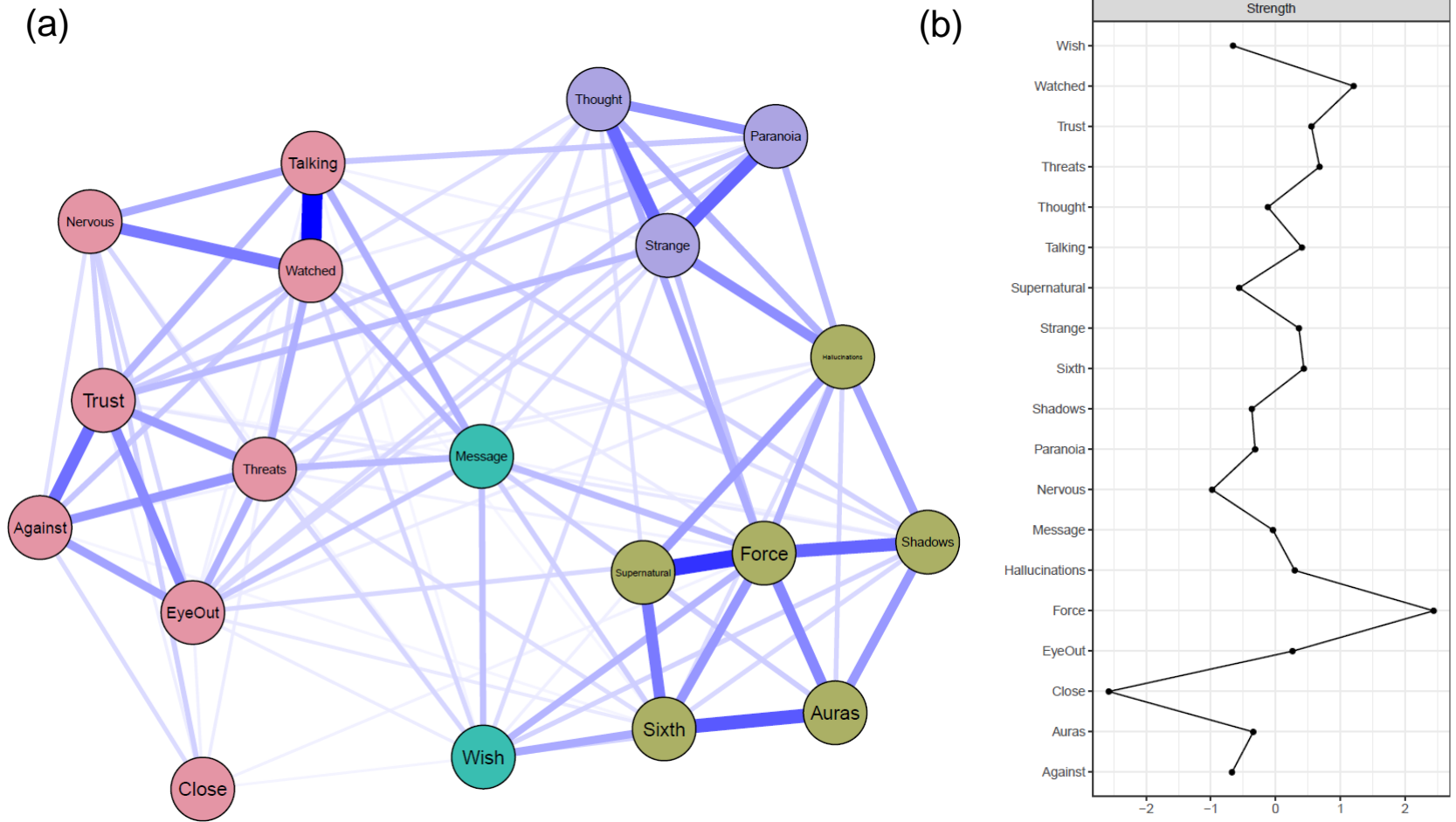


Figure 6.1. (a) Ising model network for total sample and (b) strength centrality estimates for total sample network

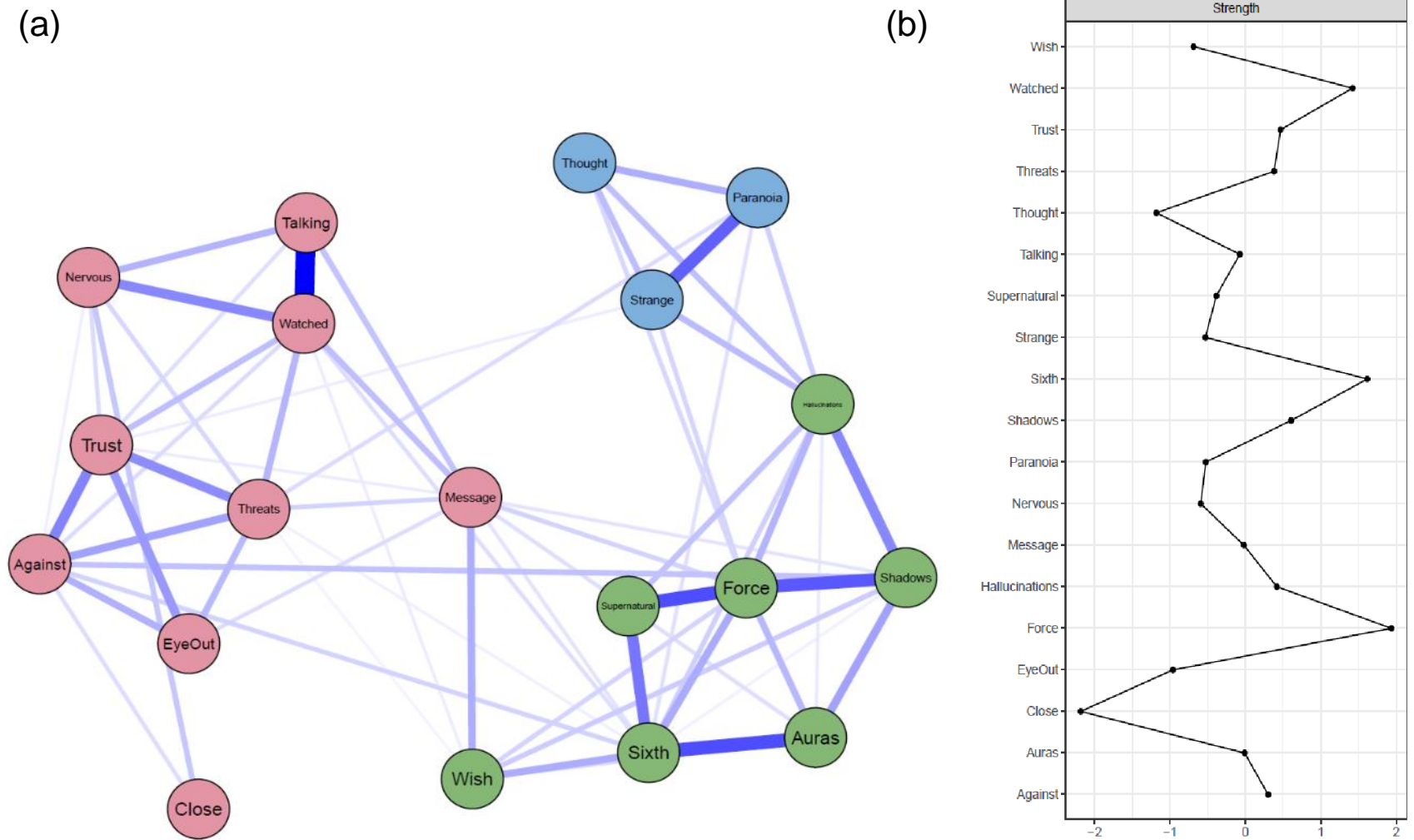


Figure 6.2. (a) Ising model network for High internal threat group and (b) strength centrality estimates for High internal threat group network

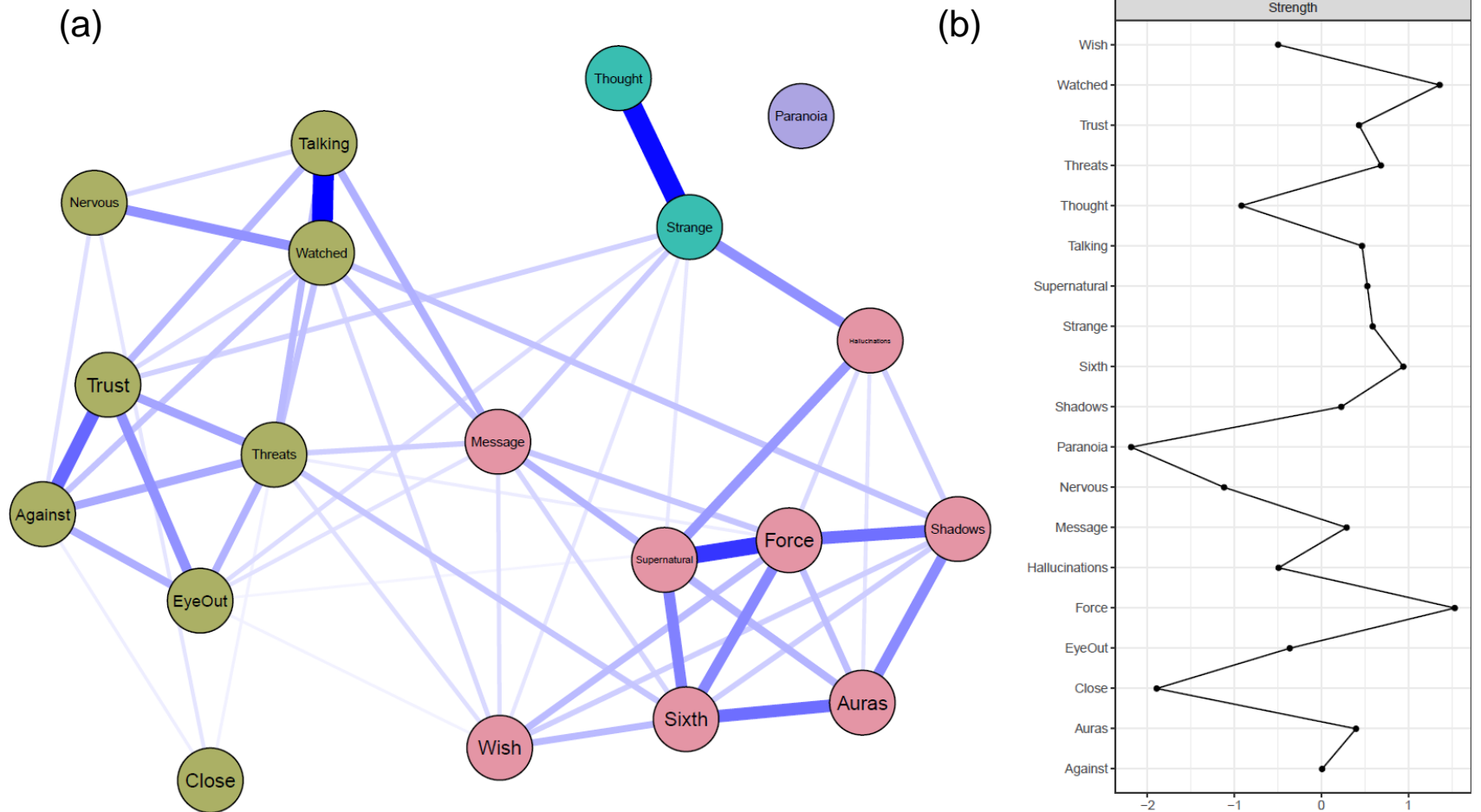


Figure 6.3. (a) Ising model network for Moderate internal threat group and (b) strength centrality estimates for Moderate internal threat group network

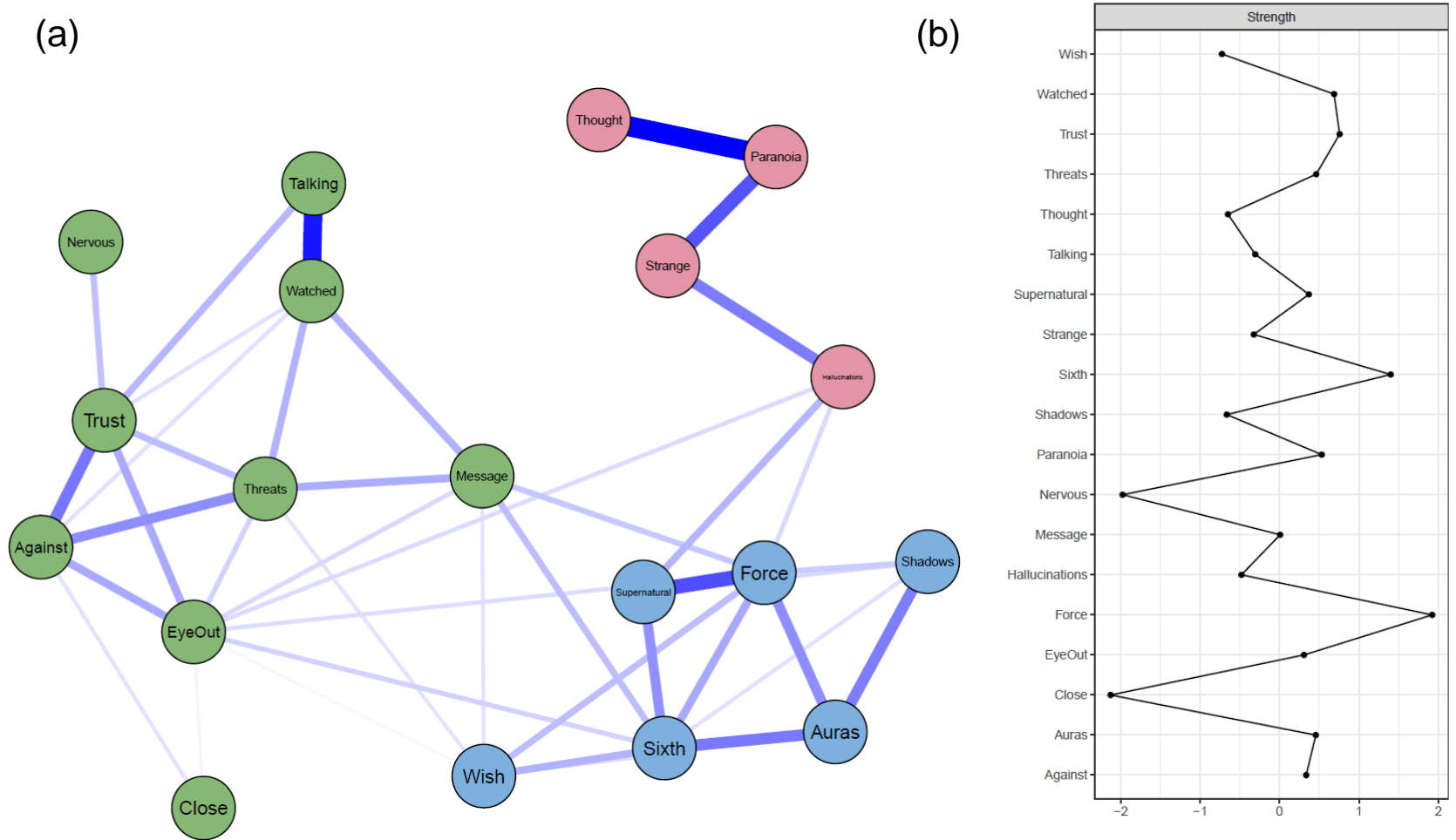


Figure 6.4. (a) Ising model network for Baseline internal threat group and (b) strength centrality estimates for Baseline internal threat group network

6.7. Discussion

The purpose of this study was to further examine the relationship between the internal threat continuum and psychosis. In Chapter 5, this was assessed using logistic regression analyses, which allowed for the presence of associations between internal threat classes and psychosis and the strength of these associations to be determined. This chapter however, utilised a novel analytic framework based on the network theory of psychological distress/mental disorders to alternatively examine the relationship between these constructs. The connectivity of individual PEs was mapped in accordance with changes in internal threat status. Thus, the expression of psychosis at lower, medium and upper points on the continuum could be compared. As this thesis proposes that internal threat may be a risk factor for psychosis, it was suggested that psychosis may ‘grow’ and ‘develop’ in relation to internal threat severity. Therefore, the expression of psychosis was modelled and compared across groups reflecting the internal threat continuum. It was expected that with increasing internal threat (i) network connectivity would increase, (ii) PEs more clearly characterised by threat content such as paranoia would increase in importance (strength centrality) and (iii) fewer clusters of PEs would be identified, reflecting a more unified, homogeneous psychosis construct.

6.7.1. Network connectivity

This hypothesis was partially supported. Firstly, the NCT test for global strength, which sums edge weights in the network, found no significant differences among the three networks. Furthermore, the NCT test for structural invariance, which compares the difference in the maximum edge weights in the network, suggested that the Baseline group significantly differed from the High and Moderate group networks. Contrary to expectation however, the Baseline network had a significantly stronger, rather than weaker, maximum edge weight than the other networks. Finally, regarding the presence of edges, there was support for increased connectivity; the High network had 62 edges above zero, the Moderate had 56 and the Baseline had 42.

Thus, there were mixed findings overall. The Baseline group displayed fewer edges than the other networks, however, almost two-thirds of its edge weights were moderate-to-strong (i.e., >0.6). The Moderate and High networks displayed more edges,

but these edge weights were not as strong; just over a third of edges in these networks were moderate-to-strong in weight. Therefore, increased PE network connectivity was demonstrated by the presence of more connections moving through the continuum, but not by the presence of stronger connections. Borsboom (2017) defines mental health from a network perspective as “the stable state of a weakly connected network”. Mental disorders however are considered the “stable state of a strongly connected network” (p.9). Once a symptom is activated by a triggering event, this activation can spread through the network via its connections. When more connections are present, there is a greater chance of the network becoming self-sustaining whereby symptoms continually activate and trigger one another in a stable feedback loop. Thus, the presence of more edges, regardless of their weight, in the network representing individuals who feel inferior, worthless and defeated, engage in submissive behaviour and who question the value of their lives, suggests that once triggered, these individuals are more likely to exhibit a clinically significant psychotic episode.

6.7.2. Node centrality

The importance of an item in the network can be determined by the centrality estimates. This study focussed solely on the strength estimate due to the unreliability of the betweenness and closeness values. It was hypothesised that PEs which could most clearly be characterised by relevant internal threat content (i.e., NSE, suicidality, harm, death, threat) would be most central in the networks, with increasing centrality proportionate to increasing internal threat severity. Items related to paranoia were considered to most directly align with this description in the absence of information relating to the phenomenology of PE. Seven items in the network were considered to be related to paranoia, e.g. paranoid ideation, ideas of reference, etc. These were *Watched*, *Trust*, *Threats*, *Talking*, *Paranoia*, *EyeOut* and *Against*.

Watched was the only paranoia-related item which demonstrated a linear increase in its strength value from group to group (i.e. low to moderate to high internal threat). The other items' strength values were stable, decreased or exhibited no trend across the groups. Notably, *Sixth*, *Shadows*, *Nervous* and *Hallucinations* were the only other items to show a linear increase with increasing internal threat. Notably, however, two of these items were hallucinatory, *Shadows* (Do you often think that objects or shadows are

really people or animals or that noises are actually people's voices?) and *Hallucinations* (Have there been times when you heard or saw things that other people could not?). As discussed at length in Chapter 1, both visual and auditory hallucinations are commonly characterised by threat content. For example, visual hallucinations often take the form of powerful beings or of objects related to death (e.g. noose, gravestones; Gauntlett-Gilbert & Kupiers, 2003; Uptegrove et al., 2016). Voices are frequently critical, abusive and threatening (Cortsen & Longden, 2013) and can take the form of commands to engage in dangerous or violent acts such as SH (Kasper et al., 1996; Kent & Wahass, 1996). Furthermore, source monitoring (ability to recognise thoughts and actions as self-generated) and source flexibility (ability to switch attention from internal to external stimulus and vice versa) biases are significantly associated with psychosis, particularly among individuals who experience hallucinations (Brookwell, Bentall & Varese, 2013; Laloyaux, Della Libera & Larøi, 2018; Waters, Woodward, Allen, Aleman & Sommer, 2012).

It is these PE features (threat content and externalising biases), that, in part, provided support for the proposed Suicidal Drive hypotheses. Strength measures the degree to which a node is directly connected to all other nodes; high strength suggests that activation of this node is likely to lead to activation of other nodes (Epskamp et al., 2018; McNally, 2016). The increasing strength centrality of these items (*Watched*, *Shadows* and *Hallucinations*) with increasing severity of internal threat may suggest that as individuals descend towards self-attacking and suicidality and these symptoms are activated, it is more likely that other symptoms will be activated which could potentially produce a self-reinforcing network. That is, these may be the original symptoms which are triggered as a threat response but that eventually lead to a more significant, distressing PEs through the activation and reinforcement of other nodes. Overall, these suggestions are highly speculative primarily due to the absence of this trend among the other paranoia items.

6.7.3. Node clusters

Contrary to the proposed hypothesis, three clusters were found in each network. The Q-index suggested that the clustering of the nodes in this manner was not random. These clusters represented a 'Paranoia', 'Bizarre experiences and magical thinking' and 'PSQ items'. Across the three networks, there were slight changes regarding which items fell

into which clusters, however, these were minor and did not affect the interpretation of the cluster. Despite this hypothesis not being supported, there were, nevertheless, interesting patterns among the node clusters.

The PSQ item cluster was almost entirely separate in the Baseline network, its only edges to the schizotypy items coming from the *Hallucinations* item, connecting it to both the Bizarre and Paranoid clusters. In the Moderate network, both *Hallucinations* and *Strange* connected the PSQ cluster to the other clusters. In the High network, the PSQ cluster exhibited many more edges, from all four of the PSQ items, connecting it to the other clusters. Thus, with increasing internal threat, the PSQ items become more integrated within the network. The PSQ items are considered to a more clinically-relevant form of subclinical psychosis than schizotypal personality traits, i.e., they fall higher on the psychosis continuum (Fonseca-Pedrero & Debbané, 2017). Therefore, the greater interconnectedness between this cluster and the other clusters in the High network may represent a drive towards a more clinically significant psychotic episode. Notably, it is the *Hallucinations* item which mainly bridges the PSQ cluster to the other clusters.

Furthermore, with increasing internal threat severity there are more within and between cluster connections. Additionally, the clustering of the schizotypal personality items somewhat corresponds to previous factor analytic studies. Ahmed et al. (2013) reported a 3-factor model of schizotypal personality in their study, reflecting perceptual, odd beliefs and social/interpersonal dimensions. The social/interpersonal dimension maps directly onto the Paranoid cluster in this study, inclusive of both paranoia-related items and social anxiety items. In contrast, the items contained within the perceptual and odd beliefs dimensions in the Ahmed et al. (2013) study clustered together in this study; the ‘Bizarre Experiences and Magical Thinking’ cluster. Finally, in the Moderate network, the *Paranoia* item had no edges connecting it to any other items in the network. This may be for several reasons (i) the lack of connection may be a true reflection of the network (ii) a weak connection may have been present which disappeared during the regularisation process or (iii) a connection exists which was not identified during the network modelling process. Further research is needed on a variety of samples to understand how the PSQ *Paranoia* item is linked with other PSQ items and schizotypal personality traits.

Overall, there was partial support for the increased connectivity hypothesis and potential support for increased centrality of threat-potentiated items hypothesis. However, the node clustering hypothesis was not supported and some of the findings were at odds with what was expected; for example, the Baseline network having a significantly stronger maximum edge weight and the majority of the paranoia-related items not demonstrating increasing strength centrality values. Although there may be several reasons for this, the nature and quality of the data likely had an impact. Hypotheses were stipulated that psychosis would grow and evolve in relation to internal threat; these were based on the theory of the Suicidal Drive Hypothesis and the previous findings of this thesis. The manner in which psychosis may ‘grow’ and manifest in relation to internal threat, at a symptom level, was not clear from the theoretical background and previous findings and, as such, the hypotheses were somewhat exploratory. As mentioned, while items related to paranoia clearly have threat-related content, for other items, threat phenomenology is less clear (e.g. strange experiences, hallucinations, supernatural, etc.). Endorsement of an AVH experience includes individuals who hear voices instructing them to harm themselves as well as individuals who hear voices benignly commenting on their day-to-day activities. Therefore, the subclinical psychosis items modelled in this study were heterogeneous in terms of threat content. As a result, the specific effects of internal threat on psychosis, as stipulated in the hypotheses, may have been lost amongst the ‘noise’ of the variety of experiences modelled. Future research, using PEs with phenomenological information is needed.

6.7.4. Comparison with previous PE network analyses

While not the main focus of this study, several other findings are noteworthy and parallel previous PE network analysis results. *Force*, *Sixth* and *Watched* had consistently high strength values across all networks. Consistently low strength values were found for *Close* and *Thought*. Murphy et al. (2018), in their network analysis of schizotypy items in the NESARC, reported that ‘being watched’, ‘supernatural’ and ‘sixth sense’ had the highest strength values in their study alongside ‘act strange’. Further, ‘no close friends’ had the lowest strength estimate. Moreover, Fonseca-Pedrero et al. (2018) reported that a ‘suspiciousness’ item and a ‘no close friends’ item had the highest and lowest EI estimates in their study, respectively.

Although not derived using a clustering algorithm such as Walktrap, Murphy et al. (2018) described clusters of nodes based on visual inspection. They noted a cognitive/perceptual cluster made up of items ‘wish’, ‘supernatural’, ‘sixth’, ‘force’ and ‘aura’. This maps onto the Walktrap derived Bizarre Experiences and Magical Thinking cluster in this analysis. Núñez et al. (2018) include SI in their network study of PEs. They found the PEs with the strongest connections to SI were related to auditory hallucinations, visual hallucinations and difficulties forming close relationships. This compliments the finding in this study that, for strength estimates, *Shadows* and *Hallucinations* both demonstrated a dose-response effect, i.e., the strength values for these items increased from the Baseline, to the Moderate, to the High group network. Together, these findings suggest that, of all PEs, hallucinatory experiences may be of particular relevant to internal threat.

6.7.5. Limitations

There are several limitations to this study that must be acknowledged. Firstly, these networks were conducted on cross-sectional data and as such are undirected. No temporal information was available for the PEs therefore, it could not be determined whether edges represented unidirectional or bidirectional associations and if unidirectional, what direction this was. Therefore, network theory was not able to be directly applied to the network analysis conducted due to the lack of causal inferences; the networks only represent a cross-sectional mapping of PE associations. Moreover, as previously acknowledged, as a result of modelling difficulties thought to be related to a lack of power, the seven original FMM classes were collapsed together to form three distinct internal threat groups. This step was necessary to overcome the modelling issues, however, this process resulted in the loss of class-specific information.

The items used in the study mainly represented the positive symptoms of psychosis, although some of the schizotypy items related to social domains also. Therefore, negative symptoms were not modelled alongside positive symptoms in this study. Negative symptoms are not considered as manifestations of an internal threat response within the Suicidal Drive Hypothesis, however, inclusion of these experiences in future studies of this nature may help provide further support for the hypothesis and better understand how positive and negative symptoms interact. Furthermore, the items

used in this study were from both a psychosis screening instrument and a schizotypal personality measure. Although both considered subclinical manifestations of psychosis, there are important differences between the constructs. As mentioned, subsidiary PSQ questions were utilised in an attempt to capture more clinically relevant PEs within the sample. Schizotypal personality items are, however, considered less severe and positioned lower on the psychosis continuum. They have been conceptualised as a latent group of personality traits which result in liability and vulnerability for psychosis spectrum disorders (Fonseca-Pedrero & Debbané, 2017). Thus, it is important to acknowledge that items included in this network reflected both state-like (PSQ items) and trait-like (schizotypal personality disorder items) manifestations of subclinical PEs.

Although, considered a novel and attractive way to examine the dynamic interactions between symptoms, network analysis is not without issues. Some researchers have been critical of latent variable modelling vs. network models and mental disorders vs. medical disorders stance within the network theory literature (Bringmann & Eronen, 2018). These authors claim that these comparisons are oversimplified and applied too heavily; a less polarising and restrictive viewpoint should be considered. Indeed, the two branches can be combined (Fried & Cramer, 2017), latent variable network models are already conducted (Anandkumar, Hsu, Javanmard & Kakade, 2013; Epskmap, Maris, Waldorp & Borsboom, 2018). Furthermore, unlike latent variable modelling, fit statistics are not available to determine model quality (Fried, 2015). Additionally, PRMF networks are more likely to omit 'true' connections than report spurious connections. As such, these models are more likely to be sparser than that of the true model (Borsboom, Robinaugh, The Psychosystems Group, Rhemtulla & Cramer, 2018). Moreover, the previously acknowledged issues with edge weight accuracy and centrality stability limit the interpretation of the current results. It is necessary to attempt to replicate these findings on other samples, however, amendments are suggested (see Future Research, below). The replicability of network models has been questioned, with some determining replicability as lacking (Forbes, Wright, Markon, Krueger, 2017). Others, however, have met this assertion with contempt, rather, claiming that network models replicate well (Borsboom et al., 2018). Overall, it is clear that caution should be taken and novel findings should not be overinterpreted.

6.7.6. Future research

As stated, these results are novel and need replicating. Several amendments are suggested which may aid in better examining the propositions of the extended Suicidal Drive Hypothesis. It is suggested that future analyses in this area attempt to model associations among data with phenomenological specificity. A more refined mixture of positive PEs, only inclusive of those directly aligned with internal threat (e.g. suicidality, NSE, death, harm) may allow for more accurate testing of the hypotheses. Murphy and colleagues most recent Suicidal Drive study (under review) has similarly attempted to take PE phenomenology into account when considering the hypothesis; they reviewed clinical interview case notes for PEs with suicidality, threat or death related content and themes. Thus, although the results of this study did not emerge entirely as expected, there is still potential that psychosis manifests in meaningful ways with the evolution of internal threat.

If future PE network research can be replicated across a range of sample, clinical and therapeutic interventions may be informed. Interventions can be designed around targeting nodes, edges or items external to the network (Isvoranu, Boyette, Guloksuz & Borsboom, 2017). Such interventions would be consistent with CBT; intervening to break cycles of thoughts, feelings and behaviours is the bedrock of this approach. However, it should be noted that Fried (2018) observes that the idea that nodes with the highest strength values should be the target of interventions has not been empirically tested.

6.8. Conclusions

This final study sought to model the relationship between PEs and the internal threat continuum using the network approach. This afforded an opportunity to explore whether internal threat could potentially operate as a risk factor for psychosis from a novel perspective. Networks of PEs were modelled across three separate groups reflecting the internal threat continuum; High, Moderate and Baseline. There was tentative support for the hypotheses that connectivity may increase in relation to internal threat and that threat-potentiated PEs, such as hallucinations and paranoia, may be the main experiences aiding this increasing connectivity. Importantly however, these results were speculative, and some findings were observed in contradiction to what had been

hypothesised. It is clear that further research, preferably modelling directed networks of threat-informed PEs, is needed. Overall, therefore, these findings should be interpreted with caution.

Chapter 7

General discussion

7.0. Introduction to Chapter 7

This chapter will explore the theoretical, methodological and clinical implications of the research in two sections. Section One will firstly consider implications relating to the conceptualisation of internal threat and the modelling of the continuum while Section Two will consider the implications of the relationship between internal threat and psychosis.

7.1. Section One: Establishing a continuum of internal threat

The results of Chapters 2, 3 and 4 can be interpreted in light of previous theoretical and empirical contributions to the literature relating to the hierarchical nature of internal threat, risk factors for internal threat states and the transdiagnostic nature of internal threat. Further, methodological considerations regarding the validity of the continuum, the limitations of the data and directions for future research will be outlined. Finally, although too premature to suggest their implementation, the potential clinical implications relating to risk assessment, early intervention and trauma-focussed interventions in the light of the internal threat continuum will be discussed.

7.1.1. Theoretical implications

Hierarchical classes of internal threat

Overall, the results of Chapters 2 and 3 suggested the presence of graded continuum of internal threat in the general population. The Integrated Motivation-Volitional (IMV) model of suicidal behaviour (O'Connor & Kirtley, 2018; discussed briefly in Chapter 2) may be of particular relevance to the interpretation of the groups of individuals falling along this continuum. The IMV model was developed in response to acknowledgement that the majority of suicide ideators do not go on to attempt suicide (Kessler, Borges & Walters, 1999). Consequently, the model was partitioned into three stages: (i) pre-motivational; background factors and triggering events that set the context in which a suicide attempt (SA) may occur (ii) motivational; factors influencing the development of suicidal ideation (SI) and (iii) volitional; factors influencing the likelihood an

individual will act on their SI. Therefore, the model is useful in understanding both SI in isolation and its potential transition to SA.

In light of the current research, negative self-evaluation (NSE), in the form of self-criticism, defeat, shame, low self-esteem, subordination, etc. could be conceptualised as the key factor in the motivational stage; the factor which influences the development of SI. Indeed, the authors of the IMV, in their detailed discussion of the model (O'Connor, Cleare, Eschle, Weatherall & Kirtley, 2016; O'Connor & Kirtley, 2018) have suggested that such variables may play these roles. In brief, the authors propose that appraisals of defeat and humiliation and an accompanying sense of entrapment are key in the motivational stage in the prediction of SI. Furthermore, sensitivity to feelings of defeat and humiliation may be determined by factors in the pre-motivational stage such as perfectionism, pessimism and negative affect. This maps onto the content of the classes proposed by this study to lie at the lower end of the continuum. Moreover, it also compliments the proposed ordering of the classes along the continuum, whereby these classes are less severe and are likely to temporally precede the classes characterised by SI.

Moreover, these results are consistent with previous empirical research which suggests that individuals that have a negative view of themselves and a lack of self-confidence, are harsh on themselves, feel inadequate and fear disapproval and criticism from others and are vulnerable to negative emotions and feelings of defeat. Awareness of these negative feelings towards oneself and the accompanying negative affect may prompt an individual to question the worth of their life. For example, Gilbert et al. (2010) examined the impact of self-criticism on SH. The authors found that self-criticism, and a range of other self-evaluative variables such as shame, submissive behaviour and social comparisons, were strongly correlated with SH and one another. Notably, however, when examining how the different forms of self-criticism ('inadequate self' and 'hated self', Gilbert, Clarke, Hempel, Miles & Irons, 2004) independently associated with SH, 'inadequate self' made no unique contribution. That is, 'hated self' (feeling self-disgust and self-directed anger) remained correlated with SH when controlling for 'inadequate self' (feeling inadequate and disappointed in oneself) but the opposite relationship was not present. This led the authors to suggest that "it is possible that people who hate themselves may also feel inadequate, but the reverse may not be true" (Gilbert et al., 2004, p.571). This suggestion fits with the latent structure of

internal threat that was modelled in Chapter 3; no factor mixture model classes emerged characterised by suicidality without the presence of NSE but classes characterised by NSE in the absence of suicidality did emerge. Individuals can have high levels of feelings of inadequacy, but this only translates into a risk for SH when combined with feelings of self-hatred also. Similarly, the continuum suggests that individuals may need to transition through more severe classes before they reach the class characterised by SH. Furthermore, this assumption is generally consistent with the results of the SA regression; only classes at the upper end of the continuum conferred risk for endorsing a SA, with the exception of Class 6.

Xavier, Pinto-Gouveia, Cunha and Carvalho (2016) further supported this position, finding that although the ‘hated self’ factor was directly associated with NSSI in an adolescent sample, depressive symptoms also mediated this relationship. Moreover, defeat has previously been found to prospectively predict suicidality also (Taylor, Gooding, Wood, Johnson & Tarrier, 2011). These findings are also in line with the conceptualisation of SH, particularly NSSI, as a way to regulate negative emotions or to self-punish for ones perceived failings, inadequacies or wrongdoings (Klonsky, 2007; 2009). Furthermore, the association between these classes and SA is consistent with theoretical and empirical research related to the suicidality continuum (De Leo, Cerin, Spathonis & Burgis, 2005; Ribeiro et al., 2016; Svetlicic & De Leo, 2012).

Risk factors for internal threat classes

The IMV model may also be useful when considering the risk factors for internal threat. The pre-motivational stage of the IMV includes background factors and triggering events which include biology, personality, environmental factors and life events. Although a complex interplay of these factors is hypothesised, some of which have been specifically noted by the authors, including socially prescribed perfectionism, socio-economic inequality, early life adversity/negative life events generally. This directly aligns with the findings in Chapters 3 and 4. In Chapter 3, the variables most consistently associated with the continuum of internal threat were low income, sexual assault and bullying. Moreover, in Chapter 4, interpersonal trauma history, living in an urban neighbourhood, not having a college education and being unemployed were all

associated with elevated risk of membership to the latent class characterised by both NSC and suicidality.

The IMV suggests that the presence of these vulnerability factors is thought to increase sensitivity to signals of defeat. On the other hand, Social Mentality Theory posits that hostile or abusive interpersonal relationships can become reflected in self-to-self relating (Gilbert & Irons, 2005) while trauma theorists suggest that adverse or traumatic life experiences can disrupt schematic models relating to our social roles and personal identities, having devastating effects on self-worth (Bertensen & Rubin, 2007; Janoff-Bulman, 1989; Pearlman, 1997). Furthermore, Social Rank Theory (Gilbert, 1992) posits that humans' evolved concerns for social position and value can result in feelings of defeat and submission when individuals possess fewer of these socially valuable traits/abilities (Gilbert, 1992; Sloman, 2014). The presence of associations between these variables and classes at the lower end of the continuum is supportive of these theories.

Regarding the association these trauma and adversity variables have with the upper end of the continuum, defeat, in combination with feelings of entrapment has been considered in multiple models (Baumeister, 1990; Gilbert & Allan, 1998; O'Connor & Kirtley, 2018; Williams, 2001) to potentially lead to SI. Empirical studies have supported the hypothesized role of both defeat and entrapment in SI (Rasmussen et al., 2010; Taylor et al., 2011). This may suggest that although these adverse experiences may trigger the feelings of NSE, it is only in the presence of entrapment that these variables become associated with suicidality. Qualitative research suggests that in the context of adverse life circumstance, a job loss, debt, housing problems or benefits sanctions acted as a 'final straw' to trigger SH (Barnes et al., 2016). The findings of the regression in Chapter 3 suggested that variables such as divorce or separation, being out of work for more than a month, homelessness and being unemployed were mainly associated with the severe internal threat classes. These could be considered entrapment variables; while these experiences in isolation may not be associated with NSE, their presence on top of pre-existing feelings of worthlessness, defeat and inferiority may entrap the individual and act as a 'final straw' in their journey towards SH. Furthermore, the graded nature of the internal threat classes and their associations with these adverse life events/circumstances supports the large body of research that has reported NSE concepts as mediators of interpersonal trauma and SH or SI (Dyer,

Dorahy, Shannon & Corry, 2011; Glassman, Weierich, Hooley, Deliberto & Nock, 2007; Jones, Bilge-Johnson, Rabinovitch & Fishel, 2014).

Transdiagnostic nature of internal threat

While much of this thesis has focussed on the relationship between the internal threat continuum and psychosis, internal threat is meaningful across the spectrum of psychopathology. The continuum has been evidenced using features, symptoms and characteristics of pre-existing diagnostic constructs in Chapters 2 and 4 (e.g. depression, BPD, CPTSD). Furthermore, the transdiagnostic nature of internal threat was evidenced through the regression analysis in Chapter 5. For all the non-psychotic disorder diagnoses (GAD, OCD, panic disorder, social phobia and specific phobia), dose-response associations with internal threat were exhibited at all levels. It is likely, therefore, that internal threat is not specific in an individual's potential journey to psychosis, but is a transdiagnostic construct, relevant to psychopathology more generally.

If internal threat is indeed a construct which cuts across diagnostic boundaries and is relevant in individuals' trajectories towards suicidality and a range of other distressing outcomes, then consideration must be given to the utility of discrete diagnoses. In recent years there has been a movement towards the deconstruction of psychiatric diagnoses. In acknowledgement of the shortcomings associated with traditional categorical taxonomies of psychiatric diagnoses, alternative dimensional frameworks have been posited. The National Institute of Mental Health, for example, developed the Research Domain Criteria framework (RDoC; Insel et al., 2010) and formally changed its position from focussing on DSM diagnoses to the processes that underpin behaviours (Kreuger & DeYoung, 2016). Similarly, the Hierarchical Taxonomy of Psychopathology (HiTOP; Kotov et al., 2017; Krueger et al., 2018) involves a hierarchical organisation of features of psychopathology using a multi-level approach, i.e., symptoms, traits, syndromes, subfactors and spectra, which cut across diagnostic boundaries.

It is possible, given the apparent transdiagnostic nature of internal threat, that it may be incorporated into the HiTOP framework in some form. Its inclusion may be useful from both research and clinical perspectives in the prediction of suicide and other

forms of distress. The current HiTOP framework is indeed more useful in the prediction of suicide than individual DSM diagnoses (Eaton et al., 2013). Furthermore, the HiTOP framework may be useful in clarifying and advancing the aetiology of psychological distress (Kotov et al., 2017; Kreuger et al., 2018). Phenomena such as childhood maltreatment and life adversity, which were associated with internal threat in this thesis, have been found to be associated across all psychiatric disorders broadly rather than mental disorders individually (Caspi & Moffitt, 2018; McLaughlin, 2016). It is thought that these frameworks may be more useful to researchers and clinicians than categorical taxonomies which may be hindering the process of better understanding psychological distress. Further, as described in Chapter 4, the manifestation of an internal threat response for a given individual may be the result of their position along the continuum, which may change over time. Specific personal factors may account for why this response is manifested differently in different individuals (BPD, eating disorder, psychosis, etc.).

7.1.2. Methodological implications

Validity of the internal threat continuum

Several aspects of the results of Chapters 2, 3 and 4 were cited as support for the internal threat continuum. These were (i) the strong factor correlations, particularly amongst the factors hypothesised to lie next to one another on the continuum; (ii) the item endorsement rates showing that the suicidality items were generally endorsed less frequently than the NSE items; (iii) the half-normal item distribution indicative of the majority of individuals endorsing very few of the items but a significant proportion endorsing progressively more items; (iv) the class compositions arising from the factor mixture analysis reflecting a graded structure of internal threat characterised by classes with progressively more factors and higher levels of those factors; (v) the class proportions generally indicating that fewer individuals tended to be categorised into classes characterised by more internal threat; (vi) and demographic and aetiological validity as indicated by the general dose-response effect between a number of hypothesised risk variables and the severity of internal threat class. Many of these indicators were used by Sveticic and De Leo (2012) and van Os, Linscott, Myin-

Germeys, Delespaul and Krabbendam (2009) as support for the suicidality and psychosis continua, respectively.

Many of these indicators were a product of the latent variable modelling techniques used to model the continuum, i.e., factor analysis, factor mixture modelling (FMM) and latent class analysis (LCA). As discussed in Chapter 3, there is a degree of subjectivity in model identification in FMM and LCA. Determination of model fit is based on a series of fit statistics, the interpretability of the class structure, the theoretical compatibility of the model and whether classes in the model are considered to differ enough from one another (Muthen, 2002; Muthen & Muthen 2000). The decision-making process is not simple however, especially when these markers are not in agreement with one another. These issues are not uncommon and “issues surrounding model selection remain unresolved” (Grimm Mazza & Davoudzadeh, 2017, p.254). However, in cases where fit indices are not in agreement with one another, it is suggested that all fit information be presented, the rationale for model selection be provided and the subjectivity involved in the process be acknowledged (Grimm et al., 2017; Ram & Grimm, 2009). This information was clearly presented in Chapter 3. Furthermore, despite the statistical and theoretical indication for a 7-class model, it was acknowledged that replication is needed to ensure this class structure is not specific to the BPMS sample. Moreover, it is important to reiterate that there is subjectivity in the model building process also; the dimensional and class structures that emerged from the analyses can only be representative of internal threat to the extent of the items used to build the model. An even broader selection of internal threat items may lead to the emergence of more internal threat classes.

Limitations

The BPMS was the main source of data in this thesis; despite the large general population sample it provided and the robust analytic methodology testing, a number of limitations with the data utilised in this thesis must be reiterated. Firstly, the use of secondary data results in a number of compromises. Ideally, the internal threat items which were harvested from the BPMS in Chapter 2 would have come from recognised measures of these phenomena, particularly the NSE items. The use of scales such as the Forms of Self-Criticizing/Attacking and Self-Reassurance scale (Gilbert, Clarke,

Hempel, Miles & Iron, 2005), the Submissive Behaviour Scale (SBS; Allan & Gilbert, 1997), the Social Comparison Scale (SCS; Allan & Gilbert, 1995) and the Experiences of Shame Scale (Andrews, Qian & Valentine, 2002) may have allowed for a more accurate measurement of these phenomena.

However, the current study took a novel approach to overcome this issue, attempting to select items tapping into these same constructs within the BPMS. Many of the items selected mapped onto items from these scales; for example, the SCS requires individuals to make global comparisons about themselves in relation to others, such as whether they feel more inferior/superior, incompetent/competent, unattractive/more attractive. This mapped directly onto the item “Do you believe that you’re not as good, smart, or as attractive as most other people?”. Additionally, the item used in this study “Do you find it hard to disagree with people even when you think you are wrong?” reflects the same phenomena as described in an item from the SBS: “I agree that I am wrong, even though I know I’m not”. Given the theorised role of defeat in the manifestation of depression and the role of depression in suicidality, it was considered important to include items relating to low mood/feeling empty. This is consistent with some items from Gilbert and Allan’s (1998) defeat scale: “I feel that there is no fight left in me”, “I feel down and out”. The other items, although not direct representations of the items included in previous scales, were considered to tap into the same core processes of being internally put down and considered inadequate, inferior, defeated, uncertainty/lack of confidence in oneself, self-blame and powerlessness. There are of course limitations to using these items as proxies; these items may not have fully captured the phenomena or may have been too context specific when considered in isolation. Notwithstanding these issues, this study took a creative approach to dealing with data limitations.

Additionally, the majority of items from the data used in these analyses were self-report measures. Self-report measures can eliminate potential sources of bias related to interviewer/clinician interpretation; however, such items are open to misinterpretation or memory biases. Studies examining the effect of recall bias relating to traumatic experiences, however, have found retrospective self-reports of trauma to be reliable (Dube, Williamson, Thompson, Felitti & Anda, 2004; Read, van Os, Morrison & Ross, 2005). Furthermore, since the data used was anonymised, the motivation of participants

to purposefully answer untruthfully would appear less likely. Moreover, it should be noted that the items were measured on different time scales. The suicidality questions related to lifetime, the items from the personality disorder section refer to the past several years and the low mood item refers to the past month.

Future research directions

A number of directions for future research directions relating to building and enhancing the internal threat continuum should be considered. Firstly, this thesis has taken on the extensive task of reconceptualising and expanding the pre-existing suicidality continuum. The reconceptualization of the suicidality continuum is worthy of future investigation, particularly due to the potential application of such a continuum across the spectrum of psychopathology, as described in the theoretical considerations. While this continuum was modelled using the BPMS and on smaller, trauma-related datasets in Chapter 4, the exploratory nature of this research means that replication is necessary. Future research should aim to utilise diverse samples and longitudinal data. Examining predictive validity is key to establishing the continuum and a priority of any future research, i.e., whether individuals have potential to transition from one internal threat class to another over time, in an ordered, hierarchical manner. Latent transition analysis and growth mixture modelling may be utilised as appropriate techniques for this purpose. The IMV model could also be useful at this stage to investigate what variables contribute to movement between classes (i.e., motivational and volitional variables).

Although trauma experience has been acknowledged, theoretically and empirically to influence self-worth and suicidality, the internal threat continuum suggests that a descent into a 'spiral' of internal threat can happen in its absence. Although only a relatively small number of trauma variables were included and controlled for in the Chapter 3 regression analysis, variables such as low income and not being in a couple conferred significant risk to membership to these classes. Similar findings are noted in Chapter 4 which controlled for a broader range of traumas via the latent classes. The continuum, therefore, may afford the opportunity for clinicians and researchers to consider extreme states of psychological distress in the absence of any clearly recognised trauma. Everyday experiences of rejection, humiliation, discrimination, ostracization, etc may gradually erode an individual's sense of self-worth and begin a trajectory towards suicidality. Therefore, it may also be useful for

future research to consider the role of daily stressors/hassles on the internal threat continuum.

Replication is necessary to assist in addressing a number of unexpected findings. Class 6 was of particular interest due to its significant relationship with SA history in Chapter 3 and with psychotic disorder in Chapter 5. The SA finding was unusual as a recent study by Zhang et al. (2017) reported that negative emotional states were not directly associated with SA. They were however indirectly associated with SA through the presence of SI or NSSI (consistent with the significant ORs between Classes 1, 2, and 3 and SA). Furthermore, the lack of significant association between Class 4 and SA and psychotic disorder is particularly interesting in this respect. Variables which were associated with Class 6 but not Class 4 in Chapter 3 included drug dependence. Given the relationship between drug abuse and SA (Pompili et al., 2010; Poorolajal, Haghtalab, Farhadi & Darvishi, 2015) and psychosis (Degenhardt et al., 2018; Marconi, Di Forti, Lewis, Murray & Vassos, 2016), this may help account for this unusual finding and may be an avenue of future research interest.

7.1.3. Clinical implications

Clinical and risk assessment

A recognised continuum of internal threat may afford clinicians an opportunity to make inferences about the psychological journey an individual has navigated to reach the point of clinical assessment. Furthermore, they may be able to make inferences regarding the potential future trajectory of this journey. Like the suicidality continuum, the internal threat continuum may provide an understanding of the trajectory from SI to engaging in a SA. Notably, however, it may also provide a better understanding of how an individual has reached the point where they are thinking, actively or passively, about taking their own life. Firstly, an understanding of the factors that affect transitioning towards a SA has important implications for prevention and intervention. However, it has been noted that traditional forms of risk assessment for suicidality show weak predictive validity and as such should not be used to inform treatment decision making (Roos, Sareen & Bolton, 2013; Smith et al., 2015). However, given the importance of risk prediction, these methods continue to be used and dominate the therapeutic assessment. Rather than excessively relying on the presence of SI in individuals, the

continuous assessment of this broader range of NSE concepts, alongside SI may be able to more reliably represent an individual's 'at-risk' status.

Additionally, for individuals presenting at the severe end of the continuum, the internal threat continuum may offer an understanding of their psychological journey to reach this point. It allows for consideration of a pathway from compromised self-worth, which, with continued decline and compromised functioning can build momentum towards a point of severe distress in the form of suicidality. This may not only be useful in conducting a formulation and implementing an appropriate intervention but may be useful in establishing a good therapeutic alliance. Indeed, Smith and colleagues (Smith et al., 2015) advocate for a compassionate approach when dealing with suicidal/self-harming individuals and highlight the priority of establishing a therapeutic alliance over establishing a diagnosis or conducting a risk assessment.

Early intervention

Furthermore, identification of individuals occupying the lower end of the continuum has important implications for early intervention to cease their potential advancement towards suicidality. Compassion focussed therapy (CFT; Gilbert, 2009; Gilbert, 2014; Gilbert & Irons, 2005; Gilbert & Procter, 2006) is rooted in the philosophies of Buddhism and Eastern meditation techniques that teach self-acceptance and self-love. Stemming from a Social Mentality Theory perspective, it involves a functional analysis of our hardwired social motivational systems (e.g. seek out a partner, form hierarchies, live in groups, etc.) as well as the function of our emotional systems in relation to these mentalities (seeking our resources, responding to threats, etc.) (Gilbert, 2014a). Thus, it may be particularly useful for individuals presenting at the lower end of the continuum. Using techniques such as compassionate mind training (CMT), CMF posits that for real change to occur the mind, needs to be trained to think in different ways, i.e. away from self-attacking and towards self-compassion, through reducing shame and dominant self-to-self relating, replacing unhelpful defences and teaching self-soothing and reassurance. With time and practice, these techniques produce new neural pathways, allowing for the development of a new self-to-self relationship (Gilbert & Irons, 2005).

Viewing psychopathology compassionately is central to CFT as well as a number of other therapies such as dialectical behaviour therapy (DBT; Gilbert, 2009; Linehan,

1993), a therapy commonly used for suicidal and self-harming individuals, and Acceptance and Commitment therapy (ACT; Luoma & Platt, 2015). From perspectives such as these, whereby engagement in SH may be serving an adaptive function as a means of self-regulation, it may be more useful to target the underlying deficits in sense of self-worth rather than intervening with the aim to cease SH only. This in turn may reduce the individual's reliance on SH to cope with behavioural and emotional regulation and to help them develop alternative healthy coping approaches to adopt other than self-attacking (Gilbert & Irons, 2004; Yates, 2004).

As noted, the continuum has the potential to be applicable transdiagnostically. Equally, CFT has not been formulated for a specific diagnosis, but rather for transdiagnostic issues such as self-criticism. At its core, it is about accepting oneself, caring for oneself and loving oneself. Increased self-compassion is linked to lower levels of poor mental health and wellbeing while lower self-compassion is linked to higher levels of psychological distress (MacBeth & Gumley, 2012; Zessin, Dickhäuser & Garbade, 2015). A systematic review on the topic concluded that self-compassion interventions are successful at reducing anxiety and depressive symptoms (Wilson, Mackintosh, Power & Chan, 2019) and that it is effective for use among adolescents as well as adults (Marsh, Chan and MacBeth, 2018). CFT has been found effective among individuals with more complex problems such as psychosis and personality disorders for increasing self-compassion and ability to self-reassure and reducing depression, perceived social marginalisation and shame and self-hatred (Braehler et al., 2013; Lucre & Corten, 2013). A review of the role of self-compassion in suicidality in particular (Cleare, Gumley & O'Connor, 2019) reported significant associations between higher levels of self-forgiveness/compassion and lower levels of SI, SA or SH. The strength of these associations, however, varied substantially between studies.

Trauma-focussed interventions

Reconsidering how we view threat also has implications on how we consider intervening clinically/therapeutically. NSE and suicidality may emerge as reactions to external forms of threat, but they are also internally generated, self-directed threats themselves. When an individual discloses a trauma in a therapeutic setting, the clinician may spend a significant amount of time getting an in-depth account of this experience

before attempting to unravel whether this individual is experiencing PTSD, CPTSD or BPD, for example. However, during this time a new threat has emerged internally (NSE and/or suicidality); this ongoing self-attacking, sense of worthlessness, shame, suicidal thoughts, self-harm, etc. may, at the time of assessment, be more sinister than the past external trauma. Therefore, it may be more beneficial for the therapeutic intervention to focus on identifying and intervening with these negative self-components rather than excessively detailing or relieving the trauma in an attempt to formulate a diagnosis.

Therefore, it would seem that compassionate-orientated interventions may be useful for alleviating internal threat which may be a more beneficial route than tackling the memories and nature of external threat in some traumatised individuals. Karatzias, Shevlin et al. (2018) found negative self-cognitions, characterised by negative views of oneself and one's trauma symptoms was the most important factor for a CPTSD diagnosis. They suggested targeting negative self-cognitions and emotional regulation skills as promising avenues of intervention. Indeed, the DSO cluster of CPTSD, but not the PTSD clusters, appear to be specifically related to a lack of self-compassion (Karatzias, Hyland et al., 2018). Effective therapies for PTSD (e.g. trauma-focussed CBT and eye movement desensitization and reprocessing; Bisson, Roberts, Andrews, Cooper & Lewis, 2013) have components which focus on NSE related to adverse life experiences, however, this is not their sole focus. Furthermore, highly self-critical individuals may not respond well to cognitive therapy (Rector, Bagby, Segal, Joffe & Levitt, 2000), therefore, alternative interventions, focussing specifically on NSE and increasing self-compassion, are needed.

7.2. Section Two: Internal threat and psychosis

The results of Chapters 5 and 6, which focussed on the relationship between the internal threat continuum and psychosis, may also have a number of useful clinical applications. Theoretical implications will be discussed firstly, considering the relationship between psychosis and suicidality, models of psychosis aetiology and empirical research on externalising biases. Next, methodological limitations and recommendations for future research will be outlined. A number of speculative applications of these findings to clinical settings are then reviewed, including the dilemma of intervening with a defence,

understanding resistance to changing beliefs, a de-stigmatised approach for individuals' understanding of their distress and specific psychosis interventions.

7.2.1. Theoretical implications

Psychosis and suicidality

As outlined in detail in Chapter 1, a vast amount of research has been conducted in recent years on the relationship between psychosis and suicidality. This research has utilised clinical and non-clinical samples, adult and adolescent samples, cross-cultural samples, a range of analytic strategies, and both cross-sectional and longitudinal design. However, this cross-sectional research, when discussing the relationship between these variables, has failed to acknowledge the possibility of alternative temporal interpretations. Pathways from psychosis to suicidality are discussed as if they are the only viable option. The neglected consideration for bidirectionality means that the results of these studies are open to reinterpretation, in anticipation of the continued successful longitudinal modelling of the Suicidal Drive Hypothesis (Murphy et al., under review). Furthermore, future longitudinal research should acknowledge and test the bidirectionality of this relationship in order to negate future instances of presumed unidirectionality and thus assumed causality.

Models of psychosis aetiology

The results of Chapters 5 and 6 are consistent with, and can be interpreted in light of, pre-existing models of psychosis (discussed in Chapter 5), such as the cognitive model of positive symptoms (Garety, Kuipers, Fowler, Freeman & Bebbington, 2001) and the Social Defeat Hypothesis (Selten, van der Ven, Rutten & Cantor-Graae, 2013). Both of these models have similar themes which are also common to the extended Suicidal Drive Hypothesis modelled in this thesis. The main recurring themes of all three models is the role of trauma in NSE development and the subsequent role of NSE in psychosis development. In the cognitive model, social adversity, trauma, marginalisation, etc. are considered to contribute to the formation of NSE and furthermore, that negative self-schemas provide the content for PEs. The Social Defeat Hypothesis, however, focuses more on the appraisal of experiences as humiliating, rejecting and isolating as being

important in determining whether events are experienced as defeating. Within both of these models, NSE as the result of adversity is considered to confer risk for the development of psychosis. In the cognitive model, risk is conferred through beliefs about oneself as vulnerable and others and the world as dangerous which, in the aftermath of a triggering event, can cause cognitive and affective disturbances which contribute to psychosis. According to the Social Defeat Hypothesis, these adverse experiences lead to the sensitization of the mesolimbic dopamine system which increases the risk of psychosis.

Again, the current model similarly suggests that trauma and adversity can contribute to the development of NSE through evolved social ranking and disrupted schematic processes. NSE takes a more central role in this model compared to the others. However, like the cognitive model, NSE is hypothesised to contribute to anomalous cognitive processing. The cognitive model focusses on a range of cognitive biases (jumping to conclusions, externalising bias, reasoning bias), whereas the extended Suicidal Drive focusses mainly on the externalising bias. Moreover, within this model, an externalising bias is considered to arise as part of an adaptive threat response process to distance an individual from threat; it is a protective externalisation of one's internally generated and self-directed threat. Thus, it plays a more purposeful role than the cognitive model. Moreover, the current model does not propose that a triggering event is necessary to bring about an externalising bias, in line with the Social Defeat, cumulative exposure to adversity, marginalisation, etc. are considered as risk for psychosis. Although the Social Defeat Hypothesis claims this process occurs as a result of biological mechanisms, the current model makes no such claims.

Additionally, like the cognitive model, this model assumes that NSE is reflected in the phenomenology, content and expression of positive psychosis symptomology. Negative-self beliefs are drawn upon in order to make sense of anomalous experiences within the cognitive model, while the current model would rather suggest that it is negative beliefs themselves that create a sense of threat that causes anomalous experiences. Both the cognitive and Social Defeat models incorporate the role of negative affect. Garety et al. (2001) propose that separate routes to psychosis development are possible, one through affective changes only. Similarly, the centrality of defeat within the Social Defeat model, and its strong links to depression (Gilbert, 1992) highlight the role of negative affect. Aspects of defeat/low mood were

incorporated as part of the self-attacking variables in this body of work. The main difference between these models, the cognitive model of positive psychosis (Garety et al., 2001) and the Social Defeat Hypothesis (Selten et al., 2013), and the extended Suicidal Drive, is the inclusion of suicidality in the model. Despite the recognised link with defeat/depression in both models, no reference to suicidality is made. Notably, a Social Defeat study by van Nierop et al. (2014) concluded that social defeat acted as a mediator and therefore possible underlying mechanism between childhood trauma and psychosis. This study included several items related to SI in their measure of social defeat, however, the specific theoretical implications of this were not addressed.

Future research may wish to consider the integrability of these different theories with one another, given their shared recognition of the role of experiences of social marginalisation, subordination, rejection, humiliation, adversity, disadvantage and trauma leading to the development of negative thoughts and feelings about oneself. Furthermore, they share acknowledgement that these experiences may lead to an increased vulnerability for psychosis. Thus, future research on cognitive or Social Defeat models for psychosis may wish to incorporate suicidality within these analyses. Indeed, the mechanisms that may account for the trauma – psychosis link are complex; a recent systematic review on the psychological mediators of the relationship between childhood adversity and psychosis (Williams, Bucci, Berry & Varese, 2018), highlighted five main ‘families’ of mediators. These were post-traumatic symptoms (e.g. dissociation), affective disturbance (e.g. depression, attachment), cognitive processes (social defeat, negative self-schemas), life circumstances (e.g. daily hassles, loneliness) and exposure to other risk factors (e.g. substance misuse). Notably, the extended Suicidal Drive Hypothesis includes many of these variables and integration with other theoretical models may facilitate a more robust interpretation. Inclusion of suicidality in future research may also lead to its identification as a mediator.

Externalising bias and The Suicidal Drive Hypothesis

Several recent studies have reported associations between exposure to traumatic experiences and an externalising attribution bias (Chu, Ho, Tollenaar, Elzinga & Zhang, 2019; Gawęda et al., 2019). Chu et al. (2019) reported that individuals with early relational trauma were more likely to attribute externally derived material as internally

generated. This finding held when controlling for nonrelational trauma, negative affect, parental dysfunction and memory function. This may help explain why interpersonal traumas were more strongly and consistently associated across the continuum. Not only may trauma lead to the development of NSE, but it may also create a vulnerability for externalisation which becomes more easily triggered in the presence of internal threat. Moreover, as noted by Bells, Mills, Modinos and Wilkinson (2017) many of the theories and explanations regarding the role of externalising biases in hallucination and delusion formation (e.g. Waters, Woodward, Allen, Aleman & Sommer, 2012) do not specify the underlying reasons why they are typically experienced as a social phenomenon rather than a non-social/depersonalised phenomenon. As commented by Bells et al. (2017, p. 539) “In other words, this model, like most others, accounts for why the experience is ‘not me’ but offers no account of why it is of ‘somebody else’”. The Suicidal Drive Hypothesis may be able to offer an explanation. This hypothesis suggests that PEs operate as a threat response mechanism to distance and individual from a source of threat (i.e., themselves) via externalisation. This process results in psychological distance from the source of threat and prompts engagement safety and help-seeking behaviours which aid their survival. The social nature of hallucinations and delusions may, in part, result from an evolutionary process to make the externalised threat seem more viable and realistic in order to stimulate engagement in safety- and help-seeking behaviours and ultimately, prolong survival.

7.2.2. Methodological implications

Limitations

As with modelling the continuum of internal threat, the inability to model temporal associations between internal threat and psychosis in this thesis is a significant shortcoming which compromises certainty about the meaning of associations found. Although the Suicidal Drive Hypothesis served as a basis for temporal ordering in Chapters 5 and 6, without prospective data causal associations cannot be identified. Nevertheless, this thesis maintains that in light of the theory proposed, it is viable to suggest a meaningful temporal ordering of the results. The associations contained in this body of work regarding the relationship between internal threat and psychosis in

particular are consistent with the hypotheses proposed. Importantly, however they are also not inconsistent with the existing paradigm regarding psychosis → suicidality.

Furthermore, for such complex and heterogeneous phenomena as psychosis and suicidality, it is unlikely that the internal threat continuum and Suicidal Drive Hypothesis will apply to every individual. For example, experiences of drug-induced or post-partum psychosis may not be as applicable to the Suicidal Drive Hypothesis. Additionally, as discussed in Chapter 6, positive psychosis symptomology covers a wide range of experiences and without detailed information regarding their phenomenology, it is not possible to calculate the proportion of these experiences that would align with the Suicidal Drive's suggestion of externalisation of internal threat. Moreover, many individuals who experience trauma/adversity and subsequent suicidality do not go on to experience psychosis. A better understanding of the specific application of the Suicidal Drive is therefore needed.

Future Research

First and foremost, continued empirical testing of the Suicidal Drive Hypothesis on longitudinal data is needed. Due to the departure from the traditional unidirectional paradigm, prospective modelling is crucial in order to proceed with this extended interpretation of the Suicidal Drive Hypothesis. In light of the current thesis, such testing may benefit from inclusion of an internal threat continuum when modelling prospective associations with psychosis. It would be expected that individual's membership to groups along this continuum would be significantly related to their future risk of experiencing psychosis; increasing levels of internal threat would be associated with increasing risk of future psychosis. This is a priority for the next stage of research. Moreover, the only existing longitudinal research on the Suicidal Drive Hypothesis, (Murphy et al., under review) modelled suicidality – psychosis associations at ages 12 and 18. PEs are common during the preadolescent phase and may not necessarily be reflective of clinical relevance (Kelleher, Connor, Clarke, Devlin & Harley, 2012). Therefore, longitudinal research would ideally utilise information from datapoints during young adulthood and later, when emergence of clinically relevant psychosis is more common.

Several other, additional areas of future research are of great interest. The application of the internal threat continuum to eating disorders (EDs) may be particularly interesting. As mentioned, information on EDs was not collected in the BPMS, therefore, this could not be included in regression analyses. Research has consistently linked EDs to self-criticism, self-esteem, shame, and suicidality etc. (Noordenbos, Aliakbari & Campbell, 2014; Thew, Gregory, Roberts & Rimes, 2017). A growing body of research in recent years has also linked EDs with voice hearing. A recent systematic review (Aya, Ulusoy & Cardi, 2019) reported that ED voices are common and experienced as powerful, malevolent and omnipotent. Further, they are commonly associated with feelings of defeat and entrapment and with more severe ED symptomology. The more powerful the anorexic voice, the more negative attitudes towards eating have been reported (Pugh & Waller, 2016). Thus, there may be potential to apply the continuum to ED symptomology. Moreover, application of the model to various forms of psychopathology may be useful in deciphering the factors that lead to the manifestations of specific types of distress. A Social Mentality framework has previously been theorised as being applicable to EDs (Pugh, 2016; Mullen & O'Reilly, 2018) and some empirical research supports this position (Pinto-Gouveia, Ferreira & Duarte, 2014; Duarte, Ferreira & Pinto-Gouveia, 2016). Compassion focussed therapy has specifically targeted eating disorders (Goss & Allan, 2010). This intervention has been found to be successful in treating EDs, particularly bulimia nervosa (Gales, Gilbert, Read & Goss, 2014).

7.2.3. Clinical implications

Intervening/compromising psychosis self defence

Evolutionary psychology has long posited the potential adaptive benefits of psychopathology. As acknowledged in Chapter 1, mental disorders such as anxiety and depression have been considered as improper activation of our natural fear and 'down-ranking' responses (Gilbert, 2001; 2002). Psychosis, on the other hand, has been considered more challenging regarding the application of an adaptive benefit. Several evolutionary models of psychosis have been posited (Burns, 2004; Nesse, 2004; Scheepers, de Mul, Boer and Hoogendijk, 2016). For example, Scheepers et al. (2016) considered some of the aspects in which psychosis might be beneficial to humans; concluding that its symptoms may be a protective mechanism in particularly stressful environments. These authors suggest that psychosis may develop as a form of

‘hyperconsciousness’ necessary for social adaption at a time when individuals are leaving the family environment and need to navigate through the social world themselves.

Similarly, the Suicidal Drive Hypothesis, also proposes that psychotic symptoms may serve an evolutionary, adaptive function for humans; it serves to protect an individual when they are a threat to themselves. However, adaptive perspectives on psychosis result in challenging ethical questions regarding how it should be treated. From Scheepers et al. (2016) perspective antipsychotic medication should be used to regulate the psychotic defence mechanism, but not to “reduce psychotic symptoms to zero” (p.4), allowing the individual to attempt to successfully return to a state of equilibrium in the midst of ongoing change and stress. However, from the perspective of the Suicidal Drive Hypothesis, antipsychotic medication intervention poses even greater ethical questions; if psychotic symptoms operate as a form of defence to help protect an individual from harming themselves, could the use of medication that interferes with or supresses that experience actually raise the risk of an individual engaging with suicidality. This is a highly speculative but worthwhile consideration.

It is, therefore, interesting to note that an analysis of Welsh psychiatric records (Healy et al., 2006) suggested that there may be an increasing trend for suicide among individuals with schizophrenia. Healy and colleagues compared suicide and suicide attempt (SA) rates among individuals diagnosed with schizophrenia or psychosis at the North Wales Asylum between 1875 and 1924 and with first admissions for psychosis in North West Wales between 1994 and 1998. They found that between 1875 –1924 the lifetime rate of suicide in psychosis was approximately 16 per 100,000 while between 1994 – 1998 it was approximately 752 per 100,000. Although a range of potential mediating factors were discussed, advancements in pharmacological treatments were posited by the authors as one of the factors which may have contributed to this rise. If the use of pharmacological interventions such as antipsychotic medication deny an individual an opportunity to experience a defence mechanism then there is potential that their internal threat will not be thwarted leading to more SH/suicidality. It should be noted however, reviews of antipsychotic medication have found that it is associated either with decreased suicide risk or has no effect on it rather than increasing it (Khan, Khan, Leventhal & Brown, 2001; Pompilli et al., 2016; Hennen & Baldessarini, 2005).

Bowins (2004) suggests that in clinical settings, clinicians should consider the value, intensity and effectiveness of the individual's existing defences when formulating treatment. Removing a defence too quickly or when an individual is too vulnerable may have distressing consequences for that individual and also on the therapeutic relationship.

Resistance to changing beliefs

The perspective that psychosis could be acting in a protective capacity may also have important opportunities to consider the phenomenology of PE. For example, psychotic delusions are notorious for their levels of conviction and resistance to change, even in the presence of a wealth of seemingly contradictory information (Upthegrove, 2018; Bortolotti 2018). Adherence to these beliefs in light of contradictory evidence could be the result of the adaptive, useful nature of such a process. Stepping away from a belief system which is protective in some capacity may open opportunities for internal threat to resurface. Bortolotti (2018) reviews evidence that may support the idea that irrational beliefs may have psychological benefits in some cases, despite the counter-intuitiveness of the idea. They may serve some short-term function despite their distress but in the long-term they are not considered beneficial.

Accepting evidence that goes against strongly held beliefs can result in strong emotional responses which individuals are trying to avoid. Individuals can be motivated to hold onto an alternative reality because the true reality is too negative or upsetting for them to cope with. Thus, psychosis may allow them temporary relief from negative, anxiety provoking, unpredictable and distressing states (Bortolotti, 2018). The Suicidal Drive Hypothesis would specifically assert that these negative states include suicidality. An individual's investment in a belief that others are trying to harm them, despite a range of contradictory information, may be more beneficial for the survival of that individual than engaging with their own suicidal thoughts.

Understanding distress

Furthermore, an evolutionary perspective, whereby one's distress is intended to serve an adaptive purpose (although it may not currently be functioning in such a manner) is de-stigmatising; even though these distressing experiences may not be considered

desirable, they may be understandable. For example, psychosis can be an incredibly distressing and fearful experience both for the individual experiencing it and for family, friends, etc. If an individual was introduced to the possibility that psychosis may be operating in a protective way, potentially against their own suicidal or other self-condemning thoughts, it affords them and others around the opportunity to understand their experience in a different way. This may be less stigmatising than biological models of mental illness. Indeed, biogenetic causal beliefs about mental disorders increase stigma and negative attitudes (Larkings and Brown, 2018; Pescosolido et al., 2010). Such a perspective is particularly valuable for psychosis as individuals with its label are subject to stigma.

Moreover, recognition that the voices they hear may be aspects of themselves may be clinically useful. It gives the individual, as well as the clinician, a chance to consider their own vulnerability (internal threat) and why it may be externalised to another source; they are in a vulnerable and potentially dangerous state of mind and psychosis has been introduced to distance them from that. Finally, if psychosis can stem from internal threat, and internal threat grows out of trauma, adversity, marginalisation, daily life stress, etc., then there should be a shift towards pathologizing environments rather than pathologizing individuals (Smail, 2001). This view does not negate the role of biology in distress, but highlights the impact of our environments, personal, social and cultural, in potentially creating additional distress or manifesting our vulnerabilities.

Psychosis-specific interventions

As previously mentioned, compassion-based interventions may be a particularly useful way to work with internal threat. Moreover, compassion-focussed interventions for working with distressing voices is advocated (Heriot-Maitland, McCarthy-Jones, Longden & Gilbert, 2019). These interventions acknowledge the subordinate-dominant social mentalities and how they can play out in relationships with voices. Therefore, the aim is to help the individual to switch to a different social mentality system, one characterised by love, care and support rather than hostility. From this perspective, whereby critical hostile voices may reflect an individual's strongly held feelings about themselves a clinical rationale for engaging with them in compassionate ways is provided (Heriot-Maitland et al., 2019). Components of CFT for voice hearing involve

firstly educating the individual about the evolved processes of the mind. Safeness is stimulated physiologically by engaging with soothing breathing, posture, expression and tone. The therapy also aims to help individuals notice their threat-based motivational systems, the function of this and how to shift toward a caring mentality rather than dominant-subordinate one. Compassionate mind training (CMT) has been reported as being beneficial to voice hearers with voices becoming less malevolent, less persecuting and more reassuring over the course of therapy (Mayhew & Gilbert, 2008). It is also useful in reducing increasing self-compassion and reducing depression and perceived social marginalisation (Braehler et al., 2013). As addressed in Chapter 5, CFT may be beneficial for highly self-critical individuals who are considered at risk for psychosis as an early intervention strategy, rather than solely as a post-diagnosis intervention.

AVATAR therapy (Leff, Williams, Huckvale, Arbuthnot & Leff, 2013; 2014) may be considered another useful intervention for individuals experiencing psychosis who hold negative self-views. This novel therapy approaches the relationship between a voice hearer and their voices as a submissive-dominant one. Using recent technological advances, AVATAR therapy utilises digital character building and voice modulation software to allow the individual to virtually build a realistic digital representation of the image of their voice as well as the sound of its voice. During therapy, the clinician can switch between acting as the voice character, which criticises the individual and back to their therapeutic role, inviting and supporting the individual to challenge the comments of the voice. Over the course of the sessions, the therapist (playing as the voice character) reduces the power and negativity of the voice, allowing the individual to become more dominant within the relationship (Craig, Ward & Rus-Calafel, 2016; Leff et al., 2013; 2014). Thus, much of the focus of therapy is on building the individual's self-esteem and assertiveness in engaging with the voice. This therapy is particularly complimentary of the theorised role of internal threat in the manifestation of psychosis within this thesis; it recognises the externalisation of threat to the voice and allows interaction with it in a safe and secure manner. Furthermore, during the course of therapy some individual begins to recognise that the voice may no longer be an external entity but rather coming from within (i.e., their own self-criticisms; Leff et al., 2013; 2014). Engagement in CFT thereafter may be particularly beneficial. A recent randomised control trial (Craig et al., 2018) of AVATAR therapy among individuals with a diagnosis of a psychotic disorder and enduring AVHs reported that at 12 weeks

those receiving the therapy had greater reductions in the severity of persistence of AVHs than a control conviction of supportive counselling. The effect size for the benefit of AVATAR therapy was large.

7.3. Conclusion

In conclusion, a range of sophisticated analytic techniques were employed to robustly test the dimensional and categorical latent structure of items that were considered to reflect internal threat. Models emerged which were consistent with the hypotheses regarding graded severity in the dimensions and class structure. These findings were also consistent with the proposal that NSE and suicidality represent distinct but highly related phenomena. A history of interpersonal trauma, in particular, may create an environment for internal threat to develop and thrive. Moreover, there may be potential that self-attacking phenomena, with or without the presence of suicidality, may drive the development of subclinical PEs in some cases. A range of avenues for future investigation have been highlighted. In particular, longitudinal modelling of the internal threat continuum and its temporal association with psychosis is a priority. With replication, the theoretical implications outlined in this chapter can be advanced, the methodological implications can be overcome and clinical implications may be applied.

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Appendix A: Supplementary graphs

Results from edge weight accuracy tests

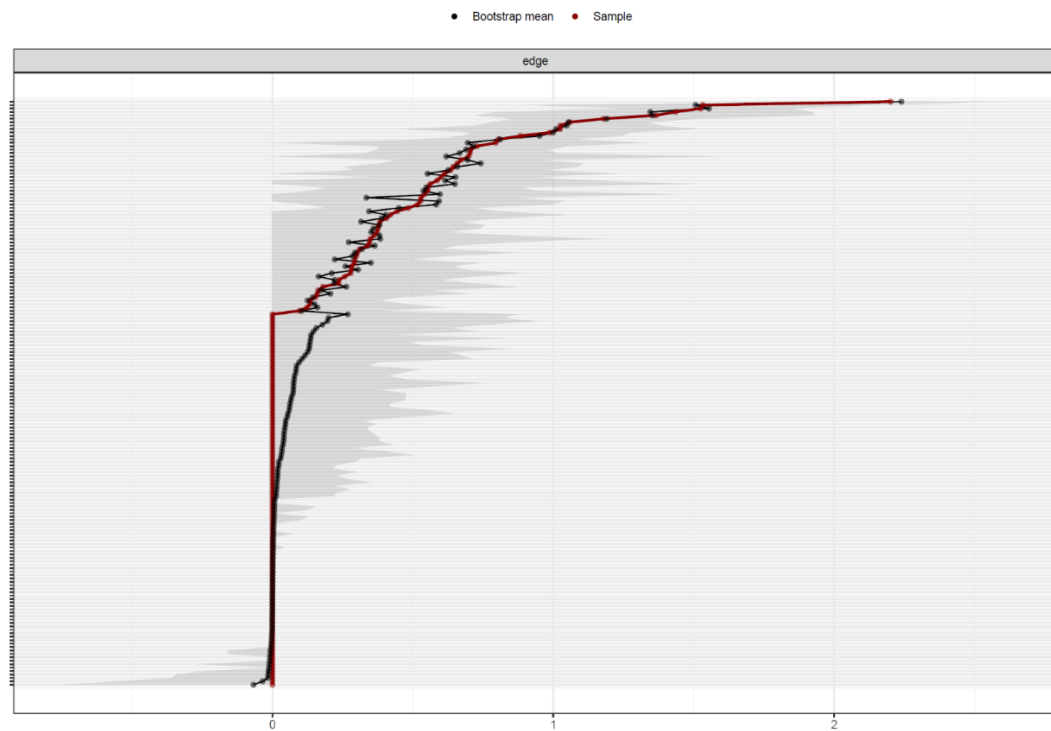


Figure S1. High internal threat group: Plot of edge weights and 95% confidence intervals (CIs) calculated using bootstrapping.

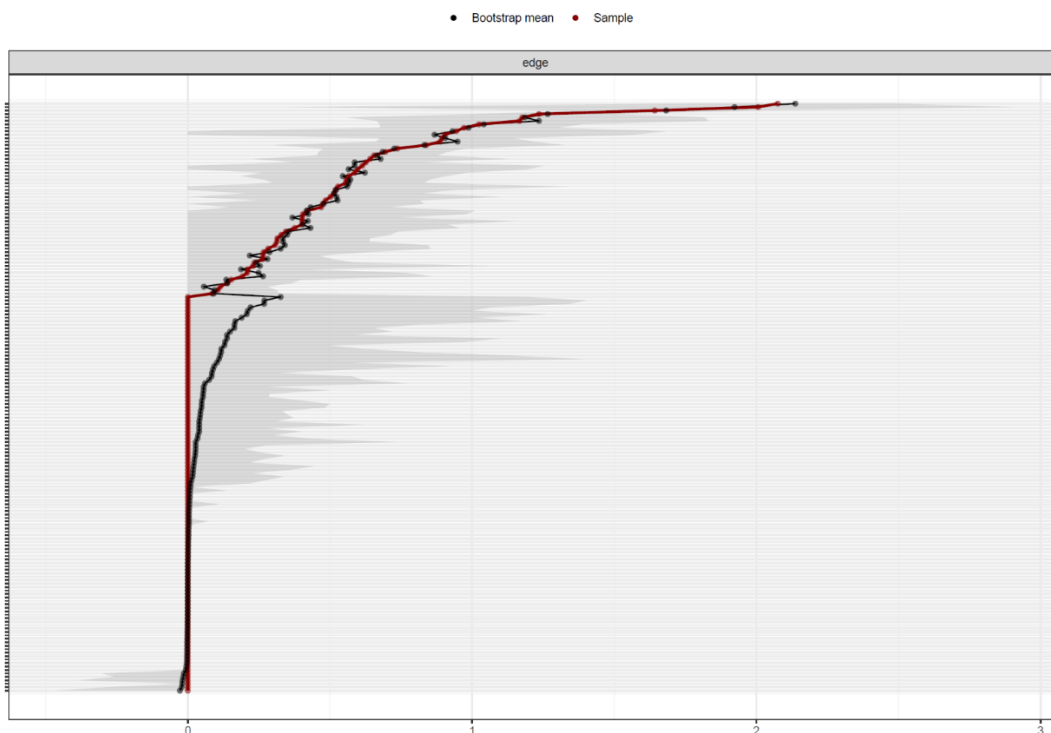


Figure S2. Moderate internal threat group: Plot of edge weights and 95% confidence intervals (CIs) calculated using bootstrapping.

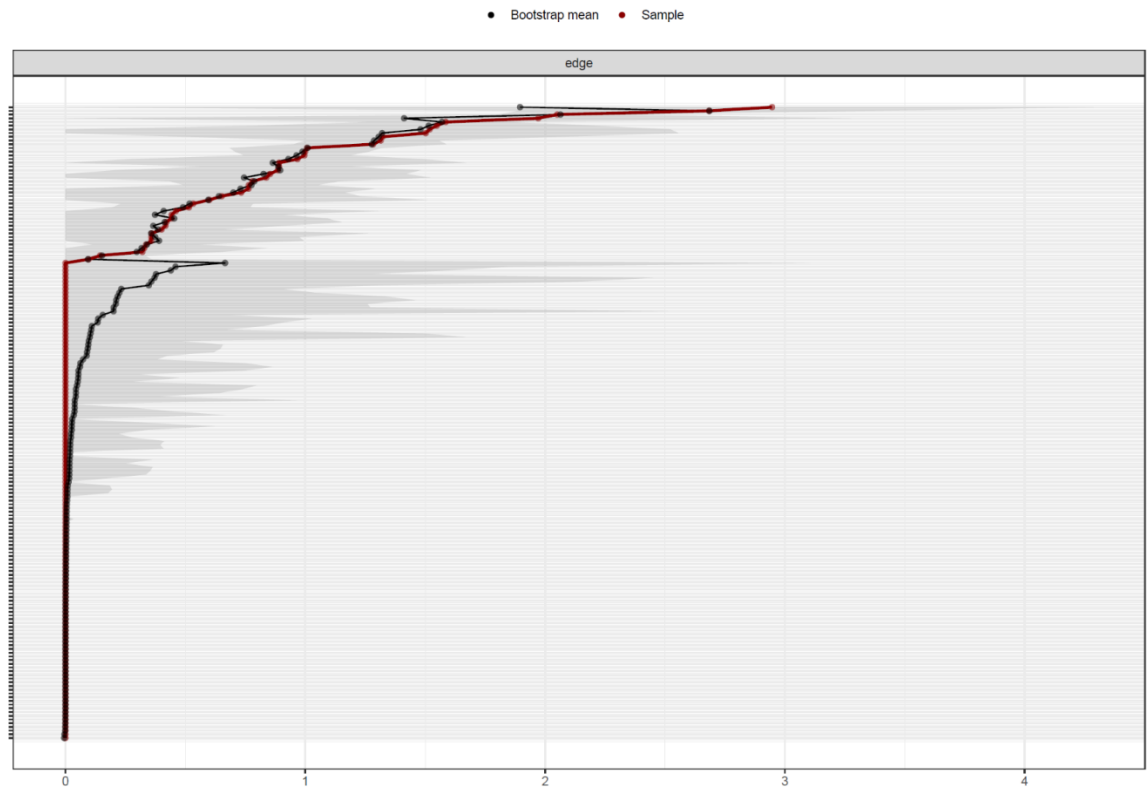


Figure S3. Baseline internal threat group: Plot of edge weights and 95% confidence intervals (CIs) calculated using bootstrapping.

Appendix B: Supplementary graphs

Results from centrality stability tests

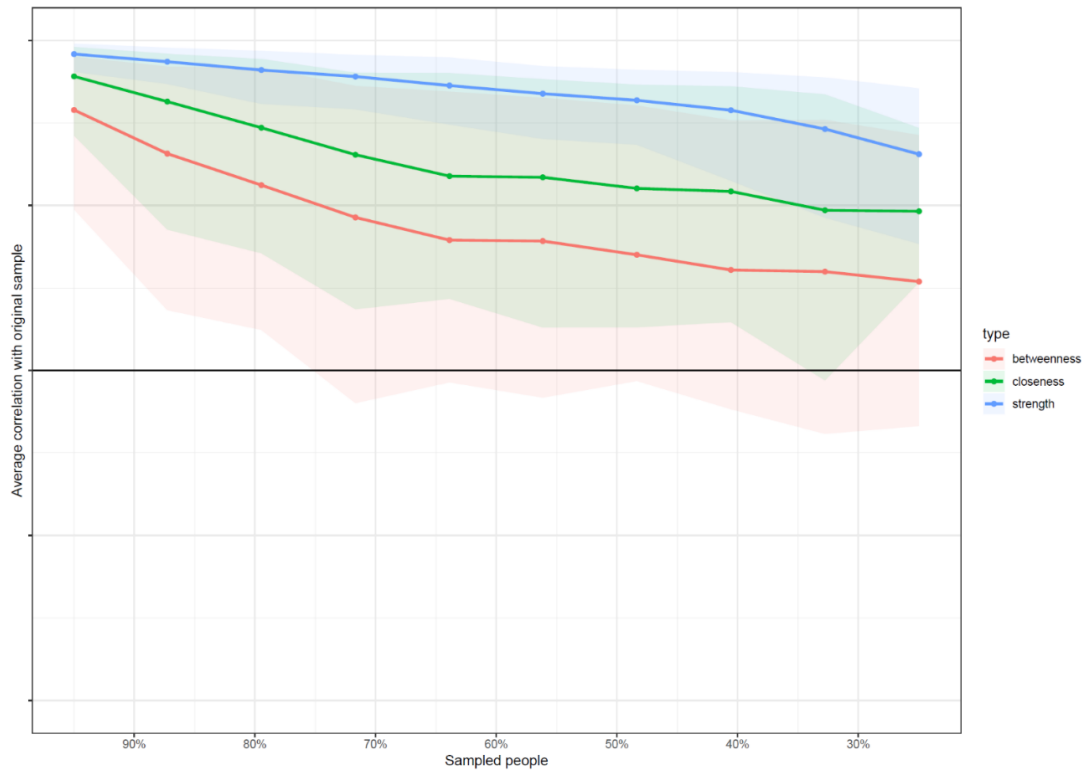


Figure S4. High internal threat group: centrality estimates stability assessed using case-dropping bootstrap method

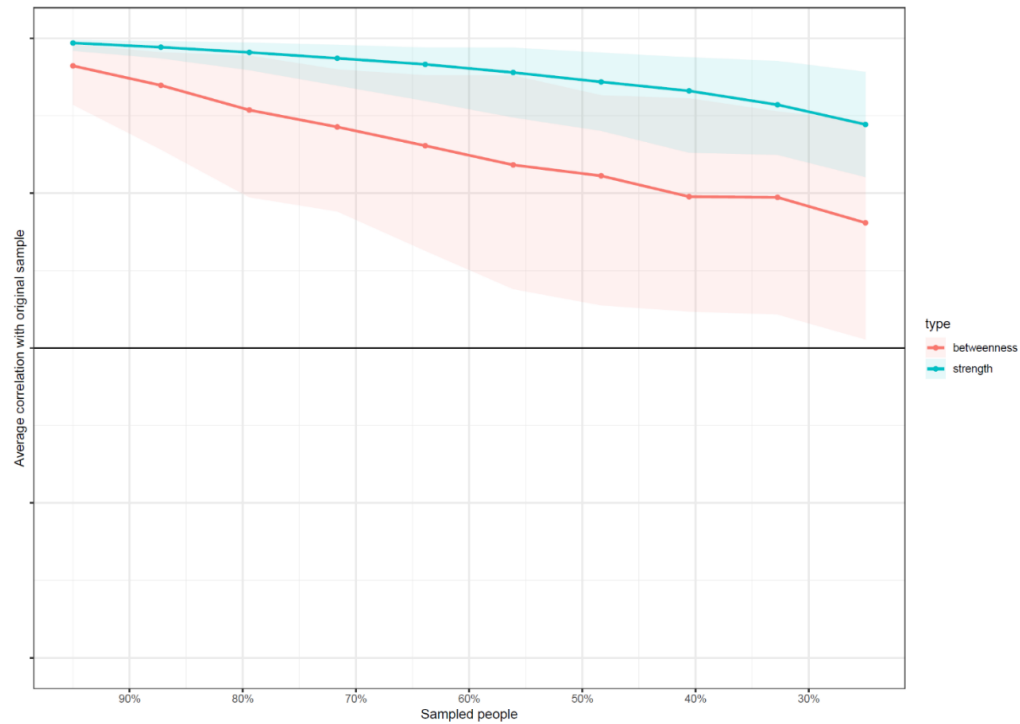


Figure S5: Moderate internal threat group: centrality estimates stability assessed using case-dropping bootstrap method

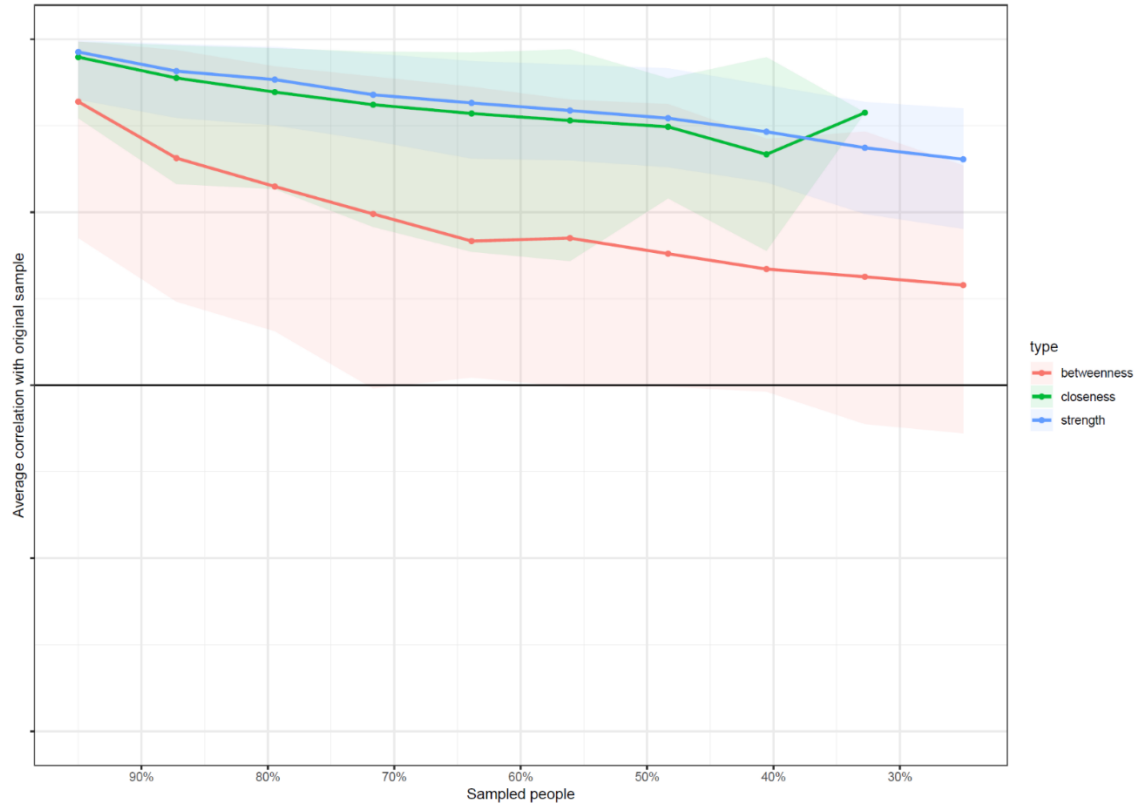


Figure S6. Baseline internal threat group: centrality estimates stability assessed using case-dropping bootstrap method

