PERSONALITY TRAITS AS RISK FACTORS FOR RECURRENT DEPRESSION AND OTHER DEPRESSION OUTCOMES

By

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Abstract

Background: Major depressive disorder (MDD) is a common, debilitating, highly recurrent disorder representing a significant health concern and a leading cause of disability and mortality worldwide. Despite effective treatments, many depressed patients relapse, with around 50% to 80% likely to experience further episodes after achieving recovery. Personality has been proposed as an essential risk factor for recurrent depression. However, researchers have addressed limited personality traits and focused on personality disorders, leaving the role of many other personality traits in recurrent depression unclear. This thesis aimed to identify what personality traits contribute to the risk of recurrent depression in addition to other MDD outcomes (onset, persistence, recovery).

Methods: Chapter two comprises a systematic review of personality traits as risk factors for relapse/recurrence in MDD. Chapter three includes a secondary data analysis that used prospective data from the Adults Psychiatric Morbidity Survey (APMS, 2000) to evaluate the association between borderline, obsessive-compulsive, and dependent personality traits and the change of depression status at 18 months (onset, persistence, and recovery). Chapter four presents a case-control study that examines the association between emotional dysregulation, affective lability, impulsivity, and recurrent depression.

Results: The systematic review revealed that individuals with high neuroticism, borderline, obsessive-compulsive and dependent personality traits or disorders are more prone to the risk of recurrence compared to those without these traits. Additionally, the secondary data analysis study showed that borderline personality was the most robust

factor; increased dependent personality traits were significantly associated with persistent MDD, and elevated traits of obsessive-compulsive personality were found to be related to the onset of MDD. The case-control study showed that emotional dysregulation and childhood maltreatment could work as risk factors for recurrent depression.

Conclusion: These findings have important theoretical and practical implications, including efforts to develop targeted intervention plans tailored to patients' characteristics. This thesis concludes by contextualising the findings within the existing literature, addressing their limitations, and proposing future directions. Overall, this thesis presents valuable insight into the role of personality traits in the risk of recurrent depression, highlighting their role in other important MDD outcomes and emphasising the need for further investigations in this area.

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CONTENTS LISTING

List of Papers

This thesis incorporates the three following papers:

Published Paper:

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Published Paper:

Altaweel, N., Upthegrove, R., & Marwaha, S. Personality factors and change in depression status at 18 months: Findings from a British Psychiatric Morbidity Survey. *Journal of Affective Disorders.*

Paper in Revision **Altaweel, N**., Upthegrove, R., & Marwaha, S. The impact of personality traits on the return of major depression: a case-control study. *Frontiers in Psychology.*

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CHAPTER ONE

INTRODUCTION

1 Introduction

Major depression is increasingly recognised as a public health concern, representing a leading cause of disability and mortality worldwide (Organization, 2022). It is a highly recurrent disorder affecting around 28.5 million people globally (Liu et al., 2020). Moreover, a recent World Health Organization report (2022) has revealed a significant increase in depression prevalence of 28% during the coronavirus (COVID-19) pandemic (Organization, 2022). Identifying risk factors for depression is one of the critical areas in depression research, as this can help researchers to understand its outcomes and control this chronic issue. Among the factors addressed by researchers, personality traits can be considered an aspect that has not received sufficient attention regarding their role in recurrent depression. The high variance in how personality is conceptualised and measured has led to an apparent methodological heterogeneity in the available research on the association between personality and depression. This raises a generalisability issue and makes it challenging to draw comparable conclusions in this area.

This introduction chapter will first discuss the background and context of this research, followed by the research problem, significance, aims, objectives, and questions.

1.1 Depression Outcomes

Major depressive disorder (MDD) is a debilitating condition that is characterised by low mood, loss of interest or pleasure, and disturbed appetite and sleep for at least two weeks (American Psychiatric Association, 2013). Serious outcomes of this disorder have been

documented, such as suicidality, impaired cognitive functioning, and social dysfunctions (Krause et al., 2019). The relationship between MDD and suicidality (attempts and ideation) has long been recognised (Orsolini et al., 2020). Suicidal behaviour and ideation have been repeatedly reported during the course of MDD, with a suicide risk rate of roughly 15% (World Health Organization, 2018). A meta-analysis on suicidal ideation and planning that covered 53,598 MDD patients revealed that male gender, severe MDD, psychotic and somatic symptoms, and traumatic experiences were all associated with higher suicidal ideation among MDD patients (Cai et al., 2021).

In addition to suicidality, substantial evidence exists on cognitive dysfunctions as a critical MDD outcome (Czerwińska and Pawłowski, 2020). Cognitive deficits are a prevalent MDD symptomatology that even persists in remission periods and represents a key risk factor for recurrent depression (Czerwińska and Pawłowski, 2020). Cognitive problems were found to be dominant during 85–94% of the time of active depressive episodes and 39–44% of the time during remissions (Conradi et al., 2011). A meta-analysis of 11,882 remitted depressed patients and 8,533 healthy controls reported significant cognitive deficits that persisted in MDD remission, particularly working and long-term memory and selective attention (Semkovska et al., 2019). In addition to their persistence in remission, these deficits were also found to worsen following MDD episodes (Semkovska et al., 2019).

Social functioning is another major aspect that is affected negatively by depression. It is an important indicator of MDD that can be defined as “an individual’s ability to perform and fulfil normal social roles” (Hirschfeld et al., 2000). As with cognitive dysfunctions, it can

persist even after remission of MDD: for example, Rhebergen et al. (2010) found that impaired social functioning persisted after three years of complete recovery from MDD. Further, social dysfunctions were found to predict MDD diagnosis two years later (Saris et al., 2017). As part of such social impairment, MDD patients typically lack the desire to communicate and withdraw from social interactions to avoid anticipated rejection and disappointment (Kupferberg et al., 2016). Collectively, what is known to date about social dysfunctions in MDD patients highlights the importance of targeting the improvement of the social aspects and skills in MDD interventions to minimise the risk of relapse rather than just focusing on reducing MDD symptoms (Kupferberg et al., 2016).

1.2 Depression Treatment Outcomes

The treatment outcomes of depression are one of the most significant aspects for researchers and patients alike. Research generally has covered common treatment outcomes of depression, such as recovery, remission, recurrence, and relapse. A terminology issue arises in treatment outcomes research, where researchers tend to use various methodologies and different definitions of these terms. For example, some researchers use the term *recovery* to describe the absence of depression in six months, while others describe this absence over the same period by using the term *remission*. Likewise, the terms *recurrence* and *relapse* are used interchangeably in the literature to refer to the return of depression. The inconsistency continues when considering the return of symptoms versus the return of an episode when referring to recurrence/relapse.

Nevertheless, efforts have been made in this area, with some research attempting to provide specific determinants of depression treatment responses based on empirical evidence. This contributes to the distinction between these terms, which may enhance their consistent use in research. For instance, (Frank et al., 1991) have guided the field concerning the definition of the primary outcomes of depression (recovery, remission, recurrence, and relapse). They proposed an operational criterion grounded in consistent, empirical evidence for each term that represents a response to the course of depression. They defined *recovery* as an extended period of remission—for example, six to 12 months—during which patients no longer fulfil the criteria of a depressive episode. *Remission* is a period of at least two months of largely absent depressive symptoms before full recovery. On the other hand, they characterised *relapse* as the return of depressive symptoms following partial remission but prior to full recovery. The term *recurrence* was described as the onset of a depressive episode after a sufficient period of remission to presume that recovery had been achieved (Frank et al., 1991).

A later attempt by the American College of Neuropsychopharmacology Task Force (ACNP) provided recommendations to define concepts of remission, recovery, relapse, and recurrence. Remission was described as the absence of depressive symptoms for three consecutive weeks, whereas recovery was defined as a persistent period of remission for at least four months. The ACNP recommended that both relapse and recurrence represent the return of a major depressive episode, wherein relapse occurs after remission, and recurrence occurs after recovery. Nevertheless, a report by Rush et al. (2006) summarising these recommendations stated that they lacked empirical evidence, as they were mainly based on logic and clinical impression.

More recent work has systematically reviewed the empirical evidence for the definitions provided by (Frank et al., 1991), since they have been a dominant resource for the conceptualisation of depression outcomes among MDD researchers and clinicians (de Zwart et al., 2019). The review suggests, for example, that remission is best defined as having fewer symptoms than previously thought (Hamilton Rating Scale for Depression, HAMD-17 $\leqslant 4$ instead of $\leqslant 7$), with no consideration of a length criterion (de Zwart et al., 2019).

Despite these efforts, confusion in this area remains, and additional validation is needed to further unify depression outcomes terms in research and practice (Bockting et al., 2015). This, in turn, can empower the function and the prognosis value in depression studies.

1.3 Depressive Relapse

While other treatment outcomes of depression are also important, research on relapse addresses the chronic and recurrent nature of depression, ultimately aiming for more sustained recovery and well-being. Despite effective treatments, many depressed patients relapse. Studies have shown that 50% of individuals who have experienced a single depressive episode are likely to have another episode at some point in their lives, and 80% of individuals who have had more than two depressive episodes are prone to experiencing further episodes within five years (Burcusa and Iacono, 2007b).

Research on depressive relapse is crucial for several reasons. First, understanding the factors that contribute to relapse can help tailor treatment approaches to individual needs. This personalized approach may lead to more effective and sustainable outcomes for people with depression. It can also inform more effective long-term management strategies, helping individuals to maintain wellness beyond the initial treatment phase. These strategies could involve ongoing support, therapy, medication management, lifestyle changes, and other interventions tailored to the individual's needs to prevent relapse and promote sustained wellness.

Second, relapse prevention can be more cost-effective than treating recurrent episodes of depression (McMahon et al., 2012). By identifying predictors of relapse and developing interventions to prevent it, healthcare resources can be allocated more efficiently. Furthermore, relapse can significantly negatively impact an individual's quality of life (IsHak et al., 2013), affecting their relationships, work, and overall well-being. Researching relapse can help to improve the quality of life for people living with depression. Finally, recurrent episodes of depression can lead to increased disability and impairment in functioning (Rytsälä et al., 2005). By focusing on preventing relapse, researchers can help to reduce the disability burden associated with depression.

Understanding the nature of depression and its outcomes is crucial for enhancing awareness and predicting the trajectory of the course of illness. One way to achieve this target is to identify risk factors that play a role in responding to depression treatments. A wide range of available research in the literature has addressed clinical aspects concerning the course of depression. Factors such as the severity of depression, the number of previous episodes,

and the type of intervention used all represent common clinical factors that have been shown to be linked with the course of depression, particularly relapse and recovery (Buckman et al., 2018a; Richardson and Barkham, 2020).

1.4 Personality

There is a considerable amount of literature linking personality to mood disorders, including depression. Evidence has been seen in the literature regarding personality pathology and the unfavourable long-term outcomes of these disorders (Tyrer et al., 2022). The presence of personality pathology is one patient characteristic that many clinicians believe may interfere with the treatment of depression (Mulder, 2002; Bagby et al., 2008). Investigating the association between personality dysfunctions and depression outcomes has been a concern for researchers and clinicians alike, as it can impact clinical practice and policies.

According to the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5), personality traits can be defined as "enduring patterns of perceiving, relating to, and thinking about the environment and oneself that are exhibited in a wide range of social and personal contexts" (American Psychiatric Association, 2013). Although this definition is widely used in research, there is considerable variance in the conceptualisation of personality, and to date, there is no consensus on how to define personality (Bergner, 2020).

Theory and research concerning personality and the differences among individuals can be broadly categorised based on their primary focus on (a) the **structures** of differences between individuals, (b) the internal **processes** within individuals that influence behaviour, and (c) personality **development**.

Personality theorists have long believed that personality traits tend to be consistent and stable over the lifespan and across situations, and that the variance in behaviour within and between individuals can be explained by looking at differences in personality **structure** (Diener and Lucas, 2019). This notion yielded the development of structural personality models that clustered personality into a few dimensions, such as the Five-Factor Model (FFM) (McCrae and John, 1992) and the Eysenck model (Eysenck and Eysenck, 1968). Researchers also attempted to interpret the structure of the variance in individuals' behaviour in different domains, such as motives, abilities and values (Baumert et al., 2017).

In addition to personality structure, researchers have aimed to determine the psychological **processes** that underly the differences in people's behaviour. Research that addresses personality processes provides potential interpretations for the differences in individuals' behaviour and across situations. For instance, biological theories of personality suggest that neurophysiological processes, which vary between individuals, contribute to the variance in people's behaviour (Corr, 2008). For example, Gray's Reinforcement Sensitivity Theory (RST) highlights the role of brain systems such as the Behavioural Activation System (BAS), which is associated with reward sensitivity and approach behaviours, and the Behavioural Inhibition System (BIS), linked to sensitivity to punishment and avoidance behaviours (Corr, 2008). Neuroimaging studies provide empirical support for these models,

showing that BAS activity correlates with activation in the dopaminergic pathways, while BIS activity is associated with the amygdala and prefrontal cortex (Corr & McNaughton, 2012). These findings elucidate the biological underpinnings of personality traits such as extraversion and neuroticism, offering a neurophysiological basis for behavioural variance. Another example includes a social-cognitive perspective, in which researchers proposed that people vary in information processing aspects such as interpretation and attention, which leads to variance in how they behave (Mischel and Shoda, 1995).

As well as structure and processes, understanding personality **development** is another key target in personality science. This means understanding patterns of the enduring changes in traits over time. Studies have indicated that personality development is affected by genetic factors and experience as well (Baltes and Schaie, 2013).

Some researchers have argued that personality domains (i.e., structure, processes and development) have been addressed in the literature independently, which could lead to misleading conclusions, and argued for an integrative approach to develop a complete understanding of personality (Mõttus et al., 2020; Baumert et al., 2017). An integrative approach to studying personality domains aims to bridge these traditionally separate areas, considering how they interact and influence each other. This approach would involve using multiple theoretical frameworks combining insights from various theories (like trait theory, social-cognitive theories, and developmental psychology) to offer a more comprehensive understanding of personality. For example, integrating trait theory (structure) with social-cognitive theory (processes) could help explain why certain traits manifest differently across situations and stages of life (McAdams and Pals, 2006). Furthermore, Integrative

models would involve developmental perspectives to explain how personality structures and processes change over time. For instance, it could examine how environmental factors and life events impact structural traits and the processes that drive behaviour (Roberts et al., 2001).

An integrative approach to studying personality could lead to a more comprehensive understanding. Viewing personality as a dynamic system allows researchers to see how traits interact with processes and develop over time, capturing a more complete picture. Additionally, it could improve predictive power by combining structural and processual data, which may better predict behaviour and personality changes (Mischel and Shoda, 1995). Finally, this approach could help address debates, like the trait vs. situation debate, by showing how stable traits interact with transient states across development.

1.5 Traits versus Situations

Some personality theorists have criticised the trait theory or the approach of limiting the personality to a few traits and referring to these traits to understand differences in behaviour within and between individuals. Predominantly, research has focused on the Five-Factor Model (FFM) of personality (McCrae and John, 1992) when investigating personality's relationship with depression (Serrano et al., 2022; Diener and Lucas, 2019). The Big-Five model of personality, also known as the Five-Factor Model, posits five core dimensions of personality: **openness to experience** reflects a person’s willingness to try new experiences

and ideas and embrace creativity. **Conscientiousness** describes how organised, dependable, and goal-oriented a person is. **Extraversion** indicates a person's sociability, energy levels, and enthusiasm for interacting with others. **Agreeableness** reflects traits such as kindness, empathy, and cooperation. Finally, **neuroticism** refers to emotional stability and how prone a person is to experiencing negative emotions like anxiety and moodiness. According to this model, each trait is considered a continuum, and individuals can vary widely within each dimension, resulting in unique personality profiles. This model is used in psychology for personality assessment, and it serves as a foundation for many applications in counselling, workplace management, and personal development.

Personality theorists have argued that the Big-Five Model, for example, is unable to capture many other traits and that people's behaviour is not consistent across situations because of the impact of several situational factors (Diener and Lucas, 2019). They also suggest that to improve research on personality, particularly in the areas of description and prediction, dimensional models that involve more specific traits are required (Mõttus et al., 2020). As a result, an enduring debate has emerged about the power of persons versus situations in predicting behaviour and explaining its differences among individuals (Jayawickreme et al., 2021). Mischel (2013) argued that predicting behaviour cannot be achieved by referring to traits; instead, factors related to the situation itself are critical for this goal.

Following the person–situation debate, researchers tended to minimise the utility of personality, instead exploring other situational factors that could interpret behaviour variance within and between individuals (Jayawickreme et al., 2021). Indeed, this debate increased the interest among personality researchers in developing an integrated approach

where both person and situational factors are involved for important improvement in this area (Jayawickreme et al., 2021).

1.6 Personality Assessment

The heterogeneity in how personality is conceptualised extends to variability in its assessments and measurements. For instance, the DSM-5 uses a categorical approach to classify personality disorders. Ten personality disorders are grouped into three clusters according to descriptive similarities. Cluster A comprises paranoid, schizoid, and schizotypal personality disorders. Cluster B comprises antisocial, borderline, histrionic, and narcissistic personality disorders. Finally, cluster C comprises avoidant, dependent, and obsessive-compulsive personality disorders. The current categorical system has been widely criticised. It might not be the ideal methodology for diagnosing personality disorders, as the patient in this approach must be classified as either having or not having a specific type of personality, which is an inaccurate approach. Therefore, there have been early calls from researchers and clinicians to consider a dimensional system for diagnosing personality disorders (Krueger et al., 2007).

The International Classification of Diseases 11th Revision (ICD-11) made a significant transition when it officially adopted a dimensional approach to classifying personality pathology. Using the ICD-11, a clinician can describe a patient's behaviour according to five domains of personality traits: negative affectivity, dissociality, anankastia, detachment, and disinhibition. This approach also allows further identification of the severity level of a personality by setting (mild, moderate, and severe). Several benefits are reported in the

literature on using the dimensional approach in diagnosing personality disorders. For instance, Morey et al. (2007), who compared alternative models of personality disorders, found that the dimensional models exceeded the classic categorical system in predicting external variables such as hospitalisations and subsequent suicidal gestures. Furthermore, Skodol et al. (2005) demonstrated that the dimensional system in diagnoses of personality disorders has greater clinical validity than the categorical model.

When examining the connection between personality pathology and outcomes in patients with MDD, measurement issues continue to be the main concern. In his review on personality pathology and treatment outcomes in MDD, Mulder (2002) revealed that the frequency and type of personality disorders are significantly influenced by how they are measured. He reported that if a different instrument was used, individuals who were diagnosed with a personality disorder in one study could be highly different from those in another one (Mulder, 2002). He also revealed that studies that used the categorical system (i.e., the DSM) in measuring the impact of personality disorders on MDD treatment outcomes had conflicting results compared to studies that used a dimensional approach, which showed higher predictive validity (Mulder, 2002).

Personality measures issues are also reflected in the use of self-administered questionnaires (e.g., the Eysenck Inventory) versus structured interviews. There has been an early acknowledgement of the structured interview as the best approach to assess personality disorders compared to self-reported questionnaires (Mulder, 2002). Zimmerman and Mattia (1999) reported that clinicians tend to diagnose personality disorders significantly more frequently when they are provided with information from semi-structured interviews

compared to their routine unstructured clinical evaluation. Many researchers have advocated for the need to find other sources of information to assess the processes and variance in personality instead of relying on self-report tools (Mõttus et al., 2020).

1.7 Personality and Depression

The relationship between personality and depression has been addressed in the literature using various conceptual frameworks. Klein et al. (2011) reviewed the available evidence on the association between personality and depression, discussing different models of this relationship. The first model assumes that personality and depression share similar aetiological influences but do not affect each other causally. The second model posits the notion of predisposition, in which personality predicts depression onset and other variables mediate this link. The final model suggests that depression has a causal effect on personality. This model assumes that personality traits are altered during a depressive episode and then return to baseline after recovery. Other views suggest that changes in personality traits may persist even after recovery from a depressive episode (Klein et al., 2011).

Although personality has long been believed to be stable, it is now commonly acknowledged that personality changes across the lifespan (Specht et al., 2011; Chow and Roberts, 2014). This notion prompts researchers to minimise the static perspective and adopt a more dynamic one when investigating issues around personality, such as whether variations in personality can predict variations in depression (Chow and Roberts, 2014). An example of such research includes a study by (Chow and Roberts, 2014), who used

longitudinal data to explore whether changes in the personality traits of neuroticism and conscientiousness were associated with changes in MDD among 5,271 participants. They revealed that the two traits were significant predictors of depression after four years and that satisfaction and health worked as mediators of the association between change in personality and depression.

Regardless of the type of connection between personality and depression, there is well-established evidence to confirm that certain personality features can predict favourable and unfavourable outcomes of depression treatments (Bagby et al., 2008). For example, a meta-analysis study reported neuroticism and conscientiousness to be the most robust predictors of MDD (Kotov et al., 2010). A considerable body of literature has supported the assertion that extraversion and conscientiousness are associated with favourable outcomes from depression therapy (Ogrodniczuk et al., 2003). In contrast, neuroticism has consistently proven to have a negative prognosis in depression outcomes (Pereira-Morales et al., 2019). Generally, personality dysfunction is becoming more widely recognized in both primary and secondary care settings and is commonly acknowledged as an indicator of the severity of depression and a predictor of recurrent depressive disorder diagnosis (Angstman et al., 2017; Weber et al., 2012).

1.8 Research Problem

Despite extensive research into the relationship between personality traits and depression, several critical gaps remain. Predominantly, research has focused on the role of personality disorders concerning recurrent depression, often sidelining the influence of broader

personality traits that do not necessarily amount to personality disorders categorically defined. This focus has been valuable in identifying extreme and pathological patterns of behaviour that exacerbate depressive episodes. However, it overlooks how non-pathological personality traits, which do not meet the threshold of a disorder but still significantly impact depressive states, contribute to the risk of recurrence.

In addition, the Five-Factor Model of personality (FFM) (McCrae and John, 1992), encompassing the traits of openness, conscientiousness, extraversion, agreeableness, and neuroticism, has been one of the most common models in exploring personality's relationship with depression (Serrano et al., 2022; Diener and Lucas, 2019). Notably, high neuroticism and low extraversion have been consistently linked to increased vulnerability to depression (Kotov et al., 2010; Ogrodniczuk et al., 2003). While these findings are robust and valuable, the exclusive focus on the (FFM) traits may be overly restrictive. Personality is a multifaceted construct, and other personality dimensions, such as impulsivity and affective lability, might also play critical roles in the onset, persistence, and recurrence of depressive episodes. This limited focus may obscure a comprehensive understanding of how a full spectrum of personality traits influences recurrent depression.

Furthermore, most research has been conducted in Western contexts (Laajaj et al., 2019), leading to a potential cultural bias in the findings. Cross-cultural studies are essential to determine whether the relationship between personality traits and depression outcomes holds true in diverse cultural settings and to identify culturally specific factors that may influence this relationship.

Addressing these gaps requires a broadened research approach incorporating a broader range of personality traits beyond those encapsulated by the (FFM) and personality disorders frameworks. This could contribute to unravelling the complex dynamics between diverse personality characteristics and recurrent depression. By doing so, the field can move towards more nuanced and effective prevention and intervention strategies, ultimately improving outcomes for individuals struggling with recurrent depression.

1.9 Research Significance

Improving our knowledge of the association between personality traits and recurrent depression has several significant advantages for research and practice.

1.9.1 Predictive Value: Personality traits can serve as predictors of various aspects of mental health, including vulnerability to depression and risk of relapse (Asano et al., 2015). Understanding how personality factors contribute to the recurrence of depression can help to identify individuals at higher risk and develop targeted interventions to prevent relapse.

1.9.2 Treatment Tailoring: Personality traits may influence how patients respond to different treatment approaches (Klein et al., 2011). By studying the relationship between personality and relapse, personality traits could help tailor interventions, where clinicians can match treatment with the patient's character (Mulder, 2002), leading to more effective and personalized treatment strategies.

1.9.3 Early Intervention: Certain personality traits (e.g., neuroticism) may predispose individuals to experience onset and recurrent depressive episodes (Noteboom et al., 2016). By identifying these traits early on, healthcare professionals can intervene proactively to prevent relapse or mitigate its impact, potentially reducing the overall burden of depression.

1.9.4 Understanding Mechanisms: Researching the association between personality and relapse can provide insights into the underlying mechanisms involved in the recurrence of depression. Understanding the mechanisms by which personality interacts with depression may illustrate how mood disorders are developed (Compas et al., 2004). This understanding can inform the development of novel therapeutic targets and interventions aimed at interrupting the cycle of relapse.

1.9.5 Comprehensive Approach: Depression is a complex and multifaceted condition influenced by a range of biological, psychological, and environmental factors. By considering personality traits as one of the contributing factors, researchers can adopt a more holistic approach to understanding and treating depression, considering the individual differences among patients.

1.9.6 Improving Long-Term Outcomes: Personality traits are relatively stable over time, making them valuable targets for intervention in the prevention of relapse. By addressing maladaptive personality characteristics or strengthening protective traits, interventions may lead to more sustainable improvements in long-term outcomes for individuals with depression.

Overall, research on the association between personality and recurrent depression holds promise for enhancing our understanding of this chronic disorder and improving outcomes through personalized and targeted interventions.

1.10 Research Aim, Objectives, and Questions

Given the need to investigate the impact of personality traits on recurrent depression, this PhD aims to determine what personality traits are associated with recurrent depression in adults. The current PhD's objectives are:

1- To gather research evidence through a systematic review to identify personality traits that work as risk factors for relapse in depression.
2- To investigate personality traits identified from the results of the systematic review using secondary data analysis of a large representative cohort and evaluate their prediction value towards some depression outcomes.
3- To investigate the association between the return of depression (relapse/ recurrence) and some personality traits that have lacked attention in research based on the systematic review findings, particularly emotional dysregulation, affective liability, and impulsivity.

Accordingly, this PhD sought to answer the following three questions:

1- What personality traits work as risk factors for relapse or recurrence of depression in adults?

2- What is the relationship between personality traits of dependent, obsessive-compulsive, and borderline personality and the change in depression status over 18 months (onset, persistence, and recovery)?
3- Are emotional dysregulation, affective lability and impulsivity associated with the return of depression in adults?

This PhD thesis is organised into five chapters, including this introductory chapter. The second chapter systematically reviews the evidence for what personality traits could be risk factors for relapse in depression. The third chapter is a secondary data analysis study that aims to examine the prospective data of the Adult Psychiatric Morbidity Survey to evaluate the contributions of certain personality factors to depression outcomes. The fourth chapter concerns the role of personality traits of emotional dysregulation, affective lability, and impulsivity in the return of depression. The final chapter discusses the results of the various studies conducted in the PhD, integrating the findings, contextualizing them within the existing literature, and addressing their limitations. Additionally, it assesses the impact of the current PhD research and suggests potential future research directions.

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CHAPTER TWO

Personality Traits as Risk Factors for Relapse or Recurrence in Major Depression: A Systematic Review

Published Paper

Altaweel, N., Upthegrove, R., Surtees, A., Durdurak, B., & Marwaha, S. (2023). Personality traits as risk factors for relapse or recurrence in major depression: a systematic review. *Frontiers in psychiatry*, *14*, 1176355.

Author Contributions

N.A., S.M., R.U., and AS conceived the presented idea. N.A. and B.D. carried out the systematic literature search, extracted the data, and assessed the quality of the included studies. All authors discussed the results and provided critical feedback. N.A. wrote the manuscript with input from all authors.

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ABSTRACT

Background: Major depressive disorder (MDD) is highly recurrent. Identifying risk factors for relapse in depression is essential to improve prevention plans and therapeutic outcomes. Personality traits and personality disorders are widely considered to impact outcomes in MDD. We aimed to evaluate the role of personality aspects in the risk of relapse and recurrence in MDD. **Method**: a PROSPERO-registered systematic review was conducted using Medline, Embase, PsycINFO, Web of Science and CINAHL as data sources, together with hand searching of four journals over the five years till 2022. There was independent abstract selection, quality assessment and data extraction from each study. **Results:** 22 studies met eligibility criteria involving 12,393 participants. Neurotic personality features are significantly associated with the risk of relapse and recurrence of depression, though the data is not uniform. There is some, though limited, evidence that borderline, obsessive-compulsive and dependent personality traits or disorders increase the risk for relapse in depression. **Limitations:** The small number, in addition to the methodological heterogeneity of the included studies, did not allow further analysis, such as meta-analysis. **Conclusion:** People with high neuroticism and dependent personality traits, borderline personality disorder or obsessive-compulsive personality disorder, compared to those without, may be at a higher risk of experiencing relapse or recurrence of MDD. Specific and targeted interventions may potentially reduce relapse and recurrence rates in these groups and could improve outcomes.

Keywords

Personality traits; relapse; recurrence; depression; personality disorders.

1. INTRODUCTION

Relapse and recurrence are critical aspects of the longitudinal course of depression, posing significant challenges for treatment and recovery. Relapse refers to the return of depressive symptoms after remission but within the same depressive episode, while recurrence denotes the onset of a new depressive episode following a period of recovery (Bockting et al., 2015). These events are common, with studies indicating that approximately half of individuals in remission will relapse, and the majority will experience at least one recurrence in their lifetime (Burcusa & Iacono, 2007). Relapse and recurrence are distinct yet interrelated processes with significant implications for treatment planning and prognosis.

One way to address the ongoing burden of major depression is to identify the risk factors for relapse and recurrence. Most of the available research in this domain has focused on clinical aspects as risk factors of depressive relapse; for example, evidence from a systematic review found an association between depressive relapse and the severity level of symptoms, residual symptoms, and the number of previous episodes (Buckman et al., 2018b). Other studies have addressed this issue by investigating and comparing different types of interventions as preventative for relapse in depression, such as antidepressants, mindfulness, and CBT (Ali et al., 2017; Kuyken et al., 2015).

Several studies in the literature have linked personality with different outcomes of depression. Researchers tend to refer to two international systems (i.e., The DSM system and the ICD) when investigating issues regarding personality and depression. However, the differences in the approach taken to the study, clinical coding, and understanding of how

to investigate personality traits that cause difficulties for people show that there is a far from settled position amongst clinicians and researchers alike.

Evidence in the literature has been seen in terms of the connection between mood disorders, including depression, and personality disorders and that having comorbidity between them can lead to worse long-term outcomes. For example, Tyrer et al. (2021) investigated the long-term outcome in patients with mixed symptoms of depression, anxiety, general neurotic syndrome, and ICD-11 personality disorders. Patients with one or a mix of these disorders (n= 210) were recruited to a randomized controlled trial receiving different treatments for ten weeks (medication, placebo, CBT, and self-help) and then were followed up for 30 years. Findings showed that patients with mood and personality disorders had a worse outcome compared to those with one mood disorder and no personality disorder. Personality traits could also be a potentially important factor in understanding depressive relapse. For instance, neuroticism and negative emotionality are associated with new-onset depression in children and adolescents; the parameters may overlap. Still, a major part of the literature is based on "depressive personality", which raises methodological issues about the definition and cause and effect (Klein et al., 2011).

Although efforts have been made to clarify the relationship between personality traits and the risk of relapse and recurrence in depression, available findings about this connection are inconsistent. Buckman et al. (2018b) highlighted in their systematic review the risk factors for relapse and recurrence of depression. They focused on neuroticism as a personality factor which appeared in their review to be associated with the risk of

recurrence in depression, yet other personality factors did not seem to be presented in that review. Another systematic review reported that evidence on some personality traits and relapse or recurrence of depression lacked replicated results (Wojnarowski et al., 2019). Therefore, highlighting personality traits related to relapse and recurrence of depression could contribute to synthesising the available evidence, enhance understanding of this phenomenon and provide a comprehensive perception of it.

This systematic review aims to investigate what personality traits are associated with the relapse or recurrence of major depression in adults. The key research question of the present study was: Which personality traits increase the risk of relapse or recurrence in adults with major depression?

2 METHODS

2.1 Study protocol

The systematic review protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO) in February 2021 (protocol ID: CRD 42021235919). https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=235919

2.2 Eligibility criteria

The inclusion criteria were: a] population of adult participants aged 18 years and older who had experienced at least one previous episode of Major Depressive disorder (MDD) and were diagnosed according to an internationally recognized diagnostic system (the Diagnostic and Statistical Manual of Mental Disorders DSM or International Statistical Classification of Diseases ICD) using clinical interview and/ or validated depression

measures; b] studies investigated relapse or recurrence defined by a clinical interview; c] studies must also investigate at least one personality trait, where authors use standardized personality instruments; published in the English language. The exclusion criteria were: a] MDD is not the primary diagnosis (e.g., anxiety, psychosis, substance misuse); b] studies are (N=1) design (case reports), cross-sectional studies, or no follow-up period allowing the outcome to occur.

2.3 Search strategy

Five databases were searched: Medline, CINAHL, Embase, Web of Science and Psychinfo. The searches were carried out in January 2023 without date restrictions. In addition, four relevant journals were searched from 2018 to 2022 (i.e., *Clinical Psychology Review*, *Journal of Consulting and Clinical Psychology*, *Depression Research and Treatment*, and *Depression and Anxiety*). The search strategy involved both key terms and subject heading techniques and MeSH headings where appropriate. Search terms included **1#** Personality traits OR Personality Types OR Personality characteristics OR Emotional dysregulation OR Emotional regulation deficits OR affective instability OR impulsivity OR Mood instability AND **2#** Depression OR Major Depressive Disorder OR Major depression OR MDD AND **3#** Risk factors OR Predictors OR association AND **4#** Relapse OR depressive relapse OR worsening OR recurrent OR recurrence. The search strategy for each search engine is available in Appendix A.

2.4 Selection of articles

All citations were downloaded into EndNote, and duplicates were removed. Titles and abstracts of selected studies in the first phase search were screened by two independent

authors (N.A., B.D.) in light of eligibility criteria; then, eligible studies were retrieved in full. Inter-rater reliability was assessed. Any disagreement was discussed and resolved by consensus. Two reviewers extracted data independently. Data extracted from identified papers were study author, date, country, population, participant characteristics, study features, clinical data, and results (personality traits associated with relapse or recurrence in people with MDD), including statistical tests used and measures of effect size where available.

2.5 Quality assessment

Eligible studies were assessed for the risk of bias using the Newcastle-Ottawa Scale (NOS) (Wells et al., 2000) by two independent authors (N.A., B.D.). It is a scale designed to assess the quality of non-randomized studies, such as case-control and cohort studies. Each study is judged using a star system on three broad aspects: selection, comparability of the groups, and the outcome (Wells et al., 2000). For further details, refer to Appendix B.

2.6 Data extraction and synthesis

Two reviewers (N.A., B.D.) extracted data independently, and all included studies were included in a narrative synthesis.

2.7 Outcome

The main outcome was relapse *or* recurrence of MDD among adults, diagnosed through a clinical assessment. This approach was taken as confusion remains with regard to distinguishing between depression relapse and recurrence; therefore, the current review assessed studies that investigated the association between personality traits and relapse or recurrence.

3 RESULTS

3.1 Study selection

The search process retrieved 1182 studies (Web of Science n = 467, PsycINFO n = 375, Embase n = 189, Medline n = 85, CINAHL n = 56, and additional resources n = 10). **Figure 1** shows a PRISMA (2009) flow diagram of the study selection process. De-duplication resulted in 627 remaining studies, which underwent abstract and title screening. A total of 44 studies were retrieved for full-text review. The inter-rater reliability for the full-text screening was generally moderate (kappa = 81.25%), and 22 studies were eligible according to the current review criteria.

3.2 Study characteristics

The current review included 22 prospective studies that were published in the English language. Studies addressed personality traits as risk factors for relapse (n= 9), recurrence (n= 11) or both (n= 2) in MDD. Most studies were conducted in the USA (n= 6) or the Netherlands (n= 6). Two studies were conducted in Finland, and the other individual studies were from the UK, New Zealand, Norway, Canada, Mexico, Spain, Denmark, and Japan. The follow-up period of these studies varied between 6 months and 13 years. Details of the

characteristics of the included studies are shown in **Table 1**. Most studies did not use the personality traits as described in the DSM-5 or the ICD-10/11, instead using well personality schedules such as the big-5 factor model of personality.

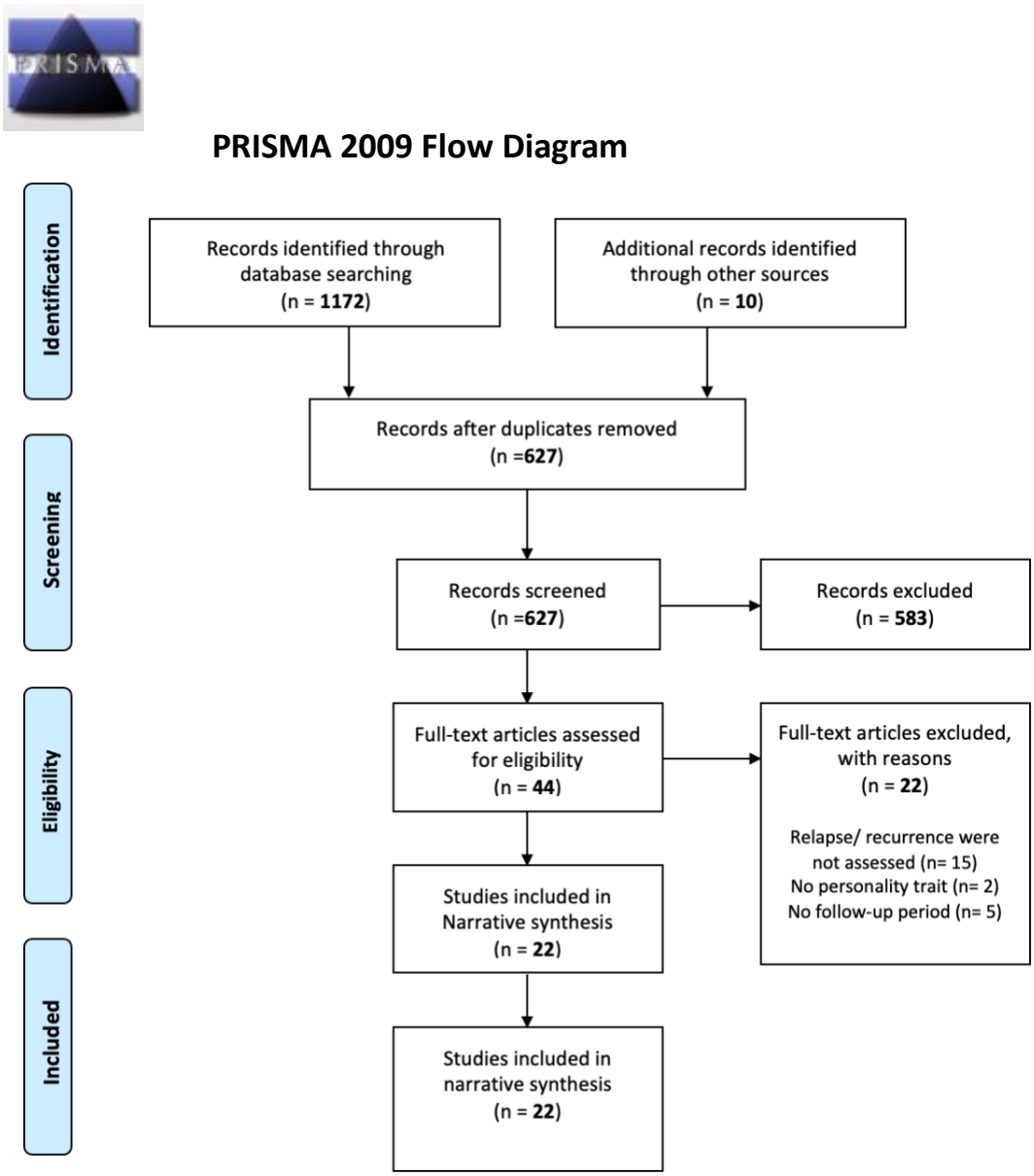

FIGURE 1| Flow- diagram of the study selection process.

3.3 Participants

The eligible studies recruited a total of 12,393 participants, including both cases and healthy controls, with a mean age of approximately 41.5 years, and females represented about 67% of the total participants in these studies; see **Table 1** for details. Participants were assessed for the symptoms of MDD using measures that included the Hamilton rating scale for depression (HAM-D), Beck Depression Inventory, Structured Clinical Interview for DSM-III-R—Patient Version (SCID-P) and The Composite International Diagnostic Interview (CIDI), Lifetime Version 2.1 (WHO Lifetime Version 2.1).

Table 1

Characteristics of the included studies

Study	Country	Study of relapse or recurrence	Personality traits	Instruments	Sample	Mean age	Gender	Follow-up period
Mulder et al., (2006)	New Zealand	Both	Novelty seeking, Harm avoidance, Reward dependence, Self-directedness, Cooperativeness, Self-transcendence, and Axis II personality disorders	(SCID-II), and the Temperament and Character Inventory	*N*=175	31.6 years	57% female	6 months
de Klerk-Ssuis., et al., (2022)	The Netherlands	Relapse	Self- compassion	the Self Compassion Scale (SCS; Neff, 2003)	*N*= 282	50.3	67.7 female	15 months
Melartin, T. K. et al., (2004)	Finland	Recurrence	Neuroticism	The Eysenck Personality Inventory: dimension of neuroticism	*N*= 269	41 years	72% female	18 months
O'Leary, D., & Costello, F., (2001)	UK	Relapse	Axis II personality disorders Extroversion and Neuroticism	Personality assessment was based on the informant rated Standard Assessment of Personality (SAP, Pilgrim et al., 1993) and the self-rated Maudsley Personality Inventory (MPI, Eysenck, 1959)	*N*= 84	39 years	58% female	18 months
Berlanga, C. et al., (1999)	Mexico	Recurrence	Neuroticism Extroversion Psychoticism Desire for social acceptance	Eysenck Personality Questionnaire	*N*=42	36 years	76% female	One year

Table 1

Continued

Study	Country	Study of relapse or recurrence	Personality traits	Instruments	Sample	Mean age	Gender	Follow-up period
Segal, Z. V. et al., (1992)	Canada	Relapse	Dependency Self-Criticism	Dysfunctional Attitude Scale DAS	*N* = 59	38.43 years	40.6% female	One year
Gopinath et al., (2007)	US	Relapse	Neuroticism Self- efficacy	the NEO Personality Inventory Neuroticism Scale and the self-efficacy scale for managing depression	*N*= 386	45.7 years	74.65% female	One year
Gollan, J. et al., (2006)	US	Relapse	Avoidant Dependent Passive Aggressive Self-Defeating	MCMI II = Millon Clinical Multiaxial Inventory, Second Edition	*N*= 93	37.5 years	79.6% female	2 years
Hardeveld, F. et al., (2013)	The Netherlands	Recurrence	Neuroticism	the twelve-item subscale of the NEO Five-Factor Inventory (NEO-FFI) Questionnaire	*N*= 375	40.3 years	66.9% female	2 years
Noteboom, A. et al., (2016)	The Netherlands	Recurrence	Neuroticism, extraversion, openness to experience, agreeableness and conscientiousness	the Dutch 60-item self-report NEO five-factor (inventory (NEO-FFI	*N*= 1085	42.4 years	64.9% female	2 years

Table1

Continued

Study	Country	Study of relapse or recurrence	Personality traits	Instruments	Sample	Mean age	Gender	Follow-up period
teunenberg al., (2009)	The Netherlands	Recurrence	Neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness	the NEO five factor Inventory	*N*= 92	76	66% female	3 years
kodol et al., 011)	US	Recurrence	Axis II personality disorders	SCID-II	*N*= 1996	30 to over 50	67.5% female	3 years
erhoeven, E et al., 018)	The Netherlands	Both	Neuroticism Extraversion Openness to experience Agreeableness Conscientiousness Mastery Loneliness self-esteem	The five-factor inventory (NEO-FFI), the mastery Scale, the Rosenberg self-esteem scale and the Loneliness scale	*N*= 213	43.1 years	64.8% female	3-11 years
sano, T. et ., (2015)	Japan	Recurrence	Harm Avoidance Self-Directedness	the Temperament and Character Inventory (TCI)	*N*= 109	55.3 years	61.46% female	4 years
binhoven et ., (2016)	The Netherlands	Relapse	Neuroticism Experiential avoidance	the Dutch version of the 60-item NEO Five-Factor Inventory, the Dutch version of the 9-item Acceptance and Action Questionnaire-I	*N*= 2513	44.1 years	Mean 553.3 female	4 years

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tudy	Country	Study of relapse or recurrence	Personality traits	Instruments	Sample	Mean age	Gender	Follow-up period
ardi et al., 997)	US	Relapse	Axis II Personality disorders	The Personality Disorder Examination (PDE; Loranger, Susman, Old- ham, & Russakoff, 1987)	*N*= 50	38.3 years	78% female	M = 49.9 months
olma et al., 008)	Finland	Recurrence	Axis II Personality disorders Neuroticism Extroversion	(SCID- II) The Eysenck Personality Inventory	*N*= 163	42.3 years	73% female	5 years
ukh, J. ., et al 016)	Denmark	Recurrence	Axis II Personality disorders Neuroticism Extroversion	(SCID- II) The Eysenck Personality Inventory	*N*= 301	36 years	66.1% female	5 years
rilo et al., 010)	US	Relapse	Schizotypal, borderline, avoidant, and obsessive-compulsive personality disorders	the Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV; 29)	*N*= 303	33.3 years	65% female	6 years

Table1

Continued

Study	Country	Study of relapse or recurrence	Personality traits	Instruments	Sample	Mean age	Gender	Follow-up period
Alnaes, R. & Torgersen, S., (1997)	Norway	Relapse	Axis II Personality disorders, Self-doubt, Insecurity, Sensitivity, Dependency Compliance, Emotional instability, Rigidity, Severe superego, Parsimony, Indecision, Orderliness Exhibitionism, Imagination, Sociability, Aggression, Emotional expressiveness	Structured Interview for DSM-III Personality Disorders (SIDP-I) Millon Clinical Multiaxial Inventory (MCMI-I) Basic Character Inventory (BCI)	*N*= 298	35 years	69% female	6 years
Serrano, D. et al., (2022)	Spain	Recurrence	agreeableness, conscientiousness, extraversion, neuroticism and openness to experience	The Big Five Inventory (BFI-10)	*N*= 3102	61.65 years	53.91% female	6.9 years
Bromberger, J. T., et al., (2015)	US	Recurrence	Trait anxiety Private self- consciousness, Dispositional optimism	The 10-item modified version of the State-Trait Personality Inventory (Spielberger et al. 1970; Spielberger & Reheiser, 2009). The 10-item Self-Consciousness Scale – Revised (Scheier & Carver, 1985). The 6-item Life Orientation Test (Scheier & Carver, 1985).	*N*= 443	45 years	100% female	13 years

Note. DSM axis II personality disorders are avoidant -borderline – impulsive- anankastic -dependent - paranoid -histrionic, and schizoid. SCID is the structured clinical interview for DSM-III-R personality disorders.

3.4 Quality assessment of the included studies

Using the Newcastle-Ottawa scale, the risk of bias scores for identified studies were generally classified as high-quality studies in which four studies scored 7 (n= 4), nine studies scored 8 (n= 9), and nine studies scored 9 out of 9 (n= 9); see **Table 2** for details.

Table 2 *Quality assessments scores of the included studies*

Study	Selection	Comparability	outcome	Total Score
Steunenberg et al., (2009)	***	**	**	**7**
Spinhoven et al., (2016)	****	**	*	**7**
Grilo et al., (2010)	****	*	**	**7**
Serrano, D. et al (2022)	***	**	**	**7**
O'Leary, D., & Costello, F. (2001)	****	*	***	**8**
Alnaes, R. & Torgersen, S. (1997)	****	*	***	**8**
Segal, Z. V. et al (1992)	****	**	**	**8**
Gopinath et al., (2007)	***	**	***	**8**
Gollan, J. et al (2006)	****	**	**	**8**
Hardeveld, F. et al., (2013)	***	**	***	**8**
Verhoeven, F. E et al., (2018)	****	**	**	**8**
de Klerk-Sluis, et al (2022)	***	**	***	**8**
Bromberger, J. T, et al (2015)	***	**	***	**8**
Noteboom, A. et al., (2016)	****	**	***	**9**
Skodol et al., (2011)	****	**	***	**9**
Asano, T. et al (2015)	****	**	***	**9**
Ilardi et al., (1997)	****	**	***	**9**
Holma et al., (2008)	****	**	***	**9**
Mulder et al., (2006)	****	**	***	**9**
Melartin, T. K. et al (2004)	****	**	***	**9**
Berlanga, C. et al (1999)	****	**	***	**9**
Bukh, J. D., et al (2016)	****	**	***	**9**

Newcastle-Ottawa scale for assessment of the quality of included studies – Cohort studies (each asterisk represents if individual criterion within the subsection was fulfilled).

3.5 Personality traits and the risk of relapse/ recurrence in MDD

In summary, existing studies have investigated personality traits in four broad ways. These are personality traits that fall under the Eysenck Personality Inventory, the Big Five Personality Traits Inventory (NEO), the Temperament and Character Inventory (TCI), and other types of personality traits/assessments (see **figure 2**).

3.5.1 Eysenck Personality Inventory

Six studies used the self-rated Maudsley Personality Inventory (MPI, Eysenck, 1959) or the Eysenck Personality Inventory with regard to depression relapse/recurrence. The traits include neuroticism, extroversion, psychoticism, and the desire for social acceptance. Two studies reported a relationship between an elevated score of neuroticism and an increased risk of relapse or recurrence (Berlanga et al., 1999; Melartin et al., 2004). Furthermore, two studies assessed the subscale of both neuroticism and extraversion concerning depression relapse/recurrence. A higher than median score on the neuroticism and extraversion subscales did not predict depression relapse. (O'Leary and Costello, 2001). These findings are consistent with six-year and five-year follow-up studies that found no significant relationship between neuroticism or extraversion and recurrence in depression (Holma et al., 2008; Bukh et al., 2016).

3.5.2 Big Five Personality Traits

Eight studies have investigated the relationship between relapse or recurrence and some personality traits of the NEO Five-Factor Inventory, which comprise neuroticism, extraversion, openness to experience, conscientiousness, and agreeableness. The findings of these studies varied; only two studies reported that neuroticism did not predict

depression relapse (Spinhoven et al., 2016) or recurrence (Hardeveld et al., 2013); however, generalizability issues might arise from these findings, as one study dealt with a sample of patients in specialised mental health care where patients are more likely to have severe, chronic symptoms compared to those in primary health care (Hardeveld et al., 2013). Therefore, the sample is unlikely to be representative of the entire population of depression patients. Additionally, residual depressive symptoms that have been proven to be an important risk factor for depression were not included in the analysis, which may limit the robustness of the findings. The other study reported issues regarding the attrition of the sample during the follow-up period, which may have limited the generalizability of the results in that study also (Spinhoven et al., 2016).

In contrast, six studies revealed a significant association between neuroticism and relapse/recurrence. The first reported that a high score on the neuroticism scale was significantly related to relapse of depressive disorder. Still, this association did not remain after a multi-variate regression (Gopinath et al., 2007). Two other studies found that neuroticism was the only one of the Big Five personality traits that showed a significant association with recurrence in both univariate and multivariate analyses. (Steunenberg et al., 2009; Noteboom et al., 2016).

Furthermore, a study utilised latent class growth analysis, based on symptom severity over 24 weeks following remission from an initial major depressive episode (MDE), to identify different patterns of relapse and recurrence. This analysis indicated that variability in relapse/recurrence post-MDE remission was best represented by four distinct classes. The first class followed a pattern of gradually declining residual symptoms up to week 24

("slow symptom decline"; n = 49, 23.3%). The second class demonstrated consistently low symptom levels throughout the entire 24 weeks ("quick symptom decline"; n = 30, 14.0%). The third class exhibited stable, residual symptoms for the full duration ("steady residual symptoms"; n = 84, 38.7%). The fourth class experienced a gradual increase in symptoms over time ("slow symptom increase"; n = 50, 24.1%). This study found that patients with depression who relapsed with increasing depressive symptoms showed a high score on the neuroticism subscale and a low score on the extraversion subscale compared to other patients who relapsed with different patterns (i.e., slow decline, quick decline, and steady residual depressive symptoms) (Verhoeven et al., 2018).

Additionally, a study of 3102 participants who were followed for around six years by Serrano et al. (2022) investigated gender differences in some depression outcomes, including recurrence, and the association between these outcomes and personality traits of the big five inventory. The study revealed that higher neuroticism was associated with MDD recurrence in women, whereas agreeableness was associated with reduced MDD recurrence only in men. Finally, the study showed that there was a significant association between conscientiousness and the recurrence of depression symptomology only in women, while openness increased the risk of recurrence in men (Serrano et al., 2022).

3.5.3 The Temperament and Character Inventory (TCI)

Two studies have investigated the link between relapse/recurrence in major depression and personality structures assessed using the TCI, including novelty seeking, harm avoidance, reward dependence, self-directedness, cooperativeness, and self-transcendence. The first reported no significant relationship between the personality traits of TCI and depressive relapse (Mulder et al., 2006). In contrast, a four-year prospective

follow-up study found that patients with low scores on self-directedness (SD) showed significantly shorter times to recurrence compared to patients with high SD scores. At the same time, harm avoidance (HA) did not predict recurrent depression (Asano et al., 2015).

3.5.4 Other Groups of Personality Traits/Assessments

Several researchers have assessed several personality traits using other types of personality assessments to determine the role of personality traits in the risk of relapse and recurrence of major depression.

A prospective study assessing the contribution of four personality patterns (i.e., Avoidant, Dependent, Passive Aggressive, and Self-Defeating) to the risk of depressive relapse found that only dependent personality was associated with a high risk of relapse in depression (Gollan et al., 2006). This is consistent with another study that revealed that among 17 different personality traits assessed using the Basic Character Inventory (BCI), dependency and emotional instability were the only significant predictors of relapse in major depression (Alnaes and Torgersen, 1997). Further, a study with a cohort of 386 primary care patients suggested that relapse was significantly associated with lower scores on the self-efficacy scale for managing depression (Gopinath et al., 2007). In addition, lower self-esteem scores also appeared to be associated with the risk of relapse (Verhoeven et al., 2018), while self-critical individuals emerged as more prone to relapse, especially in the case of experiencing adverse life events related to achievement (Segal et al., 1992). Furthermore, de Klerk-Sluis et al. (2022) did not find a significant association between self-compassion and relapse in 282 remitted depression patients. Finally, a 13-year follow-up study used the 10-item self-

consciousness Scale – Revised (Scheier & Carver, 1985) to assess the trait of private self-consciousness and its relation to recurrent MDD. The study revealed that for every 1-point increase in the scale score, a tendency toward self- or internal-focused attention increased the risk of recurrent MDD by 6% (Bromberger et al., 2015).

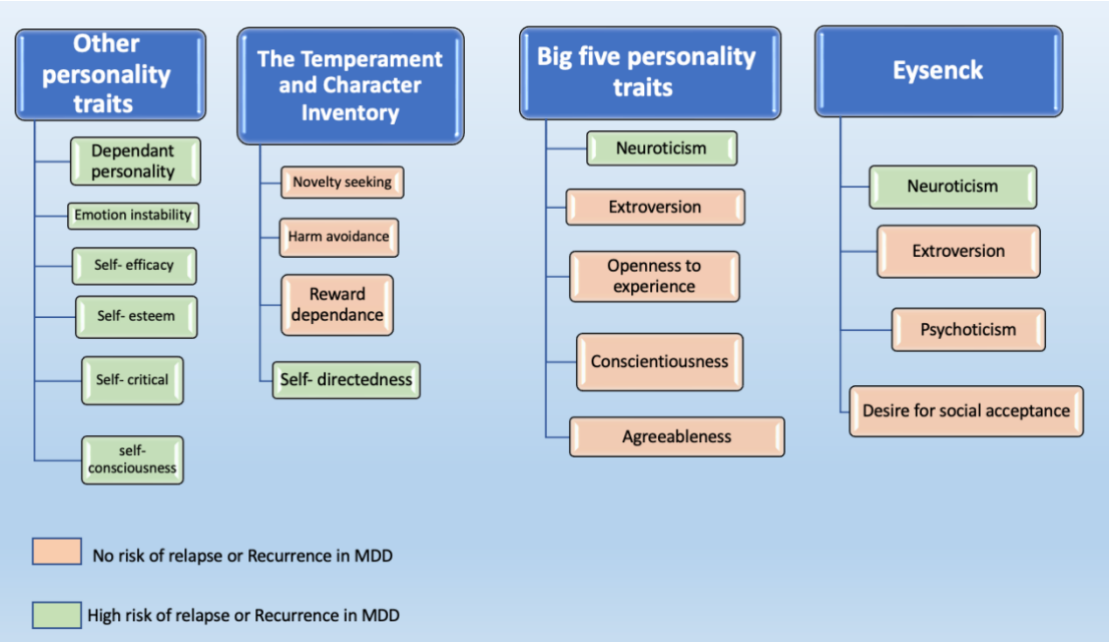

FIGURE 2 | Personality traits that have been reported to be associated with the risk of relapse or recurrence in MDD.

3.6 Personality Disorders and the Risk of Relapse and Recurrence in MDD

Eight of the 22 studies assessed the contribution of personality disorders that fall under the ICD-10 or the DSM IV Axis II personality disorders (avoidant, borderline, impulsive, anankastic, dependent, paranoid, histrionic, and schizoid) to the risk of relapse or recurrence in MDD. There were some conflicting findings of these studies, in which four did not find any significant association between the DSM IV Axis II personality disorders

and relapse (Mulder et al., 2006; O'Leary and Costello, 2001) nor recurrence (Holma et al., 2008; Skodol et al., 2011a). At the same time, in their six-year follow-up with over 300 participants, Grilo et al. (2010) found that MDD patients with personality disorders, particularly borderline personality disorder BPD and obsessive-compulsive personality disorder OCPD, had a significantly shorter time to relapse compared to MDD patients without personality disorders. These findings are consistent with the results of the six-year follow-up study of Alnaes and Torgersen (1997), where they found that BPD predicted relapse. Moreover, DSM Axis II personality disorders have been observed to be a significant risk factor for depression relapse in a study by Ilardi et al. (1997), though they did not identify which personality disorder was related to relapse. Finally, Bukh et al. (2016) reported an increase in recurrence rate by 80% in patients with comorbid cluster C personality disorders (Avoidant, dependent, and obsessive-compulsive personality disorders).

4 DISCUSSION

This systematic review aimed to investigate the contribution of personality traits to the risk of relapse and recurrence in MDD. In summary, the majority of studies investigating **neuroticism** suggest it is associated with an increased risk of relapse or recurrence in major depression. Findings on personality disorders and relapse were conflicted, in which only half of the included studies that addressed personality disorders reported an association between **borderline personality disorder**, **obsessive-compulsive personality disorder**, and **dependent personality style**. At the same time, the other half of these studies did not support this conclusion.

Other factors which could be considered to be personality traits, such as self-criticism, lower self-esteem, lower self-efficacy, lower self-directedness, and self-consciousness, were reported to be linked with depressive relapse in only one study for each trait, which raises the need for further investigation. Emotional instability was associated with relapse in depression in one study, though it is also a feature of borderline personality disorder.

Borderline, dependent, and obsessive-compulsive personality constructs were presented in the included studies primarily as categorical personality disorders, defined by either ICD-10 or DSM axis II criteria. The studies analysed these as distinct diagnostic categories. However, in two studies, dependent personality was also presented as a 'personality feature or pattern' rather than a formal disorder. Dependency was defined as 'the need for positive interchange with others, including the assurance of approval and value by others' (Segal et al., 1992) and was measured by tools like the Basic Character Inventory (BCI) and Millon Clinical Multiaxial Inventory (MCMI II), which align with DSM axis II criteria .

In contrast, self-concept traits, such as self-criticism, self-esteem, and self-efficacy, were presented as dimensional traits and assessed through specific self-report measures. These traits were examined in relation to their potential role in depressive relapse and recurrence.

Several interpretations of the connection between personality traits and depression have been provided in the literature. With regard to neuroticism, a potential explanation indicated by some researchers is that there are factors that mediate the association between neuroticism and depression. For example, studies have suggested that rumination on sadness is a possible mediator between depressive symptoms and neuroticism (Roelofs et

al., 2008; Muris et al., 2005). Furthermore, another study revealed that cognitive reactivity, particularly suicidal thinking and hopelessness, have been found to mediate the association between neuroticism and depression, where depression patients with such thinking patterns are prone to the recurrence of depression (Barnhofer and Chittka, 2010). Finally, previous evidence indicates that personality features such as neuroticism and conscientiousness have a genetic association with major depression, and this may also partly explain our findings (Kendler and Myers, 2010).

Dependent personality is also important in explaining relapse and recurrence in MDD. There is a considerable amount of evidence linking dependency with the development of mood disorders, specifically depression (Widiger and Anderson, 2003). According to the DSM-5, the core feature of dependent personality disorder 'is the extreme need to be taken care of which leads to submissive behaviour and fears of separation' (American Psychiatric Association, 2013). The interpretation presented in the psychological literature for this link is that dependent persons tend to respond to situations such as rejection, separation, or personal loss with feelings of hopelessness and helplessness, which are also features of MDD. In other words, the interaction between stressful events and the characteristics of dependent individuals makes them vulnerable to depression (Widiger and Anderson, 2003).

Personality disorders, particularly BPD and OCPD, appeared to be associated with depressive relapse/recurrence in the current review. On a cognitive level, one study found that 'functional impairment and erroneous interpretations of intrusive thoughts' in OCPD patients predicted depressive symptoms (Abramowitz et al., 2007). This functional impairment could mediate the relationship between OCPD and MDD. Likewise, the co-

morbidity between BPD and MDD has been widely recognised in the literature (Luca et al., 2012a; Winsper et al., 2016; Marwaha et al., 2013), which may explain the relapse phenomenon among depressed patients with BPD. To illustrate, common characteristics have been found between BPD and MDD; for example, one study revealed that participants with high BPD/MDD showed greater emotional dysregulation and difficulties in controlling impulsive behaviour compared to other participants with low BPD/MDD symptoms (Dixon-Gordon et al., 2015).

Our findings are in keeping with previous literature, in smaller, less representative samples, that has demonstrated the potential for comorbid personality disorders and poor treatment response in depression. A meta-analysis by Newton-Howes et al. (2006) found that depressed patients with comorbid personality disorders are twice likely to have a poorer outcome than patients with only depression. Neglecting personality disorders' role in worsening treatment outcomes in depression can lead to several issues, such as overprescription of medication (Farmer and Nelson-Gray, 1990) and the planning of ineffective interventions (Sadeq and Molinari, 2018). Therefore, it is important to emphasize examining factors like personality in customising interventions for depression (Marquett et al., 2013).

The present review showed that several personality traits had not received sufficient research attention, although signals exist on a possible relationship between these traits and depressive relapse. For instance, emotional regulation is a factor that might be associated with relapse and recurrence in MDD. In a review by Compare et al. (2014), clinical studies demonstrated that emotional regulation is a significant element in developing MDD.

Furthermore, emotional dysregulation is prospectively associated with incident depression over 18 months (Marwaha et al., 2015). Similarly, there appeared to be no relevant studies investigating the impact of irritability on depressive relapse.

One interpretation of these findings related to emotional dysregulation is that depression is associated with an impairment in cognitive control, such as processing unpleasant components. This is linked with higher rumination, expressive suppression and impaired cognitive reappraisal, which are significant aspects of emotional dysregulation (Compare et al., 2014). Another systematic review found that individuals who recovered from depression reported higher maladaptive emotional regulation strategies than healthy participants who had never experienced depression. These studies, whilst limited in range and number, suggest emotional dysregulation deficits may be important in the genesis, manifestation (Dubad et al., 2021) and outcomes of depression, such as relapse (Visted et al., 2018).

Impulsivity is another trait that could be linked to depressive relapse, yet it has received little clinical attention. A meta-analytical review stated that a strong relationship has been found between impulsivity and remitted depression, which continues even in remission (Saddichha and Schuetz, 2014); all included studies in that review reported high impulsivity scores among participants with MDD. However, it has been observed that many studies that addressed the association between impulsivity and depression have done so in light of suicidal behaviour, so it remains unclear how far impulsivity may impact depression when suicidality is not a feature. In addition, although existing attempts to investigate the association between impulsivity and relapse depression, there is no

sufficient explanation as to the critical aspects of impulsivity. Therefore, it may be essential to explore specific aspects of impulsivity (e.g., non-planning, cognitive impulsivity and impulsive decision-making) and their influence on relapse or recurrence in depression.

4.1 Limitations of the literature

The available studies that addressed personality disorders in terms of their relationship with relapse and recurrence in MDD were not recent, the last one being published in 2016. This resulted in relying on standard classification systems such as the DSM and the ICD-10, which have since been further developed. For example, the classification of personality disorders in the ICD-11 has changed significantly from the ICD-10. The ICD-11 takes a dimensional approach and emphasises severity and functional impact (Tyrer et al., 2019; Mulder, 2021). Likewise, the DSM-5 has adopted the maladaptive personality traits and the level of personality functioning as key features of personality pathology (Barkauskienė et al., 2022; Sharp and Wall, 2021), but it remains a categorical diagnosis in that system.

Similarly, most available studies did not use the personality frameworks used in DSM or ICD and assessed personality using a number of other frameworks and with differing instruments. The differences in classification systems, their development, as well as the lack of uniformity in how personality is conceptualised across scientific studies in the field mean that results are difficult to compare. Newton-Howes et al. (2018) examined the difference between three approaches to personality disorders taxonomy (dichotomous, dimensional, and severity) in depressed patients (n= 578); to assess which of these approaches has the most significant clinical utility in terms of predicting symptoms reduction. The outcomes of interest were psychopathology and social

functioning. To achieve this, the study analyzed data from four clinical trials at six weeks to six-month outcomes; that used different interventions for depression. The results revealed that all three approaches had contributed significantly to assessing personality disorders at the six-month outcome, and no specific taxonomy exceeded the other two.

Whilst studies investigated the association between personality and relapse or recurrence, we cannot, of course, infer causation from them. In addition, it can be said that research findings on the area of relapse and personality traits are generally inconsistent. This might be due to the relatively limited number of studies or how personality factors are conceived and measured (Klein et al., 2011). For instance, personality trait/disorder measures were administered at different time points in these studies, which could have affected the results. Previous research demonstrated that the number of personality disorders decreased in the case of assessment during recovery compared to the evaluation during the course of illness with both self-report measures and structured interviews (Sanderson et al., 1992). Additionally, the variation could be due to the lack of control of some critical clinical variables reported in the literature to be strongly associated with depressive relapse, such as the number of previous episodes and their severity (Buckman et al., 2018).

4.2 Limitations of this review

A small number of studies were included in this review, which was a significant limitation. The small number, in addition to the heterogeneity in the methods of these studies, precluded further analysis, such as meta-analysis. The hand-searching process resulted in additional potential eligible articles that were not found through searching the databases,

which is a limitation concerning the search strategy. However, this could be due to the inaccurate indexing of some articles in databases or the applied search limits, such as restricting the search to English. Finally, the narrative synthesis of the present review was conducted without established guidance or a framework, like that proposed by (Popay, 2006), which can introduce several challenges and limitations. For instance, it may lead to inconsistency and subjectivity in the synthesis process, as it may rely on individual interpretations rather than a structured approach. This could result in selective reporting, where some aspects of the data are emphasised or omitted based on implicit biases rather than systematic criteria. Without a standardised framework, synthesising findings across studies becomes more complex, especially when studies are heterogeneous in methods, settings, or outcomes. This can affect the conclusions' reliability and reproducibility, limiting other researchers' ability to validate or build upon the review.

On the other hand, several strengths can be considered, such as the pre-registration of the study protocol, searches using multiple electronic databases alongside hand-searching, and the use of a quality assessment tool that indicated the high quality of all included studies. Furthermore, the consistency of our findings with previous studies validates our conclusions. Finally, the present review contributes to the area of personality and relapse in depression, which, to our knowledge, is the largest study of its kind.

4.3 Future directions

A limited number of studies have explored the long-term outcome of depression in relation to personality dysfunction, though it is widely clinically assumed that they are strongly related. Future studies need to examine personality factors which may be transdiagnostic

(e.g emotional dysregulation) (Broome et al., 2015) and that are already linked to aspects of depression (Peters et al., 2016; Balbuena et al., 2016) but which are under-investigated in terms of the links with relapse and recurrence. Ideally, cohort studies should examine the impacts of personality traits on incidence, recovery, persistence and relapse to provide a deep level understanding of this area.

In addition, an interpretation of the mechanisms in which personality traits interact or lead to recurrent depression is needed, as this area remains ambiguous, as well as other factors that may overlap personality aspects (i.e., stressful events). Finally, how far the influence of personality factors changes with age is also unknown, though it could aid in investigating the clinical staging of mood disorders.

5 Conclusions

Given the morbidity and mortality associated with relapse in MDD, the literature regarding personality factors and relapse and recurrence is relatively scant. However, there does appear to be a signal for neuroticism, dependent, obsessional and borderline personality features being important. In addition, researchers should attempt to address some personality traits common in a range of mood disorders, such as emotional dysregulation and impulsivity, which have, in fact, rarely been the subject of investigations concerning their effect on recurrence or relapse. Understanding the risks for relapse or recurrence of depression is essential, as it could significantly improve therapeutic and prevention plans; this, in turn, would reflect a significant development in the mental health field.

Conflict of Interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

N.A., S.M., R.U., and AS conceived the presented idea. N.A. and B.D. carried out the systematic literature search, extracted the data, and assessed the quality of the included studies. All authors discussed the results and provided critical feedback. N.A. wrote the manuscript with input from all authors.

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CHAPTER THREE

Personality Factors and Change in Depression Status at 18 Months: Findings from a British Psychiatric Morbidity Survey

Published Paper

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N.A., S.M. and R.U conceived the presented idea. N.A. performed the statistical analysis plan. All authors discussed the results and provided critical feedback. N.A. wrote the manuscript with input from all authors.

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Abstract

Background: MDD is a common mental disorder, yet it shows low remission rates. The available evidence on personality traits as factors associated with the course of MDD has common methodological limitations. Identifying personality traits linked with MDD can improve understanding of the course of illness. Therefore, we aimed to investigate personality traits that are associated with the course of depression over 18 months. ***Methods:*** longitudinal data of 2366 Adult Psychiatric Morbidity Survey respondents were analysed. Assessments were applied at two-time points (baseline) and follow-up (about 18 months later). We assessed the total score on the screening questionnaire from the Structured Clinical Interview (SCID-II) for the dependent, obsessive-compulsive, and borderline personalities. MDD was measured using the revised Clinical Interview Schedule (CIS-R) version. ***Results:*** An increase of one score on the borderline personality scale at baseline increased the odds of experiencing persistent depression by 1.50 times (OR=1.50, 95% CI [1.22- 1.86]), depression onset by 1.30 times (OR=1.30, 95% CI [1.14- 1.50]), and recovery by 1.52 times (OR=1.52, 95% CI [1.35- 1.70]), comparing to no depression group. Elevated scores of dependent personality traits significantly predicted depression persistence (OR=1.95, 95% CI [1.52- 2.49]). An increase of one score on the obsessive-compulsive personality scale increases the odds of depression onset by 1.21 times (OR=1.21, 95% CI [1.04- 1.39]). ***Limitations:*** The APMS survey defined MDD statuses in a limited sense, which may affect the generalisability of these results. ***Conclusion:*** The present study confirms previous findings and contributes evidence suggesting that personality dysfunctions worsen depression outcomes.

Keywords: Personality traits; depression; recovery; onset; persistence.

1. Introduction

The outcomes of depression are highly variable, encompassing trajectories of onset, persistence, and recovery that differ widely between individuals. While some individuals experience a single depressive episode followed by sustained recovery, others endure recurrent or chronic courses marked by episodes that persist or relapse over time. Persistence of depression, characterised by enduring symptoms beyond the typical duration of an episode, is associated with more significant functional impairment and a reduced likelihood of spontaneous remission (Eaton et al., 2008). Conversely, recovery represents the resolution of depressive symptoms and a return to baseline functioning, yet it does not guarantee immunity from future episodes (Frank et al., 1991). Despite effective treatments, a large proportion of patients do not achieve remission. A meta-analysis with 3,202 depressed primary care patients revealed that irrespective of the type of intervention, the remission rate ranged between 50% and 67% (Dawson et al., 2004).

Common outcomes of depression, including onset, persistence, and recovery, are influenced by a complex interplay of biological, psychological, and social factors. Among these, personality traits have emerged as significant risk factors that shape the trajectory of depressive disorders. For instance, traits associated with borderline personality, such as emotional instability and difficulty regulating affect, have been robustly linked to shifts in depression status, often exacerbating symptoms or delaying recovery (e.g., Newton-Howes et al., 2020). Similarly, dependent personality traits, characterised by excessive reliance on others and fear of abandonment, are associated with a heightened risk of persistent depression, possibly due to maladaptive coping mechanisms and limited self-efficacy

(Miller et al., 2021). Conversely, obsessive-compulsive personality traits, which include perfectionism and rigid thinking, have been implicated in the onset of depressive episodes, potentially through their contribution to chronic stress and unmet high self-standards (Shahar et al., 2015).

We have recently systematically reviewed the existing literature and reported that there is an association between dependent personality style and obsessive-compulsive personality disorder and depressive relapse (Altaweel et al., 2023), though the extent of the evidence is limited and of variable methodological quality.

Researchers have identified some factors that appear to mediate the relationship between personality and depression, such as rumination (Roelofs et al., 2008; Muris et al., 2005) and cognitive reactivity (Barnhofer and Chittka, 2010). Additionally, previous evidence indicates that personality traits such as neuroticism and conscientiousness are genetically associated with major depression (Kendler and Myers, 2010).

Although extensive research has been carried out on personality pathology and depression, these studies have varied significantly in the methods used, which might raise issues with generalisability (Altaweel et al., 2023; Mulder, 2002). One critical source of heterogeneity is the population targeted in these studies. For instance, it is challenging to generalise the findings of studies that used samples of patients with depression in specialised mental health care, where individuals are more likely to have chronic, severe symptoms (Hardeveld et al., 2013). In addition, a common limitation in the available evidence on the relationship between personality and the course of depression is the reliance on cross-

sectional designs. A more robust approach is to analyse longitudinal data with an adequate follow-up period to allow outcomes to occur (Klein et al., 2011).

Given the increasing rates of depression worldwide, its chronicity, and the increased morbidity and mortality (Liu et al., 2020), reaching effective prevention and treatment plans is crucial. One way to achieve this goal is to identify factors associated with the course of illness. Evidence on the potential critical implications of personality on diagnosing and depression treatment needs to be supported with further validation. The low remission rates reported among depressed patients, besides the methodological limitations in the available literature in this area, accentuate the need to investigate this issue using prospective information from a representative sample.

Our recent systematic review (Altaweel et al., 2023) revealed signs of association between depression, particularly depressive relapse, and personality features of borderline, obsessive-compulsive and dependent personality. Therefore, using the Adult Psychiatric Morbidity Survey (APMS) (2000), we aimed in the present study to further investigate the relationship between personality traits of dependent, obsessive-compulsive, and borderline personality and the change in depression status over 18 months (onset, persistence, and recovery) in a large representative cohort in England. We hypothesised that there would be a significant relationship between personality traits of dependent, obsessive-compulsive, and borderline and the change in depression status over 18 months.

2. Methods

The APMS is a series of surveys that provide data on the prevalence of psychiatric disorders in the adult English population aged 16 and over. These surveys were conducted in 1993, 2000, 2007 and 2014. The current study used data from the 2000 version of the survey, as it provides longitudinal data, which enables investigation of the change in depression status over 18 months. The main aspects of the survey methods will be described below; further methodological details can be found in (Singleton et al., 2003).

2.1 Sample

The 2000 survey involved participants aged from 16 to 74 years who were living in private households in England, Wales, and Scotland (n = 8,580, response rate = 70%). Respondents were recruited from the small user Postal Address File. First, 438 sectors were selected with a probability proportional to size. Then, within each selected sector, 36 addresses were randomly selected to be included in the survey. Interviews in the first phase included screening measures to assess mental disorders alongside other topics, such as risk factors and service use. The sample at the 18-month follow-up included three groups of participants who were selected based on their mental health status at baseline. From those who were interviewed at baseline, respondents for the 18-month follow-up were those with a mental disorder (n = 1,685) who scored 12 or higher on the Clinical Interview Schedule–Revised (CIS-R) (Lewis et al., 1992). The second group were respondents with sub-threshold symptoms of mental disorder (n = 1,032) who scored between 6 and 11 on the CIS-R, and finally, one in five respondents with no mental disorder (n = 819) with CIS-R scores between 0 and 5 (Singleton and Lewis, 2003). Therefore, the participants eligible to

be included in the follow-up survey were more likely to have a mental disorder or likely to develop a disorder. Of these respondents, 2,406 completed the interviews (Singleton and Lewis, 2003). A few significant differences between responders and non-responders regarding their mental health were observed. The non-responders were more likely to be younger, single, with lower socioeconomic levels, and slightly more likely to be smokers and to have used drugs in the past years (Singleton and Lewis, 2003).

2.2 Study Measures

The original fieldwork took place in 2000, and the follow-up assessments were conducted 18 months later. Therefore, assessments were applied at two-time points, T1 (baseline) and T2 (about 18 months later), except for personality traits, which were assessed only once at baseline.

2.2.1 Major depressive disorder: Common mental disorders, including MDD, were assessed in the survey using the revised version of the CIS-R (Lewis et al., 1992). Particular common mental disorders were diagnosed by examining responses to different CIS-R sections using algorithms based on the ICD-10 diagnostic criteria for research (Organization, 1992). A score of 12 or above on the CIS-R indicated a disorder.

2.2.2 Personality traits: the APMS assessed features of ten personality disorders, including dependent, obsessive-compulsive, and borderline personality, using the screening version of the Structured Clinical Interview (SCID-II) for DSM-IV (American Psychiatric Association, 1994). Respondents were asked to indicate whether they had a

specific personality characteristic by selecting one of three answers: Yes, No, Don't know/Does not apply; for example, **"Are you the kind of person who …?"**. The term "borderline personality traits" was defined based on the assessment criteria used in the APMS 2000. The present study assessed the total score for each personality trait, representing the number of traits each respondent had.

2.2.3 Sociodemographic data: these included variables that might work as co-factors according to the APMS report, namely age, gender, marital status, and employment status (Singleton and Lewis, 2003).

2.3 Study Outcome

The primary outcome was depression status at the follow-up point of 18 months. The APMS 2000 survey assigned four statuses of common mental disorders, including MDD, at 18 months. These were: no disorder at baseline, new onset of a depressive episode, persistence of a depressive episode, and recovery from the depressive episode. The survey used the following definitions for the status of common mental disorders at 18 months: respondents with *no MDD* were not diagnosed with MDD at baseline or follow-up. Respondents were in the *Onset* group if they only had an MDD diagnosis at the follow-up point. *Persistent* respondents were individuals with an MDD diagnosis at baseline and follow-up. Finally, *Recovery* was defined as respondents who had an MDD diagnosis at baseline but did not have one at follow-up. See Figure 1.

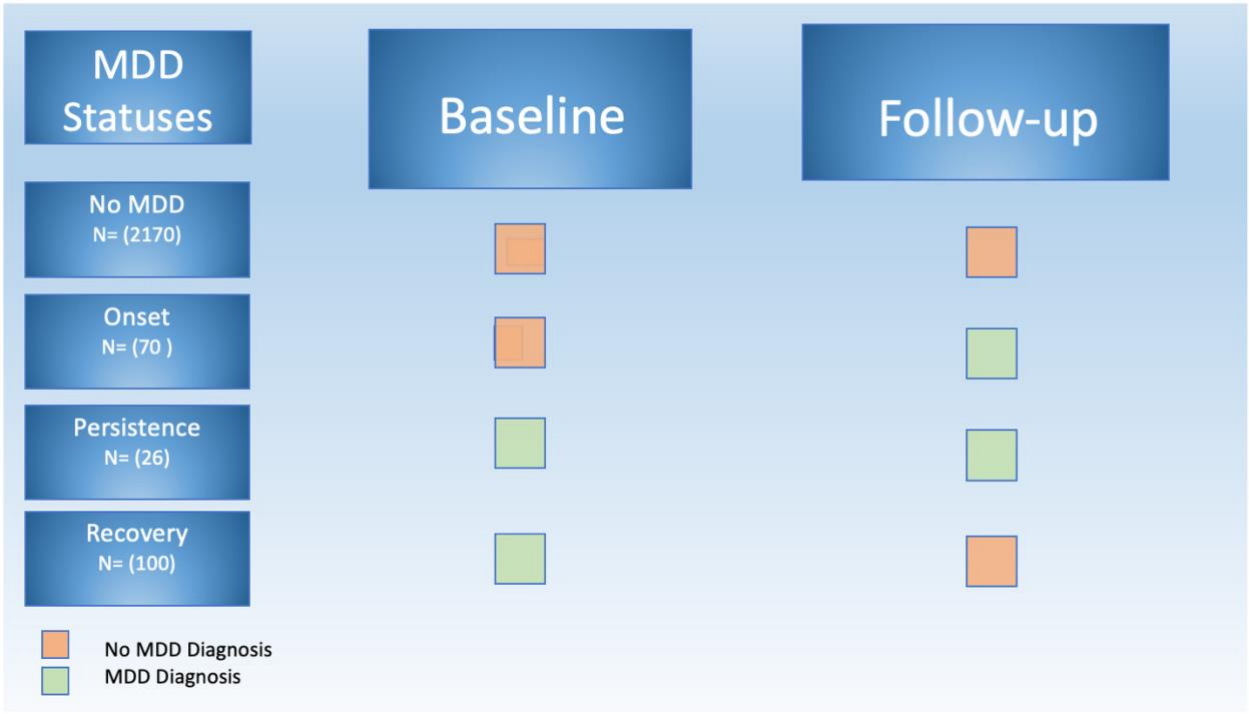

FIGURE 1| MDD statuses over 18 months.

2.4 Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) version 29.0 was used to conduct the statistical analysis for this study. Data were weighted to ensure that results were representative of the English household population. The APMS 2000 applied data weighting to consider the different probability of selection of participants in different sample groups, in addition to weighting for non-response, and finally, weighting applied in the baseline survey. In the present study, a multi-stage analysis plan was followed. First, descriptive statistics were used to understand participants' sociodemographic and personality characteristics. Next, the Kruskal-Wallis test was performed to assess the association between the continuous variables (i.e., personality traits and age) and the

change in MDD status at 18 months. Categorical variables (i.e., gender, marital status, and employment status) were tested using the chi-square test. The next step was performing a multinomial logistic regression to assess the association between all study variables and MDD status. Multinomial logistic regression, an extension of binary logistic regression, enables testing associations with an outcome with more than two categories (Kwak and Clayton-Matthews, 2002). We were also interested in understanding whether personality traits are associated with the change in MDD status at 18 months: therefore, personality factors were entered simultaneously as independent variables. Finally, personality factors were entered in the last model with the control of sociodemographic factors that were significant in the first analysis. Results were considered significant when p-values were < .05.

3. Results

Of the 3536 respondents at baseline, 1130 were not traced due to several reasons (i.e., moved no trace n=470, died n=21, proxy interview n=7, refusals/ incapable n=503, non-contacts n= 129). Overall, 2,406 respondents from the original study were followed up 18 months later and completed the CIS-R at both baseline (T1) and follow-up (T2). Of the 2,406 people, 40 respondents were excluded from the current analysis due to missing data on all personality measures, leaving 2,366 respondents representing the present study sample. Of the 2,366 respondents, 2170 had no MDD diagnosis at T1 and T2, 70 were in the onset group, 26 were in the persistence group, and 100 were in the recovery group according to the APMS definitions of MDD statuses at the follow-up point of 18 months. Details on sociodemographic characteristics and personality for all groups are shown in Table 1.

The Kruskal-Wallis H test showed that there was a statistically significant difference in the scores of dependent, obsessive-compulsive, and borderline personalities between the different MDD groups: H (3) = 62.84, p = < .001; H (3) = 23.43, p = < .001; H (3) = 117.65, p = < .001, respectively. This test also revealed significant differences in the age of respondents between the four MDD groups: H (3) = 13.79, p = .003. In addition, a chi-square test of independence showed that the relationship between gender and MDD status was not significant: X^2 (3, n = 2,366) = 2.83, p = .429 (Table 1). On the other hand, the test showed a significant relationship between marital status (X^2 (3, n = 2,366) = 38.99, p < .001) and employment status (X^2 (3, n = 2,366) = 42.62, p < .001) and the four statuses of MDD: see Table 1.

Table 1 *General Characteristics of Study (n=2366)*

Characteristics	No depression n= 2170 (91.71%)	Onset n= 70 (2.96%)	Persistence n= 26 (1.1%)	Recovery n= 100 (4.23%)	P- Value
Sex, n (%)					
• Male	930 (42.85%)	25 (35.71%)	13 (50%)	43 (43%)	.429
• Female	1240 (57.14%)	45 (64.28%)	13 (50%)	57 (57%)	
Age, mean (SD)	44.57 (15.11)	41.48 (13)	44.92 (11.80)	47.23 (13.14)	.003**
Marital status, n (%)					
• Married	1139 (52.49%)	18 (25.71%)	8 (30.77%)	35 (35%)	<.001***
• Unmarried	1031 (47.51%)	52 (74.28%)	18 (69.23%)	65 (65%)	
Employment, n (%)					
• Employed	1380 (63.59%)	32 (45.71%)	6 (23.07%)	42 (42%)	<.001***
• Unemployed	790 (36.40)	38 (54.28%)	20 (76.92%)	58 (58%)	
Dependent personality scores, mean (SD)	1.41 (1.33)	2.21 (1.64)	3.27 (2.14)	2.37 (1.87)	<.001***
Obsessive-compulsive personality scores, mean (SD)	3.42 (1.77)	4.14 (1.57)	4.11 (1.77)	3.98 (1.67)	<.001***
Borderline personality scores, mean (SD)	1.65 (1.67)	2.98 (2.17)	4.65 (2.36)	3.37 (2.19)	<.001***

Note. SD, standard deviation. *p<0.05, **p<0.01, ***p<0.001.

Table 2 shows that all personality traits, in addition to marital status and employment status, were significantly associated with depression status (onset, persistence, and recovery) at a univariate level. According to this model, age showed a significant association only with the onset group.

Table 2 *Multinomial Logistic Regression Analysis of Association of Personality Traits and Sociodemographic Factors and Depression Outcomes at 18 Months (n= 2366)* ***(Univariate analysis)***

	Persistence n= 26		**Onset n= 70**		**Recovery n = 100**	
Personality traits	OR (95%CI)	P-value	OR (95%CI)	P-value	OR (95%CI)	P-value
Dependent personality scores	2.38 (1.95- 2.91)	<.001***	1.37 (1.18- 1.58)	<.001***	1.45 (1.28- 1.63)	<.001***
Obsessive- compulsive personality scores	1.40 (1.13- 1.73)	.002**	1.32 (1.15- 1.51)	<.001***	1.16 (1.03- 1.30)	.012*
Borderline personality scores	1.97 (1.67- 2.33)	<.001***	1.42 (1.27- 1.58)	<.001***	1.53 (1.39- 1.67)	<.001***
Age	.98 (.95- 1)	.132	.97 (.96 - .99)	.004**	1.01 (.99 – 1.03)	.103
Marital status						
• Married	Ref	.003**	Ref	<.001***	Ref	<.001***
• Unmarried	3.64 (1.53- 8.66)		3.72 (2.12- 6.53)		2.05 (1.35- 3.12)	
Employment						
• Employed	Ref	<.001***	Ref	.059	Ref	.016*
• Unemployed	6.55 (2.64- 16.25)		1.59 (.98- 2.59)		1.68 (1.10- 2.56)	

Note. The reference group is no depression. *p<0.05, **p<0.01, ***p<0.001.

Third, a multiple multinomial logistic regression involving only personality traits was utilised to evaluate the association of these traits with the change in MDD status. Results are displayed in Table 3. Borderline personality was a strongly significant predictor of the change in MDD status at 18 months. An increase of one score in the borderline personality scale increased the odds of being in the persistence group by 1.61 times (OR = 1.61, 95% CI 1.33–1.95), in the onset group by 1.41 times (OR = 1.41, 95% CI 1.24–1.60), and in the recovery group by 1.47 times (OR = .47, 95% CI 1.32–1.64), comparing to being in the no-MDD group. Dependent personality was also significantly associated with MDD status of persistence and recovery. Obsessive-compulsive personality was found in this model to be associated with the onset of MDD only (see Table 3).

We were also interested in investigating whether personality traits can predict the course of MDD; therefore, we performed a multiple binary logistic regression to examine the association between personality traits and MDD status at 18 months (in the persistence versus recovery groups). Borderline personality was the only trait in this model that showed a significant association with the outcome. An increase of one score on the borderline personality scale increased the odds of being in the persistence group by 1.25 times (OR = 1.25, 95% CI 1.01–1.55). Details can be found in Appendix C.

Table 3 *Multiple Multinomial Logistic Regression Analysis of Association of Personality Traits and Depression Outcomes at 18 months (n= 2366)*

	Persistence n= 26		**Onset n= 70**		**Recovery n = 100**	
Personality traits	OR (95%CI)	P-value	OR (95%CI)	P-value	OR (95%CI)	P-value
Dependent personality scores	1.92 (1.53-2.41)	<.001***	1.09 (.92- 1.29)	.335	1.17 (1.02- 1.35)	.027*
Obsessive- compulsive personality scores	1 (.81- 1.23)	.977	1.17 (1.01- 1.35)	.031*	1.00 (.89- 1.13)	.970
Borderline personality scores	1.61 (1.33- 1.95)	<.001***	1.41 (1.24- 1.60)	<.001***	1.47 (1.32- 1.64)	<.001***

Note. The reference group is no depression. *p<0.05, **p<0.01, ***p<0.001.

In the last model, a multiple multinomial logistic regression was performed to investigate whether personality traits can predict the change in MDD status with the control for co-variables (i.e., age, marital status, and employment status): see Table 4. Again, borderline personality was the strongest predictor of the change in MDD status at 18 months. According to this model, an increase of one score in the borderline personality scale increased the odds of being in the persistence group by 1.50 times (OR = 1.50, 95% CI 1.22–1.86), in the onset group by 1.30 times (OR = 1.30, 95% CI 1.14–1.50), and in the

recovery group by 1.52 times (OR = 1.52, 95% CI 1.35–1.70), compared to being in the no-MDD group. In addition, an elevated score for dependent personality was found to be significantly associated with MDD persistence (OR = 1.95, 95% CI 1.52–2.49). An increase of one score in the obsessive-compulsive personality scale increased the odds of MDD onset by 1.21 times (OR = 1.21, 95% CI 1.04–1.39) compared to being in the no-MDD group.

Table 4
Multiple Multinomial Logistic Regression Analysis of Association of Personality traits and Sociodemographic Factors and Depression Outcomes at 18 months (n= 2366)

	Persistence n= 26		**Onset n= 70**		**Recovery n = 100**	
Factors	OR (95%CI)	P-value	OR (95%CI)	P-value	OR (95%CI)	P-value
Dependent personality scores	1.95 (1.52- 2.49)	<.001***	1.09 (.91- 1.30)	.335	1.18 (1.03- 1.35)	.072
Obsessive- compulsive personality scores	.98 (.97- 1.21)	.835	1.21 (1.04- 1.39)	.011*	1 (.88- 1.14)	.976
Borderline personality scores	1.50 (1.22- 1.86)	<.001***	1.30 (1.14- 1.50)	<.001***	1.52 (1.35- 1.70)	<.001***
Age	1 (.97 – 1.03)	.925	1 (.97 – 1)	.329	1.02 (1 – 1.04)	.005**
Marital status						
• Married	Ref	.034*	Ref	<.001***	Ref	.176
• Unmarried	2.84 (1.08- 7.43)		2.73 (1.50- 4.95)		1.37 (.87- 2.15)	
Employment						
• Employed	Ref	.012*	Ref		Ref	
• Unemployed	3.61 (1.33- 9.82)		1.43 (.84 - 2.43)	.190	1.60 (1 - 2.60)	.055

Note. The reference group is no depression. *p<0.05, **p<0.01, ***p<0.001.

4. Discussion

This study aimed to investigate the association between personality traits of dependent, obsessive-compulsive, and borderline personality and MDD status at 18 months in a representative epidemiological cohort. The main findings are that a higher number of borderline personality traits was the strongest factor that was significantly associated with

MDD status at follow-up, as it showed a significant association at both univariate and multivariate levels. In addition, persistent MDD was significantly associated with a higher number of borderline and dependent personality traits. Furthermore, the onset of MDD was associated with experiencing a higher number of borderline and obsessive-compulsive personality traits. Finally, an increased number of borderline personality traits was found to be associated with recovery from MDD.

4.1 Personality Traits and the Onset of MDD

In the current study, the onset of a depressive episode was significantly associated with the personality traits of obsessive-compulsive and borderline personality in the adjusted analysis. The comorbidity between depression onset and personality disorders has been widely recognised in the literature, with a rate between 30% to 70% indicated in a review by (Farmer and Nelson-Gray, 1990). The same review revealed that the onset of a new depressive episode was significantly associated with comorbid personality disorders, particularly dramatic personality cluster, which includes borderline personality. There was early agreement across cross-sectional studies on the association between personality disorders and the early onset of a depressive episode. The most frequent personalities in these studies were borderline and dependent personalities (Abrams et al., 1994; Fava et al., 1996), though the latter did not remain a significant predictor of MDD onset in the current adjusted analysis. On the other hand, prospective research has addressed this relationship from various perspectives. Some studies have investigated personality disorders as predictors of MDD onset (Alnaes and Torgersen, 1997; Pedersen et al., 2006), while others considered the early onset of MDD as a significant predictor of personality disorders

(Ramklint and Ekselius, 2003), which raises an issue of causality and mechanisms in this area.

4.2 Personality Traits and Persistent MDD

The present findings showed that respondents with elevated scores of dependent and borderline personality traits were at high risk of experiencing persistent MDD; the latter was the most robust predictor in the current study. These findings are consistent with the results of a review involving data from 1,996 MDD patients conducted by Skodol et al. (2011b), who reported borderline personality as the most significant predictor of persistent MDD. Similarly, Yoshimatsu and Palmer (2014) revealed in their review that MDD with borderline personality was more persistent than MDD with no borderline personality. Collectively, these studies outline the critical role of personality disorders, particularly borderline personality, in worsening the long-term outcome of MDD.

4.3 Personality Traits and Recovery from MDD

Borderline personality has been documented to impact the course of recovery from depression. While emotional dysregulation is a central characteristic of borderline personality, the APMS 2000 captures a broader range of traits, including impulsivity, unstable interpersonal relationships, identity disturbance, and chronic feelings of emptiness. These traits are considered in the wider sense beyond just emotional dysregulation, as each may uniquely affect recovery from depression. For instance, emotional dysregulation can heighten depressive symptoms and extend recovery time (Lee et al., 2024), while impulsivity may lead to inconsistent treatment adherence (Syrnyk and

Glass, 2023). Similarly, unstable relationships may reduce social support, a critical factor in recovery (Gariépy et al., 2016).

It is somewhat surprising that a higher number of borderline personality traits was noted in the present study to increase the odds of recovery. A potential explanation of this finding is that the recovery group was compared to a healthy group which had no depression to recover from. Another possible interpretation might be the notion that depressive symptoms of borderline personality are different from those of MDD and that clinician interviewers do not recognise the distinction easily (Silk, 2010). Depressed individuals with borderline personality differ in how they describe and rate depressive symptoms compared to those with MDD only. The depression of borderline personality disorder is typically expressed as feelings of emptiness, loneliness, or depression close to anger, while the depression of MDD is more about sadness and guilt (Silk, 2010). Additionally, the improvement in MDD among respondents with high borderline traits in the present findings seems to be supported by early observations that suggested an improvement in MDD symptoms, which was found in depressed patients with DSM cluster B personality disorders (including borderline personality) but not clusters A or C (Roepke et al., 2008; Fava et al., 1994).

4.4 Sociodemographic Factors and MDD

Unmarried individuals were more likely to be in the onset or persistence group. Unemployed individuals were more likely to be in the persistence group. The APMS report revealed that unmarried and unemployed respondents were more likely to experience a

mental disorder, which matches the findings of the current study (Singleton et al., 2002). A study with longitudinal data from 7,368 participants found that depression increased by (OR 1.78, 95% CI 1.30–2.43) in individuals who moved from permanently employed to unemployed, compared to those who were permanently employed (Yoo et al., 2016). The literature has also supported that depression rates are lower in married people (Yan et al., 2011; LaPierre, 2009). However, other studies have suggested that this relationship could be modified by other factors, such as age (Bulloch et al., 2017) and social factors (Kessler and Essex, 1982), highlighting the need for further investigation.

5. Limitations

The generalisability of these results is subject to certain limitations. First, the APMS survey defined MDD statuses in a very limited sense. In addition, there is insufficient information about the period between the first time point (baseline) and the second time point (follow-up); for example, a respondent who had an MDD diagnosis at baseline may have recovered and then became depressed again by the time of the follow-up assessment. Second, regarding the comparison between persistence and recovery groups, the inadequate number of participants in the persistence group (n = 26) compared to those in the recovery group (n = 100) could limit the strength of the findings, even though it could be taken as a potential sign of association between borderline personality and persistent depression that warrants further investigation. These limitations means that the results need to be interpreted with caution. Third, the analysis did not address the interaction between the personality factors and the study outcome or explore how personality traits relate to the study outcome (e.g., mediation analysis). This limitation could indeed have been addressed

through mediation analysis. However, such an analysis was not conducted due to the lack of data on potential mediators in the dataset used for this study. Mediation analysis requires detailed information on variables that could act as intermediaries in the relationship between personality traits and depression status. Unfortunately, the APMS 2000 did not include such variables that could be used to explore these pathways. Therefore, while this would have been a valuable addition to the analysis, it was not feasible with the data available.

Fourth, we hypothesised a significant relationship between personality traits (dependent, obsessive-compulsive, and borderline) and the change in depression status over 18 months. However, multiple statistical tests were conducted to explore these relationships without specifying a priori hypotheses for each individual analysis. This approach increases the risk of type I errors—finding significant results by chance—particularly given the absence of corrections for multiple comparisons. As a result, there is a possibility that some of the observed significant associations may be spurious.

To address this issue in future research, establishing a clear hypothesis for each analysis and applying correction methods, such as the Bonferroni correction, would help to mitigate the risk of chance findings. These adjustments would improve the robustness of the results and strengthen the conclusions regarding the relationship between specific personality traits and depression outcomes.

Finally, we examined marital status and employment status as potential confounding variables based on the APMS 2000 report, which identified associations between these variables and common mental disorders, including depression. Although data on ethnicity were available, we did not include this variable in our analyses, as the APMS report did not find a significant association between ethnicity and mental health outcomes in this context.

However, it is possible that ethnicity could still play a role in influencing both personality traits and mental health outcomes due to cultural, socioeconomic, and systemic factors. The decision to exclude ethnicity may limit the generalizability of the findings, as we may not have captured all relevant social determinants of change in depression status. Future research could benefit from considering ethnicity alongside other confounders to provide a more comprehensive understanding of how personality traits relate to changes in depression status across diverse populations.

Despite these limitations, the main findings provide insight into the potential role of personality traits in predicting changes in depression status. However, readers should interpret the results with caution, as there is a chance that some associations observed may be influenced by random variation rather than actual effects.

On the other hand, several strengths can be noted, such as using data from a notable database that used a robust methodology. Second, the analysis involved a large sample, with over 2,000 respondents. Finally, the use of multinomial logistic regression allowed

the examination of multiple factors with multiple categories of an outcome in a single model, which was an informative approach.

6. Conclusion

This study aimed to investigate the role of personality traits in the change in MDD status over 18 months using a large representative cohort. Borderline personality was the most robust predictor of the change in MDD status over 18 months. It was also shown that elevated scores of dependent personality traits were significantly associated with persistent MDD. High traits of obsessive-compulsive personality were found to be associated with the onset of MDD. The present study confirms previous findings and contributes additional evidence that suggests that personality dysfunctions worsen MDD outcomes.

The findings of this study have important clinical implications for the management of depression, particularly in tailoring treatment strategies based on individual personality profiles. For example, individuals with high levels of borderline personality traits, who are at greater risk for fluctuations in depression severity, may benefit from targeted interventions such as Dialectical Behavior Therapy (DBT), which is designed to help manage emotional instability and interpersonal difficulties. Similarly, patients with elevated dependent personality traits, who are prone to persistent depression, could benefit from therapy focused on enhancing autonomy and coping skills, as their dependence on others may hinder recovery. Additionally, recognising high obsessive-compulsive personality traits in patients could allow clinicians to identify those at risk for the onset of depression, prompting early intervention strategies. Overall, these insights underscore the

importance of assessing personality dysfunctions in depression treatment to improve patient outcomes.

Future research might explore mechanisms by which personality traits can relate to MDD and additional factors that could mediate this relationship, such as social factors.

Declaration of Interests

None.

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CHAPTER FOUR

The Impact of Personality Traits on the Return of Major Depression: A Case-Control Study

Paper in revision:

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Author Contributions:

N.A., S.M. and R.U conceived the presented idea. N.A. collected the data and performed the statistical analysis plan. All authors discussed the results and provided critical feedback. N.A. wrote the manuscript with input from all authors.

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ABSTRACT

Background: Major depression is a common, chronic, recurrent, debilitating disorder. Despite effective treatments, remission rates remain low, and many of those who do experience remission then relapse. Some personality traits are potential risk factors for relapse, though they have, to date, received insufficient attention. There is growing attention to the role of emotional dysregulation in recurrent depression. We aimed to investigate the association between the return of major depression and emotional dysregulation, affective lability, and impulsivity personality traits.

Method: A case-control design sampling adults over 18 years old with a history of depression and currently either experiencing a depressive episode (cases) or currently being free of a depressive episode (controls). Current depression was assessed using the Patient Health Questionnaire-9, and study participants were recruited online. Multi-staged logistic regression modelling was used to explore the association between personality traits and the return of depression, adjusting for important confounding factors.

Results: 152 respondents (76 cases and 76 controls) were recruited. Emotional dysregulation was significantly associated with the return of depression (OR=1.03, 95% CI [1.00-1.06], p= .04) even after adjustment for the confounding factors: marital status and childhood trauma. Childhood trauma (OR=1.04, 95% CI [1.00-1.08], p= .03) and being widowed, divorced, or separated (OR=13.95, 95% CI [1.16-166], p= .03) were also associated with the return of depression. Our analysis did not detect any association between affective lability and impulsivity and the return of depression.

Limitations: Our study relied on self-report questionnaires, including measuring depression. We used cross-sectional data in the present study analysis.

Conclusion: Our findings suggest emotional dysregulation and childhood trauma could work as risk factors and predate depression. This information can be used to develop targeted treatment plans and improve therapeutic outcomes.

Keywords

Personality traits; relapse; recurrence; depression; emotional dysregulation; affective lability; impulsivity.

1 Introduction

The return of depression, manifesting as relapse or recurrence, is a prevalent challenge in the management of depressive disorders. Research has increasingly highlighted the role of personality traits, particularly those related to negative emotionality, in predisposing individuals to these outcomes. Negative emotionality, encompassing traits such as emotional instability, high sensitivity to stress, and a propensity for negative affect, has been linked to an elevated risk of relapse and recurrence due to its impact on cognitive and emotional regulation (Ormel et al., 2013). These traits can amplify stress reactivity and maladaptive coping, leading to sustained vulnerability even after remission (Clark et al., 2020). Moreover, personality dimensions such as neuroticism, a core component of negative emotionality, have been consistently associated with the return of depressive episodes, as they predispose individuals to rumination and pessimistic interpretations of life events (Barnhofer & Crane, 2009). Recognising these links provides critical insight into the development of relapse prevention strategies that address enduring personality-related vulnerabilities.

Personality traits related to emotional dysregulation, such as affective lability AL, are important factors associated with the return of depression. Emotional dysregulation and affective lability are interrelated constructs that collectively influence emotional instability. Emotional dysregulation refers to difficulties in managing and modulating emotions, leading to intense and often inappropriate responses that can hinder effective coping (Gross, 2013). Affective lability, defined as frequent and rapid shifts between emotional states, exacerbates this instability by making emotional responses highly variable and unpredictable (Harvey et al., 1989). When emotional dysregulation is present, high

affective lability may lead to an amplified sense of emotional chaos, as individuals struggle to maintain consistency in their reactions and are more prone to impulsive behaviour. This relationship is particularly evident in mood and personality disorders, where the combination of emotional dysregulation and heightened affective lability contributes to significant functional impairments and distress (Gratz and Roemer, 2004).

A meta-analytical review reported that maladaptive emotional regulation strategies among people with depression were found to continue even after recovery to represent a key risk factor for relapse (Visted et al., 2018). In addition, some evidence has been presented in the literature on the positive role of involving emotional regulation skills in interventions to prevent depressive relapse. For example, a randomised controlled trial which aimed to combine emotional regulation and mindfulness skills to prevent relapse of depression reported that patients who received training in emotional regulation and mindfulness skills showed a significant reduction in depressive symptoms (Elices et al., 2017).

Affective lability has also been linked to mental disorders. Marwaha et al. (2018) demonstrated in their case-control study that levels of AL were higher in individuals with mental disorders compared to those without such disorders. They also showed that AL predated the onset of depression (Marwaha et al., 2018), which could contribute to understanding and preventing the course of illness.

Additionally, there are indications in the literature that impulsivity is another factor that might contribute to the return of MDD. The term *impulsivity* is often used to describe "actions without foresight" (Dalley et al., 2011): it is the tendency to act prematurely.

Results of a study with a sample of 127 inpatients suffering from depression reported a significant correlation between impulsivity and severe depression (Corruble et al., 2003). A meta-analytical review reported a strong association between remitted depression and impulsivity that persists in remission to be a potential risk factor for relapse (Saddichha and Schuetz, 2014). Moreover, a systematic review on personality traits and depressive relapse found that neuroticism and dependent, obsessive-compulsive, and borderline personality were associated with depressive relapse. Emotional dysregulation and impulsivity represent key features of these factors that need further attention to understand their impact on the return of depression (Altaweel et al., 2023).

Despite these efforts, some personality traits have not been sufficiently investigated regarding their role in the return of depression. In a systematic review and meta-analysis on factors associated with depressive relapse, the majority of studies have focused on clinical, demographic, and other types of factors associated with the return of depressive symptoms (Buckman et al., 2018a). That review showed that only a few studies had investigated the role of personality in the relapse and recurrence of depression and that this was mostly done through assessing personality disorders, not personality traits that do not meet the diagnosis level of a disorder.

What is not yet clear is the impact of personality traits on the return of depression among many depressed patients who do not have a personality disorder diagnosis. This indicates the need to understand the various perceptions about how some personality traits can lead to a return of depression. An increased investigation of the relationship between personality pathology and the return of depression could overcome the methodological limitations in

the available studies and provide further validation of the current evidence on this relationship.

Highlighting less addressed factors in the return of depression, such as emotional dysregulation, affective lability and impulsivity, could help to reduce relapse rates and contribute to the development of effective intervention plans. In the present study, we attempted to explore the personality traits that could be associated with the return of depression while considering important co-factors (i.e., clinical and social) in an international sample. This study aimed to investigate the association between the return of MDD and personality traits of emotional dysregulation, affective lability, and impulsivity. We hypothesised that there is a significant relationship between the return of depression and personality traits of emotional dysregulation, affective lability, and impulsivity.

2 Methods

This study obtained ethical approval from the University of Birmingham's Science, Technology, Engineering and Mathematics Ethics Review Committee, ERN_0173 -Apr 2023. See Appendix D.

2.1 Study Design

This study used a case-control design consisting of individuals with a history of depression who were currently either experiencing a depressive episode or in remission. In line with the Patient Health Questionnaire-9 (PHQ-9) (Kroenke et al., 2001), the sample was divided

into two groups: cases, who were participants with a current major depressive episode; and controls, who were participants with no current major depressive episode.

2.2 Participants

Respondents were adults (18 years and over) with a history of depression who were recruited online. The data was collected using Qualtrics, which is a secure survey software. more details can be found in the recruitment procedure section of this paper.

The inclusion criteria were participants aged 18 years or over who had been previously diagnosed and treated for major depression over their lifetime and recovered, according to their self-report. The exclusion criteria were participants under the age of 18 or with no history of MDD. Eligible participants were identified using two questions: Have you ever been diagnosed with and treated for depression and recovered? Are you over the age of 18? Participants were considered eligible if they answered YES to both questions.

2.3 Study Measures

All study measures were delivered to participants online. It should be stressed that the cross-sectional design involved in the present study limits the accurate use of clinical terms such as *relapse* and *recurrence*. Therefore, in this paper, the authors will be referring to this phenomenon by the term (*return of depression*), to describe a current major depressive episode after a period of recovery reported by a participant in a self-report questionnaire.

2.3.1 Current Major Depressive Episode

MDD was assessed using the Patient Health Questionnaire-9 (PHQ-9) (Kroenke et al., 2001), a widely used self-report tool to assess depression in medical settings. The PHQ-9 has shown good validity and sensitivity (.83) in measuring MDD symptoms and their severity in a large psychiatric sample (n = 1023) (Beard et al., 2016). The PHQ-9 comprises nine items that score from 0 to 27; a cut-score of ≥10 indicates a current major depressive episode and was used in this study to indicate current MDD.

2.3.2 Emotional Dysregulation

Emotional dysregulation was measured using the short form of the Difficulties in Emotion Regulation Scale (DERS-16) (Bjureberg et al., 2016). The DERS-16 is a self-report questionnaire designed to assess several elements of emotional dysregulation. It comprises 16 items; after reading each statement, respondents were asked to select the appropriate number on a scale from 1 (almost never) to 5 (almost always) to indicate how often the statement applied to them. Higher scores indicate greater emotion regulation difficulties. The measure produces a total score (SUM) in addition to scores on five sub-scales: non-acceptance of emotional responses (NONACCEPT), difficulties engaging in goal-directed behaviour (GOALS), impulse control difficulties (IMPULSE), limited access to emotion regulation strategies (STRATEGIES), and lack of emotional clarity (CLARITY). Each DERS-16 subscale demonstrated sufficient internal consistency, with Cronbach's $\alpha > .70$ for every subscale (Burton et al., 2022). The total score (SUM) was used as a continuous variable in the analysis phase.

2.3.3 The Affective Lability Scale - short form (ALS-18) (Oliver and Simons, 2004)

The short version of this scale comprises 18 items representing three subscales: anxiety/depression shifts (5 items), depression/elation shifts (8 items), and anger (5 items). The mean scores for each item are calculated to extract the overall score. The total score (SUM) was used as a continuous variable in the analysis phase.

2.3.4 Impulsivity

Impulsivity was measured using the Barratt Impulsiveness Scale (BIS-11) (Patton et al., 1995), the most commonly used instrument for assessing impulsivity. The BIS-11 was built to measure impulsivity represented by three main aspects: attentional (attention and cognitive instability), motor (motor and perseverance), and non-planning (self-control and cognitive complexity). It consists of 30 statements that indicate common impulsive or non-impulsive (in the case of reverse-scoring items) behaviours and preferences. Items are scored on a four-point scale (Rarely/Never = 1, Occasionally = 2, Often = 3, Almost Always/Always = 4). Higher overall scores, which range from 30 to 120, indicate greater impulsivity. The total score (SUM) was used as a continuous variable in the analysis phase.

Covariates

In addition to the main variables of this study, we were interested in assessing further co-variables that have a potential impact on the return of MDD in order to observe their effect through the statistical analysis phase. These factors were measured as follows:

2.3.5 Current Treatment for Depression

Participants were asked "**Are you currently undergoing any treatment for depression?"** (yes/no) and "**Did you stop treatment for depression in the last three months?"** (yes/no).

2.3.6 The Number of Previous Depressive Episodes

Participants were asked "**How many depressive episodes did you experience in the past?"** Participants had to select an option from a drop-down list comprising one episode, two episodes, three episodes or more; I am not sure, coded as 0, 1, 2 and 3, respectively.

2.3.7 Generalised Anxiety Disorder

Generalised Anxiety Disorder (GAD) was measured using the GAD-7 (Spitzer et al., 2006), a brief self-report scale. It aims to assess an individual's anxiety level by assigning scores from 0 to 3 for each item, where 0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day. The total score ranges from 0 to 21; this can fall under one of four categories: 0–4: minimal anxiety, 5–9: mild anxiety, 10–14: moderate anxiety, and 15–21: severe anxiety.

2.3.8 Childhood Maltreatment

This factor was measured using the Childhood Trauma Questionnaire – Short Form (CTQ) (Bernstein et al., 2003), which is a self-report retrospective tool designed to assess different aspects of childhood abuse. This scale consists of 28 items represented in five sub-scales: physical abuse, sexual abuse, emotional abuse, physical neglect, and emotional neglect. Items are scored on a five-point Likert scale: (1 = never true, 2 = rarely true, 3 = sometimes true, 4 = often true, and 5 = very often true). This scale also includes an additional scale—the minimization/denial scale—comprising three questions to assess the likelihood of

unreported traumatic experiences. The total score (SUM) was used as a continuous variable in the analysis phase.

2.3.9 History of Personality Disorders

Participants were asked "**Have you ever been diagnosed with a personality disorder?"**(yes/no).

2.3.10 Treatment Status for Physical Health

Participants were also asked "**Please indicate if you are currently being treated for any of the following conditions"** with a drop-down list comprising substance use problems, cancer, diabetes, chronic pain, HIV, a thyroid condition, or another condition.

All participants were provided with a consent form alongside a demographic questionnaire. A diagram of the order of the study questionnaires is available in Appendix E.

2.4 Recruitment Procedure

The study was advertised through the student/staff email list at the University of Birmingham and the official Twitter accounts of the authors' institutions in the UK (see diagram 1 in Appendix F). In addition, a link was created that led to the study measures being administered electronically to potential participants. A unique number was automatically assigned to each participant to allow identification. The identification, using a unique number, allowed me to reach and discard data belonging to participants who wished to withdraw from the study. Participants remained anonymous even with these

unique numbers allocated, as no questions were asked that could reveal their identities, such as their names, date of birth, or address.

2.5 Statistical Analysis Plan

SPSS version 29.0 was used to conduct the statistical analysis for this study. Descriptive statistics that describe the basic features of the data were used to investigate participants' demographics and their characteristics on personality traits, childhood maltreatment, and clinical factors in both groups. First, a chi-square test of independence was performed to assess the association between the sociodemographic variables and other relevant questions on participants' health and the return of MDD. Fisher's exact test was applied to overcome limitations in cells that included fewer than five participants. An independent-samples t-test was used to measure the differences between groups on the personality and psychopathology variables. Second, a univariate logistic regression was utilised to assess the association between the explanatory variables and the return of MDD. The next step was to perform a multiple logistic regression to investigate the association between the return of MDD and psychopathology factors that were significant in the univariate model. Given the high correlation between emotional dysregulation and AL, we decided to assess the association between psychopathology and personality factors and the return of depression using three models. In the first model, both emotional dysregulation and AL were entered alongside the psychopathology factors. From the personality factors, only emotional dysregulation was included in the second model and only AL was included in the third. This approach allowed us to explore the effect of emotional dysregulation and affective lability on the return of MDD independently. Finally, an adjusted multiple logistic

regression was conducted to control the confounding factors that showed a significant association with the return of MDD in the univariate analysis.

In relation to missing data, propensity score weighting was performed (Olmos and Govindasamy, 2019). A logistic regression model (non-response vs response outcome) was developed, and the main covariates of the study were entered to calculate the predicted probability of responding to the survey based on the covariates included in this model. Next, a new variable called *Weight* was created based on the predicted probability to determine weights for each respondent to account for non-participants. The "weighting cases" function in SPSS was activated during the analysis. Results in this study were considered significant when p-values were $< .05$.

2.6 Power and Sample Size Estimation

This study aimed to test the differences between individuals who experienced a return of MDD (cases) and individuals with no return of MDD (controls) on emotional dysregulation scores. Then, the association between emotional dysregulation and the return of MDD was evaluated. Based on previous studies on emotional dysregulation and depression (Ehring et al., 2008), a small to medium effect size ($d = 0.46$) was estimated. The estimated sample size necessary to determine a small to medium effect size at an alpha rate of 0.05 (two-tailed) using the G*Power Programme was 152 respondents (76 cases and 76 controls). See Appendix G.

2.7 Main Study Outcome

The primary outcome was emotional dysregulation. This was defined in this study as a current greater score on the short form of the Difficulties in Emotion Regulation Scale (DERS-16) (Bjureberg et al., 2016), which reflects higher levels of emotional dysregulation. Both groups were compared on the DERS-16 to determine current emotional regulation deficits.

3 Results

Initially, 1,032 participants accessed the link online to the study. Of those, 290 were eligible to participate according to the study criteria, of whom 138 participants were excluded due to failing to respond to one or more of the study questionnaires. Thus, 152 participants (n = 152) were included in the current analysis (males n= 41, females n= 108, other n= 3), participants were also from diverse ethnic groups (Arab n= 117, White n=26, others including Black, Pakistani, Indian, Chinese and none of these n= 9). Seventy-six participants of the final sample were reported to have current depression, according to the PHQ-9, representing cases, whereas 76 did not report current depression, according to the same scale, representing controls. Both groups self-reported a history of major depression. Characteristics of the sample on the study variables are shown in **Table 1**.

Fisher's exact test showed that among all sociodemographic factors, marital status was the only factor that was significantly associated with the return of MDD (two-tailed p = .014) (Table 1).

There was a statistically significant relationship between the history of personality disorders and the reported return of depression: X^2 (1, n = 152) = 7.75, p = .008. The same

test also showed that generalised anxiety disorder was strongly associated with the return of depression: X^2 (3, n = 152) = 31.62, p < .001. The groups also differed significantly on the question "Did you stop treatment for depression in the last three months?" with X^2 (1, n = 152) = 8.18, p = .006 (Table 1).

Regarding personality traits, an independent two-sample t-test revealed significant differences in DERS scores between cases (M = 54.68, SD = 13.90) and controls (M = 41.07, SD = 15.10); t(167) = -6.1, p < .001). The two groups also differed in ALS scores, with cases at M = 29.91, SD = 12.51 and controls at M = 24.38, SD = 13.03: t(167) = -2.81, p = .005. The test did not show significant differences between cases and controls in the BIS scores, with cases at M = 68.77, SD = 8.99, and controls at M = 67.47, SD = 7.47; t(167) = -1.03, p = .306 (Table 1).

Furthermore, the analysis revealed that there was a significant difference between groups in the CTQ scores, according to an independent two samples t-test, with cases at M = 59.17, SD = 12.49, and controls at M = 53.90, SD = 9.39; t(167) = -3.09, p = .002.

Table 1 *General Characteristics of Study (n=152)*

Characteristics	Return of MDD n= 76 (50%)	No return of MDD n= 76 (50%)	P-value
Sex, n (%)			
• Male	21 (27.63%%)	20 (26.3%)	.264
• Female	52 (68.42%)	56 (73.7%)	
• Other	3 (3.94%)	0 (0%)	
Age, mean (SD)	29.55 (7.12)	30.43 (6.84)	.500
Ethnicity, n (%)			
• Arab	60 (78.94%)	57 (75%)	.452
• White	11 (14.47%)	15 (19.7%)	
• Other	5 (6.57%)	4 (5.26%)	
Marital status, n (%)			
• Married	17 (22.36%)	27 (35.5%)	**.014**
• Widowed/Divorced/Separated	7 (9.21%)	1 (1.3%)	
• Single	52 (68.42%)	48 (63.2%)	
Employment, n (%)			
• Working full-time	41 (53.94%)	46 (60.5%)	.263
• Working part-time	5 (6.57%)	4 (5.26%)	
• Unemployed	26 (34.21%)	18 (23.7%)	
• Economically inactive	4 (5.26%)	8 (10.5%)	
Number of previous depressive episodes, n (%)			
• One	4 (5.26%)	11 (14.5%)	.071
• Two	7 (9.21%)	11 (14.5%)	
• Three or more	34 (44.73%)	30 (39.5%)	
• I am not sure	31 (40.78%)	24 (31.6%)	
Current treatment for depression, n (%)			
• Psychological treatment	6 (7.89)	5 (6.58)	.491
• Antidepressants	14 (18.42)	14 (18.42)	
• Both	13 (17.10)	6 (7.89)	
• Other	2 (2.63)	2 (2.63)	
• I am not undergoing any treatment for depression	41 (53.94)	49 (64.47)	

Note. SD, standard deviation. Significant figures are shown in bold fonts.

Table1 *General Characteristics of the Study (n=152) (Continued)*

Characteristics	Return of MDD n= 76 (50%)	No return of MDD n= 76 (50%)	P-value
Did you stop treatment for depression in the last three months? n (%)			
• **Yes**	33 (43.42%)	18 (23.68%)	**.006**
• **No**	43 (56.57%)	58 (76.31%)	
Other current mental health problems, n (%)			
• Yes	22 (28.94%)	15 (19.7%)	.205
• No	54 (71.05%)	61 (80.3%)	
History of personality disorders, n (%)			
• Yes	18 (23.68%)	6 (7.9%)	**.008**
• No	58 (76.31%)	70 (92.1%)	
Current treatment for drug and/or alcohol dependency, n (%)			
• Yes	4 (5.26%)	0 (0%)	.121
• No	72 (94.73%)	76 (100%)	
Current treatment for psychosis, n (%)			
• Yes	2 (2.63%)	2 (2.6%)	1.00
• No	74 (97.36%)	74 (97.4%)	
Current physical health condition, n (%)			
• Yes	17 (22.36%)	13 (17.10%)	.705
• No	59 (77.63%)	63 (82.9%)	
GAD, n (%)			
• Mild	16 (21.05%)	36 (47.36%)	
• Moderate	20 (26.31%)	15 (19.73%)	**<.001**
• Severe	35 (46.05%)	9 (11.84%)	
• No GAD	5 (6.57%)	16 (21.05%)	
DERS total score, mean (SD)	54.79 (13.74)	41.11 (15.06)	**<.001**
ALS total score, mean (SD)	30.11 (12.46)	24.45 (13.008)	**.005**
BIS total score, mean (SD)	68.87 (8.96)	67.37 (7.33)	.306
CTQ total score, mean (SD)	59.46 (12.48)	54.01 (9.30)	**.002**

Note. SD, standard deviation. Significant figures are shown in bold fonts. GAD, Generalized Anxiety Disorder. DERS, Difficulties in Emotion Regulation Scale. ALS, Affective Lability Scale. BIS, Barratt Impulsiveness Scale. CTQ, Childhood Trauma Questionnaire.

Second, a univariate logistic regression revealed that all variables significantly associated with the return of depression in the first analysis remained significant in this model. See **Table 2** for details.

Table 2 *Univariate Logistic Regression of Association between the Study Variables and the Return of Depression (n= 152)*

Factors	OR (95%CI)	P-value
Marital status		
• Married	Ref	
• Widowed/Divorced/Separated	9.37 (1.33-65.66)	**.024**
• Single	1.79 (.90-3.56)	.097
History of personality disorders		
• Yes	3.58 (1.37-9.31)	**.009**
• No	Ref	Ref
GAD		
• Mild	1.36 (.46-4.00)	.570
• Moderate	4.06 (1.32-12.48)	**.014**
• Severe	11.36 (3.58-36)	**<.001**
• No GAD	Ref	Ref
Did you stop treatment for depression in the last three months? n(%)		
• **Yes**	2.56 (1.32-4.97)	**.005**
• **No**	Ref	Ref
DERS total score	1.06 (1.03-1.08)	**<.001**
ALS total score	1.03 (1-1.06)	**.007**
CTQ total score	1.04 (1.01-1.08)	**.004**

Note. The dependent variable in this analysis is the return of MDD coded so that 0 = no return of MDD and 1 = return of MDD. GAD, Generalized Anxiety Disorder. ALS, Affective Lability Scale. CTQ, Childhood Trauma Questionnaire. Significant figures are shown in bold font.

Third, we were interested in exploring the association between personality traits alongside psychopathology factors and the return of depression: therefore, a multiple logistic regression was utilised. A Pearson correlation test between emotional dysregulation and AL revealed a significant, strong positive relationship between the two personality constructs: $r\,(167) = .50$, $p < .001$. Accordingly, three models of multiple logistic regression were conducted to assess the impact of the two personality factors on the return of depression independently. In model A, where both emotional dysregulation and AL were entered, results showed that emotional dysregulation was significantly associated with the return of depression. An increase of one score on the DERS scale increased the odds of experiencing a return of depression by 1.04 times (OR = 1.04, 95% CI 1.01–1.07). Severe anxiety was another factor that showed a significant association with the return of depression, according to this model. Results showed that the odds ratio for individuals with severe anxiety was 4.28, with a 95% confidence interval of 1.10–16.69. No other explanatory variables appeared to be associated with the return of depression in this model (Table 3).

Table 3 *Multiple Logistic Regression of Association between the Psychopathology Factors and the Return of Depression (n= 152),* ***Model A***

Factors	OR (95%CI)	P-value
DERS total score	1.04 (1.01-1.07)	**.004**
ALS total score	.989 (.95-1.02)	.537
GAD		
• Mild	.802 (.24-2.65)	.717
• Moderate	1.77 (.49-6.34)	.380
• Severe	4.28 (1.10-16.69)	**.036**
• No GAD	Ref	Ref
History of personality disorders		
• Yes	2.22 (.75-6.58)	.151
• No	Ref	Ref
Did you stop treatment for depression in the last three months? N(%)	1.93 (.89-4.15)	.093
• **Yes**	Ref	Ref
• **No**		

Note. The dependent variable in this analysis is the return of MDD coded so that 0 = no return of MDD and 1 = return of MDD. DERS, Difficulties in Emotion Regulation Scale. ALS, Affective Lability Scale. GAD, Generalized Anxiety Disorder. Significant figures are shown in bold font.

The same findings as in model A were found in model B (emotional dysregulation included), in which only high DERS-16 scores and severe GAD were significantly associated with the return of MDD (OR = 1.04, 95% CI 1.01–1.07 for high DERS-16, and OR = 3.90, 95% CI 1.03–14.72 for severe GAD). See Table 4. In model C (AL included), the analysis did not detect a relationship between ALS scores and the return of MDD. Moderate to severe GAD appeared to be associated with the return of depression in this model. See Table 5 for details.

Table 4

Multiple Logistic Regression of Association between the Psychopathology Factors and the Return of Depression (n= 152), ***Model B***

Factors	OR (95%CI)	P-value
DERS total score	1.04 (1.01-1.07)	**.003**
GAD		
• Mild	.764 (.23-2.50)	.657
• Moderate	1.69 (.47-6.0)	.419
• Severe	3.90 (1.03-14.72)	**.004**
• No GAD	Ref	Ref
History of personality disorders		
• Yes	2.14 (.73-6.27)	.163
• No	Ref	Ref
Did you stop treatment for depression in the last three months? n(%)	1.94 (.90-4.17)	.088
• **Yes**	Ref	Ref
• **No**		

Note. The dependent variable in this analysis is the return of MDD coded so that 0 = no return of MDD and 1 = return of MDD. DERS, Difficulties in Emotion Regulation Scale. GAD, Generalized Anxiety Disorder. Significant figures are shown in bold font.

Table 5
Multiple Logistic Regression of Association between the Psychopathology Factors and the Return of Depression (n= 152), ***Model C***

Factors	OR (95%CI)	P-value
ALS total score	1.00 (.98-1.04)	.551
GAD		
• Mild	1.11 (.35-3.45)	.854
• Moderate	3.15 (.96-10.35)	**.058**
• Severe	8.33 (2.37-29.30)	**<.001**
• No GAD	Ref	Ref
History of personality disorders		
• Yes	2.59 (.90-7.41)	.076
• No	Ref	Ref
Did you stop treatment for depression in the last three months? n(%)	2.06 (.98-4.32)	**.056**
• **Yes**	Ref	Ref
• **No**		

Note. The dependent variable in this analysis is the return of MDD coded so that 0 = no return of MDD and 1 = return of MDD. ALS, Affective Lability Scale. GAD, Generalized Anxiety Disorder. Significant figures are shown in bold font.

Finally, a multiple logistic regression was conducted, this time with control of confounding factors significantly associated with the return of depression in the first analysis (i.e., marital status and CTQ scores): the results are displayed in Table 6. Again, the results showed that emotional dysregulation and severe GAD were robust factors that remained significant in all models in this study. This model also revealed that widowed, divorced, and separated respondents were more likely to experience a return of depression compared to married ones. The odds ratio for individuals who were widowed, divorced, or separated was 13.95, with a 95% confidence interval of 1.16–166. Results also showed that childhood maltreatment was significantly associated with the return of depression. An increase of one

score on the CTQ scale increased the odds of experiencing a return of depression by 1.04 times (OR = 1.04, 95% CI 1.00–1.08) (Table 6).

Table 6

Multiple Logistic Regression of Association between the Psychopathology Factors and the Return of Depression with the Control of Confounding Factors (n= 152)

Factors	OR (95%CI)	P-value
DERS total score	1.03 (1.00-1.06)	**.040**
ALS total score	.987 (.95-1.0)	.454
GAD		
• Mild	1.16 (.33-4.08)	.812
• Moderate	2.49 (.65-9.60)	.184
• Severe	6.29 (1.49-26.58)	**.012**
• No GAD	Ref	Ref
History of personality disorders		
• Yes	2.23 (.72-6.88)	.160
• No	Ref	Ref
Did you stop treatment for depression in the last three months? n(%)	1.93 (.87-4.31)	.104
• **Yes**	Ref	Ref
• **No**		
Marital status		
• Married	Ref	Ref
• Widowed/Divorced/Separated	13.95 (1.16-166)	**.037**
• Single	2.13 (.90-4.99)	.082
CTQ total score	1.04 (1.00-1.08)	**.034**

Note. The dependent variable in this analysis is the return of MDD coded so that 0 = no return of MDD and 1 = return of MDD. DERS, Difficulties in Emotion Regulation Scale. ALS, Affective Lability Scale. GAD, Generalized Anxiety Disorder. CTQ, Childhood Trauma Questionnaire. Significant figures are shown in bold font.

4 Discussion

This study aimed to investigate the association between the return of MDD and emotional dysregulation, affective lability, and impulsivity. The findings showed that individuals with higher levels of emotional dysregulation and childhood trauma are more prone to the return of depression compared to individuals without these conditions. This suggests that emotional dysregulation and childhood trauma could work as risk factors and predate depression. It was also found that widowed, divorced and separated respondents could be more vulnerable to a return of depression compared to married ones. No significant differences in AL and impulsivity scores were found between cases and controls.

The results on the association between emotional dysregulation and depression are in keeping with previous research (Liu and Thompson, 2017; Visted et al., 2018). One possible explanation for the relationship between emotional dysregulation and depression is that increased rumination, expressive suppression, and impaired reappraisal are associated with emotional dysregulation. This, in turn, is related to an impairment in processing unpleasant materials, which is a core element of MDD (Compare et al., 2014). On a cognitive level, a review by LeMoult and Gotlib (2019) revealed that research has increasingly documented the significant role of cognitive emotional dysregulation strategies (e.g., rumination and reappraisal) in depression. Increased rumination and decreased reappraisal have been found to be common characteristics in people with depression (LeMoult and Gotlib, 2019). Further, difficulties in emotional regulation and the lack of adaptive emotional regulation strategies in adolescence have been found to

predict depressive symptoms two years later (Gonçalves et al., 2019). This highlights the importance of early efforts in depression prevention.

Regardless of the terms used in describing difficulties in regulating emotions, research has consistently demonstrated the role played by negative emotionality and intense fluctuating mood in understanding depression aetiology (Mennin et al., 2007). For example, mood instability MI was found to be strongly correlated with depressed people compared to those with no depression (Bowen et al., 2017). MI is also a fundamental component in neuroticism (Bowen et al., 2012), which is widely documented to be a core feature of depression (Navrady et al., 2017). Altered emotions have frequently been reported to be associated with mood psychopathology. A prospective study on emotion dynamics by (Sperry et al., 2020) found that negative emotion instability predicted depression at three-year follow-up. The relationship between unstable mood and depressive psychopathology could be partly explained by the notion that individuals with intense, frequent, fluctuating moods are more likely to generate stressful life events, which may lead to depression. For instance, a study by (Miller and Pilkonis, 2006) revealed that affective instability predicted interpersonal impairment (i.e., romantic relationships), and that such events could contribute to the development of depression.

The present study's findings also showed that childhood trauma is a possible risk factor for the return of depression. The relationship between childhood trauma and emotional dysregulation is supported by a growing body of research in neuroscience, particularly studies that explore the impact of early maltreatment on brain development.

Childhood maltreatment has been shown to affect the structural and functional integrity of the amygdala and hippocampus, regions critical for emotional regulation and memory processing (Teicher & Samson, 2016). For example, studies utilising neuroimaging techniques have revealed that individuals with a history of physical and emotional abuse often display increased amygdala reactivity to negative stimuli (van Harmelen et al., 2010), which may contribute to heightened emotional sensitivity and difficulties in emotional regulation. Concurrently, reductions in hippocampal volume have been linked to the chronic stress of maltreatment, which is hypothesised to impair stress response systems and cognitive control over emotions (Dannlowski et al., 2012).

Furthermore, emotional regulation difficulties may mediate the link between childhood trauma and adult depression by disrupting the functional connectivity between prefrontal regions and subcortical areas, including the amygdala. Evidence from functional MRI (fMRI) studies supports this hypothesis, demonstrating altered connectivity patterns in individuals with major depressive disorder (MDD) and a history of trauma (Veer et al., 2010). These disruptions suggest a neurobiological basis for the persistence and recurrence of depressive symptoms in this population.

Emotional dysregulation and affective lability, both involving challenges in managing and stabilising emotional states, have been implicated in the development and maintenance of anxiety and trauma-related disorders.

In GAD, emotional dysregulation manifests as difficulty in controlling worry and emotional responses to perceived threats, which are core features of the disorder. Studies indicate that individuals with high affective lability may experience heightened and

persistent anxiety due to frequent shifts in emotional intensity, amplifying the sense of unpredictability and lack of control (D'Avanzato et al., 2013). Furthermore, GAD's focus on excessive worry can exacerbate affective lability by fostering a heightened sensitivity to internal and external cues, creating a feedback loop that reinforces anxiety symptoms.

Similarly, in PTSD, emotional dysregulation and affective lability are closely associated with the re-experiencing, hyperarousal, and emotional numbing symptoms typical of the disorder. Individuals with PTSD often report intense emotional swings in response to trauma reminders, a phenomenon that aligns with affective lability. Emotional dysregulation in PTSD is characterised by difficulties in down-regulating intense emotional responses to trauma triggers, contributing to symptoms like anger outbursts, emotional numbing, and hypervigilance (Tull et al., 2020). This dysregulation can impede the integration of trauma memories, perpetuating emotional instability and distress.

Contrary to expectations, this study did not find a significant difference between cases and controls on AL scores. This result differs from the studies of Zwicker et al. (2020) and Høegh et al. (2022), where AL was linked to mental disorders, including depression. The high statistical correlation reported in the present study between ER and AL could partly explain this finding, as they are overlapping constructs.

Social impairments are a critical component that is frequently reported in the literature to be affected by affective dysregulation generally and by the development of depression (e.g., Høegh et al., 2022). The available evidence suggests that AL significantly and negatively affects the social functioning of people with severe mental disorders (Høegh et

al., 2022). Therefore, it might be worthwhile to understand the relationship between emotional regulation difficulties in all forms and depression by looking at the quality of social functioning.

Although some studies have reported a relationship between impulsivity and remitted depression (Saddichha and Schuetz, 2014), the present study did not find a statistically significant relationship between impulsivity and the return of MDD. It is challenging to assume a direct relationship between impulsivity and depression, as the available research in this area has conflicting findings (Fields et al., 2021; TT Ngo et al., 2011). This inconsistency is likely to be because the trait impulsivity is a multidimensional construct with various measures, and results typically depend on the facet being assessed and the type of assessment used (Fields et al., 2021). In addition, most of the studies that have examined the relationship between impulsivity and depression have done so in light of suicidality (Ekinci et al., 2011). This raises a need for further investigations into the causality and mechanisms around impulsivity and depression in the absence of suicidality.

The results of the present study provide further support for the critical contribution of emotional dysregulation in the return of depression. An implication of this is the possibility of developing effective interventions that target emotional dysfunctions that could help to reduce relapse rates after an individual has recovered from an acute episode of depression. On the individual level, the current findings offer insights into the importance of emotional regulation in managing favourable mental health.

Finally, the current study was limited by its reliance on self-report questionnaires, including measuring MDD, which ideally needs a clinical assessment alongside the scales to indicate an MDD diagnosis. Another limitation was the use of a cross-sectional methodological design, whereas a prospective approach could be ideal in examining long-term depression outcomes. This design could not allow the use of accurate clinical terms such as relapse or recurrence, as the study relied on participants reporting that they had a history of depression and had recovered. Furthermore, unrecognised bipolar disorder could partially account for the observed patterns in emotional dysregulation and AL. Affective lability (AL) is indeed a key feature in bipolar disorder, particularly during mood episodes, and the lack of direct assessment for bipolarity in this study could have implications for the findings. Given that individuals with bipolar disorder often experience depressive episodes, it is possible that some participants in the sample may have been experiencing bipolar rather than unipolar depression, which could elevate levels of AL, emotional dysregulation, and impulsivity, potentially influencing the relationship between these factors and the return of depression.

Additionally, the wide confidence intervals (CIs) observed in the binary logistic regression model of the present study are an important finding that warrants careful interpretation. Such wide CIs suggest high uncertainty around the effect estimates, which could arise from several factors. One plausible explanation is the limited sample size in specific subgroups of the dataset, leading to imprecise estimates. This is particularly relevant in cases where rare events or low-frequency outcomes are being analysed, as the available data may not provide sufficient power to derive narrow, reliable intervals.

Another potential contributor could be collinearity among predictor variables, which can inflate standard errors and, in turn, lead to wider CIs. Additionally, methodological factors may have amplified this issue, such as the choice of variable coding, model specification, or imbalances in the distribution of key predictors.

These findings have significant implications for interpreting the results. The wide CIs indicate that while the point estimates provide a central tendency, there is substantial variability in the possible effect sizes, and any conclusions drawn should be treated with caution. This highlights the need to contextualise the findings within the broader evidence base and avoid overgeneralising results from potentially unstable estimates.

Finally, the demographic profile of the study participants, particularly the young Arab women, is striking and warrants further discussion regarding the recruitment process. This notable demographic trend may reflect cultural factors and the use of social media platforms as a primary recruitment tool. Given its accessibility and perceived anonymity, social media often attracts younger audiences and allows Arab women to engage more .openly with academic and health-related initiatives

The online survey recruitment strategy may have unintentionally overrepresented this demographic, as internet use among younger individuals in Arab countries is higher than among older populations (Arab Barometer, n.d.; International Telecommunication Union [ITU], 2023). Therefore, this study's results should be interpreted with caution, considering

that the findings may be more reflective of the experiences of young Arab women than of the wider population.

Notwithstanding these limitations, the strengths of this study are manifested in involving respondents from diverse ethnic groups. In addition, the study variables were measured using internationally recognised scales. The data analysis plan also included several models to accurately explore the association between the risk factors and the outcome, controlling for important confounding factors that have been reported in the literature to be associated with the return of depression.

5 Conclusion

The present study aimed to examine the role of personality traits of emotional dysregulation, affective lability and impulsivity in the return of MDD. Higher emotional dysregulation was the most robust risk factor for the return of MDD. It was also shown that individuals who reported childhood trauma and individuals who were widowed, divorced or separated were more vulnerable to a return of depression. The analysis did not detect any association between AL and impulsivity and the return of MDD. This information can be used to develop targeted treatment plans that consider improving depressed patients' skills in managing their emotions as one way to fight the depressive relapse phenomenon. Future work could address this issue using a longitudinal approach, examining potential mediators between personality traits and the return of MDD.

Conflict of Interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

N.A., S.M. and R.U conceived the presented idea. N.A. collected the data and performed the statistical analysis plan. All authors discussed the results and provided critical feedback. N.A. wrote the manuscript with input from all authors .

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CHAPTER FIVE

GENERAL DISCUSSION

5 Discussion

The current PhD aimed to investigate personality traits as risk factors for recurrent depression in adults and evaluate their association with common depression outcomes. The findings presented in this thesis make three key contributions to the field. First, the systematic review demonstrated that individuals with borderline, obsessive-compulsive, and dependent personality traits, or elevated neuroticism, are at a substantially higher risk of recurrent depressive episodes than those without these traits. This finding corroborates and extends prior research by quantifying these associations across diverse samples (Stepp et al., 2013). Second, the secondary data analysis identified borderline personality traits as the most robust predictor of changes in MDD status over time, with dependent traits linked to persistent depression and obsessive-compulsive traits to the onset of MDD. These nuanced insights enhance our understanding of how personality dysfunction influences depression trajectories, an area previously characterised by fragmented findings (Widiger & Costa, 2013). Third, the case-control study provided novel evidence that emotional dysregulation and childhood maltreatment elevate the risk of recurrent depression. This highlights the importance of addressing these factors in preventive and therapeutic interventions.

The originality of this body of work lies in its comprehensive approach to integrating personality theory with the longitudinal and multifactorial nature of MDD. Unlike prior studies that focused predominantly on single traits or cross-sectional data, this thesis

adopted a multifaceted methodology, triangulating findings across three complementary research designs. Furthermore, it emphasises the clinical implications of these findings by proposing tailored approaches to the assessment and management of MDD, thus bridging the gap between research and practice .

By offering a holistic perspective on the interplay between personality and depression, this thesis contributes to advancing the precision and effectiveness of mental health care. The findings underscore the need for an integrated assessment framework that considers personality traits, emotional dysregulation, and early adverse experiences as interconnected risk factors for MDD outcomes. This contribution not only informs future research but also lays the groundwork for targeted interventions that could improve the lives of individuals affected by MDD.

This chapter will conclude the present research by summarising the key research aims and questions, presenting the main findings, and discussing the value and possible implications thereof. It will also review the study's limitations and propose opportunities for future research.

5.1 Aims and Key Findings

This thesis aimed first to review the literature systematically to synthesise the available findings on what personality traits are associated with relapse or recurrence of major depression in adults. Most of the studies from the systematic review suggest that neuroticism is linked with an increased risk of depressive relapse or recurrence in adults.

Additionally, the review showed that people with dependent personality style, or with borderline or obsessive-compulsive personality traits or disorders, are at higher risk of experiencing relapse or recurrence of depression compared to those without such personality traits.

The second aim was to further evaluate the findings from the systematic review by examining the relationship between dependent, obsessive-compulsive, and borderline personality traits and the change in depression status over 18 months (onset, persistence, and recovery) in a large representative cohort. Results from the Adult Psychiatric Morbidity Survey (2000) revealed that the cumulative impact of a higher number of borderline personality traits was the strongest factor that was significantly associated with depression status at follow-up. In addition, a higher number of borderline and dependent personality traits were associated significantly with persistent depression. Moreover, the onset of depression was related to experiencing a higher number of borderline and obsessive-compulsive personality traits. It was also shown that an increased number of borderline personality traits was found to be linked with recovery from depression.

The last aim was to investigate the association between the return of depression (relapse/recurrence) and certain personality traits that lacked attention in research based on the systematic review findings, particularly emotional dysregulation, affective lability and impulsivity. A case-control study was conducted in which cases were individuals with a current depressive episode and controls with no current depressive episode. Both groups had a depression diagnosis and had recovered, according to their self-reports. The results of this study showed that ER was significantly associated with the return of depression in

all models performed. It was also demonstrated that childhood trauma could work as a risk factor and predate depression. The analysis did not detect any association between impulsivity or affective lability and the return of depression.

5.2 Interpretations

Researching risk factors associated with recurrent depression is important, as they could differ from those related to the initial onset of depression (Burcusa and Iacono, 2007a). For instance, factors that are linked to depression onset include low social support, being female, and comorbid physical and psychiatric disorders (Maurer, 2012). However, a review by (Burcusa and Iacono, 2007a) revealed that female gender and low socio-economic status do not contribute to the risk of recurrence of depression. Therefore, identifying factors related to the risk of recurrent depression is crucial to control and minimise the unfavourable outcomes of this phenomenon. Researchers have highlighted various significant risk factors for recurrent depression, including personality. The current PhD comprises multiple studies that investigated personality traits concerning recurrent depression and focused on less addressed traits such as emotional dysregulation, affective lability, and impulsivity. It provides research evidence on the association between personality traits and recurrent depression in addition to other depression outcomes using different methodologies. Below are proposed interpretations for how personality traits could increase the risk of recurrent depression (relapse/recurrence).

Individuals' unique thoughts, emotions, and behavioural patterns are manifested in their personality traits, and this can impact how individuals perceive and respond to stress and

challenging life events (Diener and Lucas, 2019). Results from studies conducted for the present PhD showed that several personality traits can impact treatment outcomes and increase the risk of recurrence. In the context of depression, certain personality traits can increase the risk of relapse/recurrence for several reasons:

Negative Cognitive Patterns: Individuals with certain personality traits, such as neuroticism, are more prone to negative thinking patterns and cognitive distortions (Barnhofer and Chittka, 2010). These tendencies can contribute to the maintenance of depressive symptoms and increase the likelihood of relapse.

Difficulty Coping with Stress: Some personality traits may make it more challenging for individuals to cope effectively with stressors, which are common triggers for depressive episodes (Hammen, 2015). For example, individuals with high levels of neuroticism may be more sensitive to stress and less able to adaptively cope with life challenges (Boyes and French, 2010), increasing their vulnerability to relapse.

Impaired Social Functioning: Certain personality traits, such as introversion, may impair social functioning and decrease social support networks (Janowsky, 2001). Limited social support can exacerbate feelings of loneliness and isolation, which are known risk factors for depression and can contribute to relapse (Marroquín, 2011).

Maladaptive Coping Strategies: Individuals with certain personality traits might be more likely to adopt maladaptive coping strategies, such as avoidance or rumination, which can maintain or exacerbate depressive symptoms over time (Moulds et al., 2007).

Treatment Adherence: Personality traits can also influence treatment adherence and engagement in therapy. For instance, individuals with low levels of conscientiousness may struggle to adhere to treatment recommendations (Molloy et al., 2014), leading to inadequate symptom management and increased risk of relapse.

Collectively, understanding how personality traits interact with depression can inform personalized treatment plans that address both the underlying depressive symptoms and the individual's specific vulnerabilities. Interventions aimed at enhancing coping skills, promoting positive cognitive patterns, and improving social support can help mitigate the risk of relapse in individuals with depression.

5.3 Reflections from the Current PhD Findings

The findings from multiple studies conducted for the present PhD reflect several points. First, they support previous research suggesting that, regardless of the various terms used, intense fluctuating mood plays a vital role in experiencing depression and increasing the risk of relapse (Mennin et al., 2007). Negative affect fluctuation in daily life was found in previous research to impede early treatment response (Husen et al., 2016); it was also found to predict a faster time to relapse in 57 remitted depressed patients who were followed for 36 months (Timm et al., 2017). This relationship between dysregulating emotions and depression could be partly explained by looking at several factors that were widely reported to be associated with depression and, at the same time, were found to be linked with affective or mood instability (MI). For instance, MI, which is a core facet of ER, has been

linked with lower self-esteem, which is, in turn, recognised to be associated with depression (Franck and De Raedt, 2007). MI was also found to be associated with unhappiness, which is a major element of depression (Hills and Argyle, 2001).

Second, among all personality types, borderline personality features appeared, in the current thesis findings, to be a critical risk factor for recurrent depression and its unfavourable outcomes. Core features of this personality, such as emotional dysregulation and poor affective lability, tend to have the same negative impact. The comorbidity between depression and borderline personality has been widely documented (Luca et al., 2012b; Winsper et al., 2016; Marwaha et al., 2013). Research has revealed that emotional dysregulation represents a shared characteristic between depression and borderline personality, which may explain why depressed individuals with borderline personality are more vulnerable to depression and its unfavourable treatment outcomes compared to other personalities. For example, Dixon-Gordon et al. (2015) showed in their study that depressed participants with higher borderline personality exhibited greater emotional dysregulation compared to participants with lower borderline personality.

The distinction between borderline personality as a categorical construct and borderline traits lies in their conceptualisation and clinical application. Borderline Personality Disorder (BPD) is a categorical diagnosis, as defined by diagnostic frameworks such as the DSM-5 or ICD-11, which requires the presence of a specific constellation of symptoms that cause significant impairment in functioning. In contrast, ‘borderline traits’ refer to individual characteristics or tendencies that align with the broader borderline personality spectrum but may not meet the threshold for a clinical diagnosis .

The concept of borderline traits acknowledges the dimensional nature of personality pathology, where traits can exist at varying levels of severity across individuals. Key borderline traits include affective instability, fear of abandonment, impulsivity, identity disturbance, and patterns of intense, unstable relationships (American Psychiatric Association, 2013). These traits can occur in isolation or in combination and may contribute to emotional and interpersonal difficulties without necessarily fulfilling the criteria for BPD.

It is essential to clarify that BPD as a diagnosis is not reducible to emotional dysregulation alone, although this is a hallmark feature. Emotional dysregulation is one facet of BPD but does not encompass the broader interpersonal, behavioural, and cognitive domains implicated in the disorder. For example, borderline traits such as dissociation, chronic feelings of emptiness, and intense fears of abandonment highlight the multifaceted nature of the borderline construct. This differentiation is critical because borderline traits may predict psychopathological outcomes, such as depression onset or chronicity, even in the absence of a complete BPD diagnosis (Stepp et al., 2013).

Third, the role of the personality trait of impulsivity in depressive relapse in the absence of suicidality, eating disorders, and addiction remains unclear. This could raise the need to investigate the relationship between impulsivity and depression when these conditions are not present to provide a better understanding of this area. Furthermore, the multi-faceted nature of impulsivity (e.g., motor or cognitive) and researchers' use of different definitions and measures of this trait have resulted in mixed findings (TT Ngo et al., 2011). An

operational, integrated framework of the personality trait of impulsivity could enhance our understanding and improve research addressing this phenomenon.

Fourth, the lack of global consensus on the conceptualisation and measurement of personality traits has led to large methodological variation in personality and depression research, which could impede generalisability. This variation mainly manifests in the defining of traits, measures (e.g., self-report versus interviews), and the timing of applying personality trait assessments (i.e., baseline only versus repeated assessments). Early work by (Sanderson et al., 1992) revealed that when the assessment was used during recovery as opposed to the active course of the illness, the number of personality disorders decreased in both clinical interviews and self-report assessments. This represents one potential source of variance in conclusions in this area, which needs to be considered in future work. Findings of the systematic review conducted as part of the present PhD (Altaweel et al., 2023) showed that in mood research, when studying the link between personality and mood disorders, particularly depression, researchers address personality in the form of either disorders or traits. Researchers who investigate the role of personality disorders in depression often use the Structured Clinical Interview for DSM-III-R Personality Disorders (SCID-II). On the other hand, studies that have focused on traits concerning depression have mostly examined either traits of the Five-Factor Model (McCrae and John, 1992) or traits that fall under the Eysenck Personality Inventory (Eysenck and Eysenck, 1968). Few studies have investigated other groups of personality traits using self-rated measures to capture different ranges of personality characteristics (Altaweel et al., 2023).

Fifth, research on recurrent depression varies in its approaches to dealing with comorbidities such as anxiety disorders or substance use disorders (Burcusa and Iacono, 2007a). Some researchers choose participants who have a history of depression but exclude those with any other psychiatric conditions. In contrast, others include participants with depression regardless of any additional psychopathologies. This variation extends to the selection of control groups: some researchers require their control participants to have no history of any psychiatric disorder, while others only exclude those with a history of depression (Burcusa and Iacono, 2007a). The criteria for selecting comparison groups are crucial, as the choice of controls can impact the results of mood research (Depue and Iacono, 1989).

Sixth, it is important to recognize the significant variations in how treatment is addressed in research on recurrent depression. Some studies, particularly those that are epidemiological or community-based, do not discuss treatment at all. In contrast, clinic-referred or treatment-outcome studies provide detailed descriptions of the interventions used with participants. The approach to treatment in these latter studies is especially important, as the identified risk factors for recurrence may be confounded by issues related to treatment adherence and the varying effectiveness of different therapies (Burcusa and Iacono, 2007a).

Lastly, terminology issues around depression treatment outcomes (relapse, recurrence, remission, and recovery) seem to continue in the literature. The findings of the systematic review conducted as part of the current PhD have observed that researchers use the terms *relapse* and *recurrence* interchangeably to refer to the same incident, as well as the terms

remission and *recovery*. This overlap in defining these outcomes makes it challenging to generalise findings or draw certain conclusions.

5.4 Implications

This combination of findings has important implications for directing attention to the role that some personality traits play in worsening treatment outcomes in depression. It helps to advance our knowledge of less addressed personality traits regarding their role in depressive relapse (e.g., affective lability, impulsivity and emotional dysregulation) and provides potential explanations of how these traits relate to depression. Current results highlight that not much is known about the impact of personality traits, compared to personality disorders, on recurrent depression. This could prompt researchers to conduct studies around this impact and focus more on personality traits that have yet to be widely addressed in the literature to enhance our understanding of this topic. It could also encourage researchers to investigate possible mechanisms of how personality dysfunctions affect depression outcomes and explore potential mediators in this relationship.

The present findings also contribute to the area of personality and recurrent depression by providing a recent synthesis of the available evidence through systematically reviewing the literature. Current findings on the association between childhood trauma and the return of depression should be of particular interest to parents and carers. It is hoped to advance their awareness of the harmful influence of early traumatic experiences on mental health, which could extend to adulthood. On the individual level, current findings offer insights into the

importance of stable mood and emotional regulation skills in managing favourable mental health.

In terms of practical applications, the findings of the current PhD have a significant impact on the assessment and management of Major Depressive Disorder (MDD).

5.4.1 Assessment Implications

This PhD highlights the critical role of personality traits, particularly borderline, dependent, and obsessive-compulsive traits, in predicting MDD outcomes. This underscores the need to integrate personality assessments into the diagnostic process for individuals with MDD. Tools such as the Structured Clinical Interview for DSM-5 Personality Disorders (SCID-5-PD) or self-report measures like the Personality Inventory for DSM-5 (PID-5) can help clinicians identify at-risk individuals (Zimmermann et al., 2013). Early identification of personality-related risk factors allows for more targeted therapeutic interventions.

In addition, the findings suggest that high neuroticism, emotional dysregulation, and childhood maltreatment increase the risk of recurrence and persistence of MDD. Incorporating these factors into risk stratification models can enable clinicians to develop tailored care plans for individuals exhibiting these traits or experiences (Widiger & Oltmanns, 2017). This approach ensures that vulnerable individuals are prioritised for preventive and ongoing care. Furthermore, the robust association between personality dysfunctions and recurrent MDD implies that personality traits should be assessed longitudinally. Repeated evaluations of personality functioning can provide insights into the progression of MDD, enabling early intervention when relapse or recurrence is

anticipated (Morey et al., 2018). Such assessments are precious for tracking traits like impulsivity, perfectionism, and dependency, which may fluctuate over time.

5.4.2 Management Implications

First, given the strong association between borderline personality traits and MDD outcomes, therapies such as Dialectical Behaviour Therapy (DBT) are particularly relevant. DBT has proven effective for individuals with borderline traits, especially in reducing emotional dysregulation and interpersonal instability (Linehan, 1993). For those with obsessive-compulsive traits, Cognitive-Behavioural Therapy (CBT) focused on maladaptive perfectionism and rigid thinking styles may mitigate the risk of MDD onset (Wilkinson & Halstead, 2021).

Second, the link between childhood maltreatment and recurrent depression highlights the need for trauma-focused interventions. Therapies such as Eye Movement Desensitisation and Reprocessing (EMDR) or trauma-focused CBT can address the lasting impact of early adverse experiences and reduce vulnerability to future depressive episodes (Herman, 2015).

Third, the association between dependent personality traits and persistent MDD suggests that interventions fostering autonomy and adaptive coping strategies are essential. Schema Therapy and Assertiveness Training may be effective in addressing interpersonal dependency and associated emotional vulnerabilities (Young et al., 2003).

Fourth, the findings that obsessive-compulsive traits are linked to the onset of MDD suggest the importance of prevention. Psychoeducation and skills training targeting rigid perfectionistic tendencies could reduce the likelihood of progression to clinical depression (Widiger & Costa, 2013). Early intervention programmes could be implemented in primary care or educational settings to address these traits before they contribute to psychopathology.

Fifth, managing MDD in individuals with coexisting personality traits necessitates an integrated, multidisciplinary approach. Collaboration between psychiatrists, psychologists, and social workers ensures that care plans address biological, psychological, and social determinants of depression. Evidence supports the effectiveness of such approaches in managing complex, recurrent presentations (Tyrer et al., 2015).

5.4.3 Broader Systemic Implications

This PhD's findings can inform public health strategies for reducing the burden of recurrent MDD. Screening for personality dysfunctions in primary care, particularly in individuals with a history of childhood trauma, could enhance early detection and intervention efforts (National Institute for Health and Care Excellence [NICE], 2018). Tailored prevention strategies may significantly reduce healthcare costs associated with MDD recurrence.

In addition, clinicians need to be equipped with the knowledge and skills to address personality traits associated with MDD. Incorporating these findings into professional development programmes can enhance the competency of mental health practitioners in managing complex cases (McWilliams, 2011). Such training should focus on understanding personality pathology and its role in depression outcomes.

Moreover, the current PhD evidence linking personality dysfunctions with poor MDD outcomes emphasises the need to allocate resources towards interventions targeting these traits. Expanding access to specialised psychotherapies, such as DBT or Schema Therapy, could significantly improve outcomes for individuals with recurrent or persistent MDD (Tyrer et al., 2015).

Collectively, this PhD contributes to a deeper understanding of the interplay between personality and MDD, offering a framework for improving both assessment and management practices. Implementing these recommendations has the potential to enhance the precision and effectiveness of clinical care for individuals with MDD.

5.5 Limitations

While this PhD contributes important insights into personality and recurrent depression research, it is subject to some limitations that need to be acknowledged. These limitations impose constraints on the generalisability and depth of the findings, thus warranting caution in interpretation.

Firstly, the utilisation of cross-sectional data presents a significant limitation. Although the third chapter dealt with prospective data in a secondary data analysis study, the fourth chapter examined the link between personality and the return of depression using a cross-sectional methodology. Cross-sectional data, while useful in capturing differences among a large pool of subjects at a specific point in time, are intrinsically incapable of identifying

causes or capturing dynamic processes over time. This limitation restricts the current research's ability to infer causality or directionality in the relationships observed between the personality traits examined and the return of depression. Future research should employ longitudinal designs to further clarify temporal relationships and trajectories.

Secondly, reliance on self-report measures introduces potential biases and limitations. For example, one study in the current PhD measured major depression using only the PHQ-9 to indicate MDD diagnosis, while the ideal practice is to be accompanied by clinical assessment. Self-report measures are liable to memory recall errors and individual differences in interpretation and response styles. Although attempts were made to reduce these biases using careful questionnaire design and administration procedures, the inherent limitations of self-report assessments should be acknowledged. Future studies could involve multiple methods of data collection, such as interviews and observational measures, to enhance the validity of the results.

Furthermore, the current PhD did not address the interaction between personality and depression. While the association between personality factors and important depression outcomes was explored, the potential mechanisms and moderation effects in this association were not examined. Ignoring interaction effects may limit the comprehensiveness of the findings and overlook subtle details in this relationship. Future research may incorporate interaction analyses to uncover complex patterns of association between personality and depression to better understand the nature of this relationship.

Notwithstanding these limitations, the strengths of the present PhD are reflected in the consistency of the findings with previous studies, which validates the conclusions of the present thesis. Another key strength was following a cumulative approach in which the thesis started by systematically reviewing the literature to gather research evidence on the main topic. Then, a study was conducted using prospective data on a large cohort to validate findings from the first research stage. Finally, in light of the results of the systematic review, a study was undertaken to highlight personality factors that were not sufficiently covered in the existing literature. Further strengths are manifested in the publication of chapters of the current PhD thesis in reputable peer-reviewed journals.

5.6 Future Directions

Although it is clinically assumed that personality dysfunctions influence the long-term outcome of depression negatively, only a limited number of studies have explored this issue using robust methods. Therefore, future studies need to examine personality factors that are associated with unfavourable outcomes of depression treatments using a longitudinal approach and consider controlling for critical cofactors that have been reported in the literature to be associated with depression outcomes. Additionally, there is an urgent need to develop a well-established terminology for personality traits and their measures based on empirical evidence. An internationally recognised system for defining and measuring personality traits could help to reduce the heterogeneity in this research area. Further efforts may target exploring mechanisms in which personality traits interact or worsen depression outcomes. Finally, we could benefit from a deep understanding of the depressive relapse phenomenon if more were known about factors that overlap with personality traits in affecting depression treatments, such as social aspects and age.

5.7 Conclusion

This PhD research set out to investigate what personality traits are associated with recurrent depression and contribute to worsening its treatment outcomes in adults. It was shown that depressed individuals with neuroticism, borderline personality traits and obsessive-compulsive or dependent personality styles could be more prone to relapse/recurrence compared to depressed individuals without these characteristics. It was also found that borderline personality was the strongest risk factor for changes in MDD status over 18 months. Additionally, increased dependent personality traits were significantly linked to persistent MDD. High levels of obsessive-compulsive personality traits were associated with the onset of MDD. Finally, deficits in emotional regulation and childhood maltreatment were found to be important risk factors for the return of depression.

Taken together, these results offer some insight into the importance of addressing personality traits in recurrent depression research as an important construct in psychopathology. The present findings also suggest that considering depressed patients' personalities could help in developing effective intervention plans and could contribute to improving therapeutic outcomes. Indeed, further investigations are needed to explore possible mechanisms and mediators in the relationship between personality traits and recurrent depression in order to develop a better understanding of this interaction.

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APPENDICES

APPENDICES

Materials for Chapter Two: Personality Traits as Risk Factors for Relapse or Recurrence in Major Depression: A Systematic Review

Appendix A

Supplementary Material

Personality traits as risk factors for relapse or recurrence in major depression: a systematic review

Nada Altaweel*, Rachel Upthegrove, Andrew Surtees, Buse Durdurak, Steven Marwaha

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Search strategy

Embase

Map Term to Subject Heading**,** Limit: English language.

#1 (Personality traits or Personality Types or Personality characteristics or Emotional dysregulation or Emotional regulation deficits, or affective instability or impulsivity or Mood instability).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word].

2# (Depression or Major Depressive Disorder or Major depression or MDD).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word].

3# (Risk factors or Predictors or association).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word].

4# (Relapse or depressive relapse or worsening or recurrence or recurrent).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word].

5# 1 AND 2 AND 3 AND 4

Medline
Map Term to Subject Heading**,** Limit: English language.
1# (Personality traits or Personality Types or Personality characteristics or Emotional dysregulation or Emotional regulation deficits, or affective instability or impulsivity or Mood instability).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms].
2# (Depression or Major Depressive Disorder or Major depression or MDD).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms].
3# (Risk factors or Predictors or association).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms].
4# (Relapse or depressive relapse or worsening or recurrence or recurrent).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms].
5# 1 AND 2 AND 3 AND 4

APA PsychINFO
Map Term to Subject Heading**,** Limit: English language.
1# (Personality traits or Personality Types or Personality characteristics or Emotional dysregulation or Emotional regulation deficits, or affective instability or impulsivity or Mood instability).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh].
2# (Depression or Major Depressive Disorder or Major depression or MDD).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh].
3# (Risk factors or Predictors or association).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh].
4# (Relapse or depressive relapse or worsening or recurrence or recurrent).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh].
5# 1 AND 2 AND 3 AND 4

Web of Science
ALL= (Personality traits OR Personality Types OR Personality characteristics OR Emotional dysregulation OR Emotional regulation deficits, OR affective instability OR impulsivity OR Mood instability) AND ALL= (Depression OR Major Depressive

Disorder OR Major depression OR MDD) AND ALL= (Risk factors OR Predictors OR association) AND ALL= (Relapse OR depressive relapse OR worsening OR recurrence OR recurrent)**.**

CINAHL

"Personality traits OR Personality Types OR Personality characteristics OR Emotional dysregulation OR Emotional regulation deficits, OR affective instability OR impulsivity OR Mood instability" OR (MH "Multiple-Personality Disorder") OR (MH "Emotional Regulation") OR (MH "Avoidant Personality Disorder") OR (MH "Dependent Personality Disorder") OR (MH "Passive-Aggressive Personality Disorder") OR (MH "Histrionic Personality Disorder") OR (MH "Antisocial Personality Disorder") AND (MH "Depression") OR "Depression OR Major Depressive Disorder OR Major depression OR MDD" AND (MH "Risk Factors") OR "Risk factors OR Predictors OR association" AND (MH "Recurrence") OR "Relapse OR depressive relapse OR worsening OR recurrence OR recurrent".

Appendix B

NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE
CASE-CONTROL STUDIES

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Exposure categories. A maximum of two stars can be given for Comparability.

Selection

1) Is the case definition adequate?
   a) yes, with independent validation ✸
   b) yes, eg record linkage or based on self-reports
   c) no description

2) Representativeness of the cases
   a) consecutive or obviously representative series of cases ✸
   b) potential for selection biases or not stated

3) Selection of Controls
   a) community controls ✸
   b) hospital controls
   c) no description

4) Definition of Controls
   a) no history of disease (endpoint) ✸
   b) no description of the source

Comparability

1) Comparability of cases and controls on the basis of the design or analysis
   a) study controls for _____ (Select the most important factor.) ✸
   b) study controls for any additional factor ✸ (This criterion could be modified to indicate specific control for a second important factor.)

Exposure

1) Ascertainment of exposure
   a) secure record (eg surgical records) ✸
   b) structured interview where blind to case/control status ✸
   c) interview not blinded to case/control status
   d) written self-report or medical record only
   e) no description

2) Same method of ascertainment for cases and controls
   a) yes ✸
   b) no

3) Non-response rate

a) same rate for both groups ✸
b) non respondents described
c) rate different and no designation

NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE
COHORT STUDIES

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability

Selection

1) Representativeness of the exposed cohort
a) truly representative of the average _____ (describe) in the community ✸
b) somewhat representative of the average _____ in the community ✸
c) selected group of users eg nurses, volunteers
d) no description of the derivation of the cohort

2) Selection of the non exposed cohort
a) drawn from the same community as the exposed cohort ✸
b) drawn from a different source
c) no description of the derivation of the non exposed cohort

3) Ascertainment of exposure
a) secure record (eg surgical records) ✸
b) structured interview ✸
c) written self report
d) no description

4) Demonstration that outcome of interest was not present at start of study
a) yes ✸
b) no

Comparability

1) Comparability of cohorts on the basis of the design or analysis
a) study controls for _____ (select the most important factor) ✸
b) study controls for any additional factor ✸ (This criteria could be modified to indicate specific control for a second important factor.)

Outcome

1) Assessment of outcome
a) independent blind assessment ✸
b) record linkage ✸
c) self report
d) no description

2) Was follow-up long enough for outcomes to occur
a) yes (select an adequate follow up period for outcome of interest) ✸
b) no

3) Adequacy of follow up of cohorts

a) complete follow up - all subjects accounted for ✸

b) subjects lost to follow up unlikely to introduce bias - small number lost - > ____ % (select an adequate %) follow up, or description provided of those lost) ✸

c) follow up rate < ____% (select an adequate %) and no description of those lost

d) no statement

APPENDICES

Materials for Chapter Three: Personality factors and change in depression status at 18 months: Findings from a British Psychiatric Morbidity Survey

Appendix C

Table 5 *Multiple Binary Logistic Regression of Association between Personality Traits and Depression Outcomes at 18 Months (Persistence Versus Recovery), (n= 126)*

Factors	OR (95%CI)	P-value
Dependent personality scores	1.17 (.92-1.48)	.188
Obsessive- compulsive personality scores	.91 (.69-1.21)	.549
Borderline personality scores	1.25 (1.01-1.55)	.041*

Note. The dependent variable in this analysis is the depression status at 18 months coded so that 0 = recovery and 1 = persistence. *p<0.05, **p<0.01, ***p<0.001.

APPENDICES

Materials for Chapter Four: The Impact of Personality Traits on the Return of Major Depression: A Case-Control Study

Appendix D

UNIVERSITY OF BIRMINGHAM

Dear Steven Marwaha

RE: he impact of personality factors on the return of depressive symptoms.

Application for Ethical Review: ERN_0173 -Apr 2023

Thank you for your application for ethical review for the above project, which was reviewed by the Science, Technology, Engineering and Mathematics Committee.

On behalf of the Committee, I confirm that this study now has ethical approval.

Any adverse events occurring during the study should be promptly brought to the Committee's attention by the Principal Investigator and may necessitate further ethical review.

Please ensure that the relevant requirements within the University's Code of Practice for Research and the information and guidance provided on the University's ethics webpages (available at https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Links-and-Resources.aspx) are adhered to.

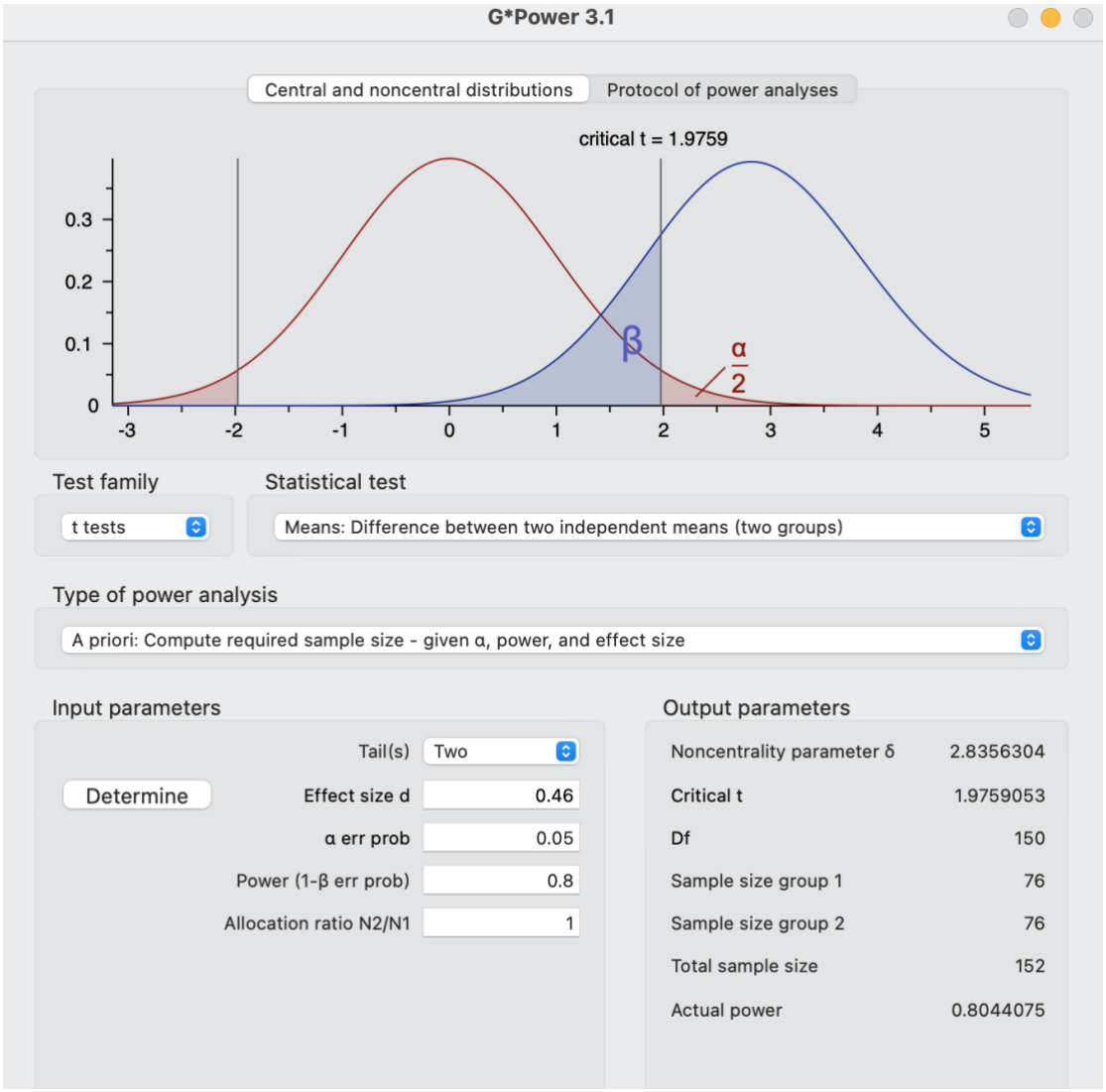
Please be aware that whilst Health and Safety (H&S) issues may be considered during the ethical review process, you are still required to follow the University's guidance on H&S and to ensure that H&S risk assessments have been carried out as appropriate. For further information about this, please contact your School H&S representative or the University's H&S Unit at healthandsafety@contacts.bham.ac.uk.

Kind regards,

The Co-Chairs of the Science, Technology, Engineering and Mathematics Committee

E-mail: ethics-queries@contacts.bham.ac.uk

Appendix E


G*Power 3.1
Central and noncentral distributions
Protocol of power analyses
critical t = 1.9759
0.3
0.2
0.1
0
-3
-2
-1
0
1
2
3
4
5
β
α/2
Test family
t tests
Statistical test
Means: Difference between two independent means (two groups)
Type of power analysis
A priori: Compute required sample size - given α, power, and effect size
Input parameters
Determine
Tail(s) Two
Effect size d 0.46
α err prob 0.05
Power (1-β err prob) 0.8
Allocation ratio N2/N1 1
Output parameters
Noncentrality parameter δ 2.8356304
Critical t 1.9759053
Df 150
Sample size group 1 76
Sample size group 2 76
Total sample size 152
Actual power 0.8044075

Appendix F

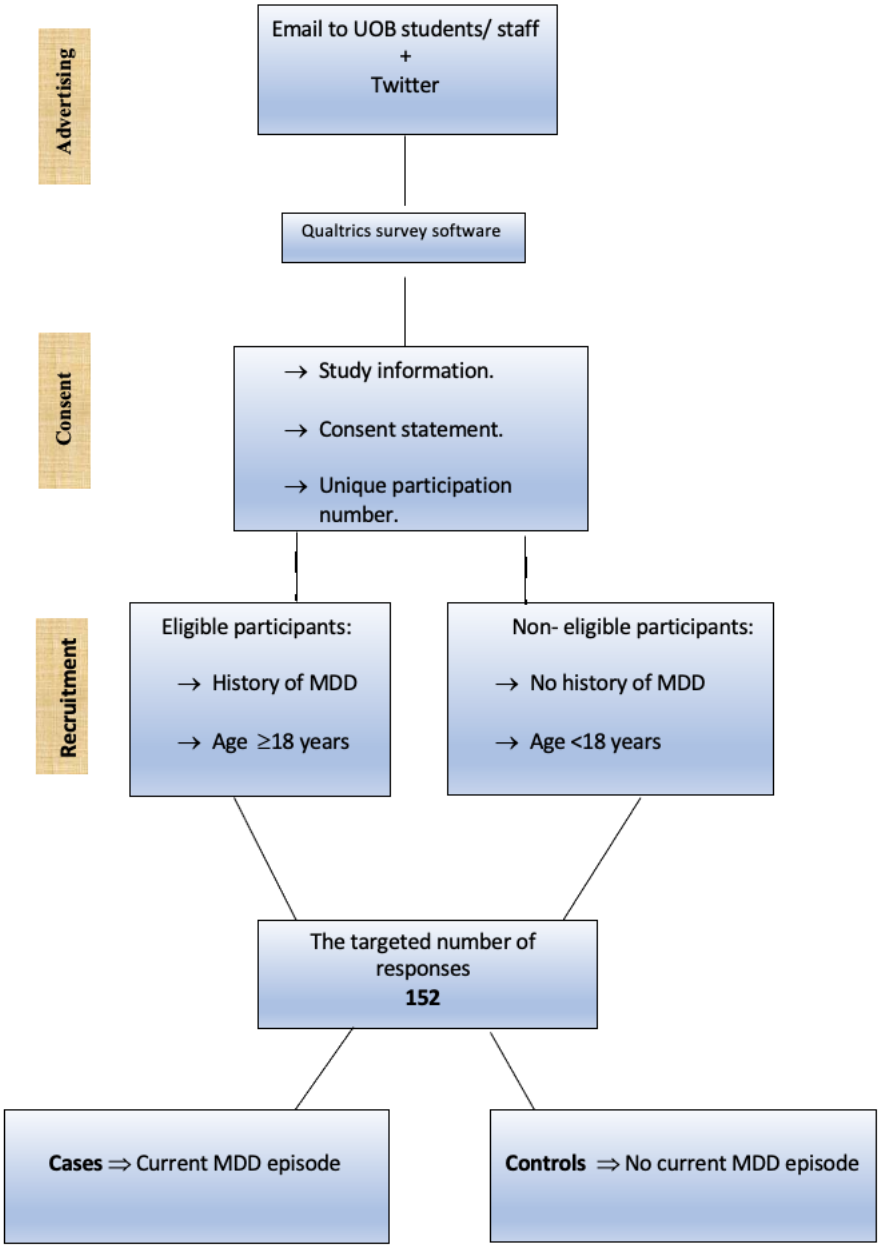
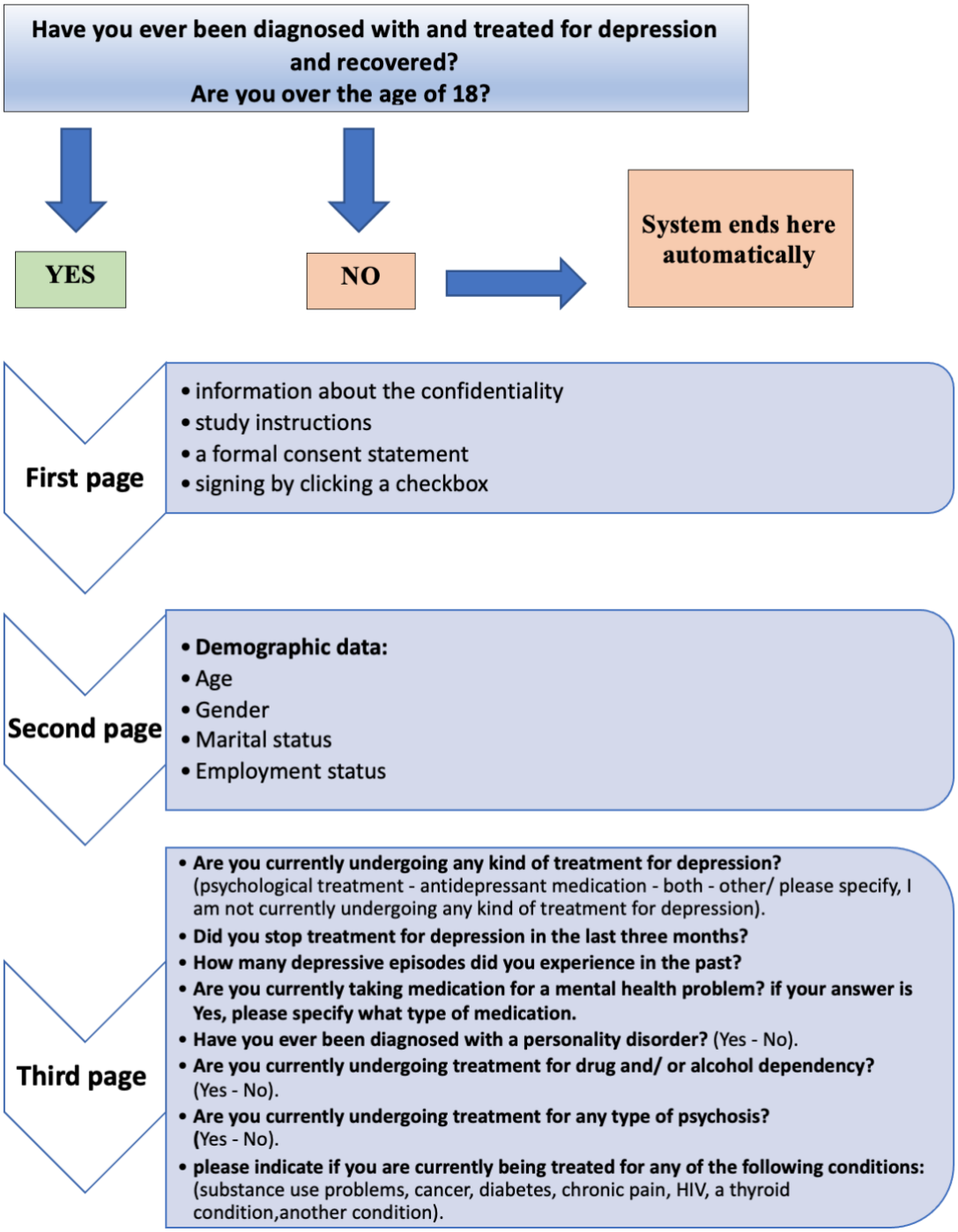


DIAGRAM 1: RECRUITMENT PROCEDURE

APPENDIX G


Have you ever been diagnosed with and treated for depression and recovered?
Are you over the age of 18?
YES
NO
System ends here automatically
First page
• information about the confidentiality
• study instructions
• a formal consent statement
• signing by clicking a checkbox
Second page
• Demographic data:
• Age
• Gender
• Marital status
• Employment status
Third page
• Are you currently undergoing any kind of treatment for depression? (psychological treatment - antidepressant medication - both - other/ please specify, I am not currently undergoing any kind of treatment for depression).
• Did you stop treatment for depression in the last three months?
• How many depressive episodes did you experience in the past?
• Are you currently taking medication for a mental health problem? if your answer is Yes, please specify what type of medication.
• Have you ever been diagnosed with a personality disorder? (Yes - No).
• Are you currently undergoing treatment for drug and/ or alcohol dependency? (Yes - No).
• Are you currently undergoing treatment for any type of psychosis? (Yes - No).
• please indicate if you are currently being treated for any of the following conditions: (substance use problems, cancer, diabetes, chronic pain, HIV, a thyroid condition,another condition).

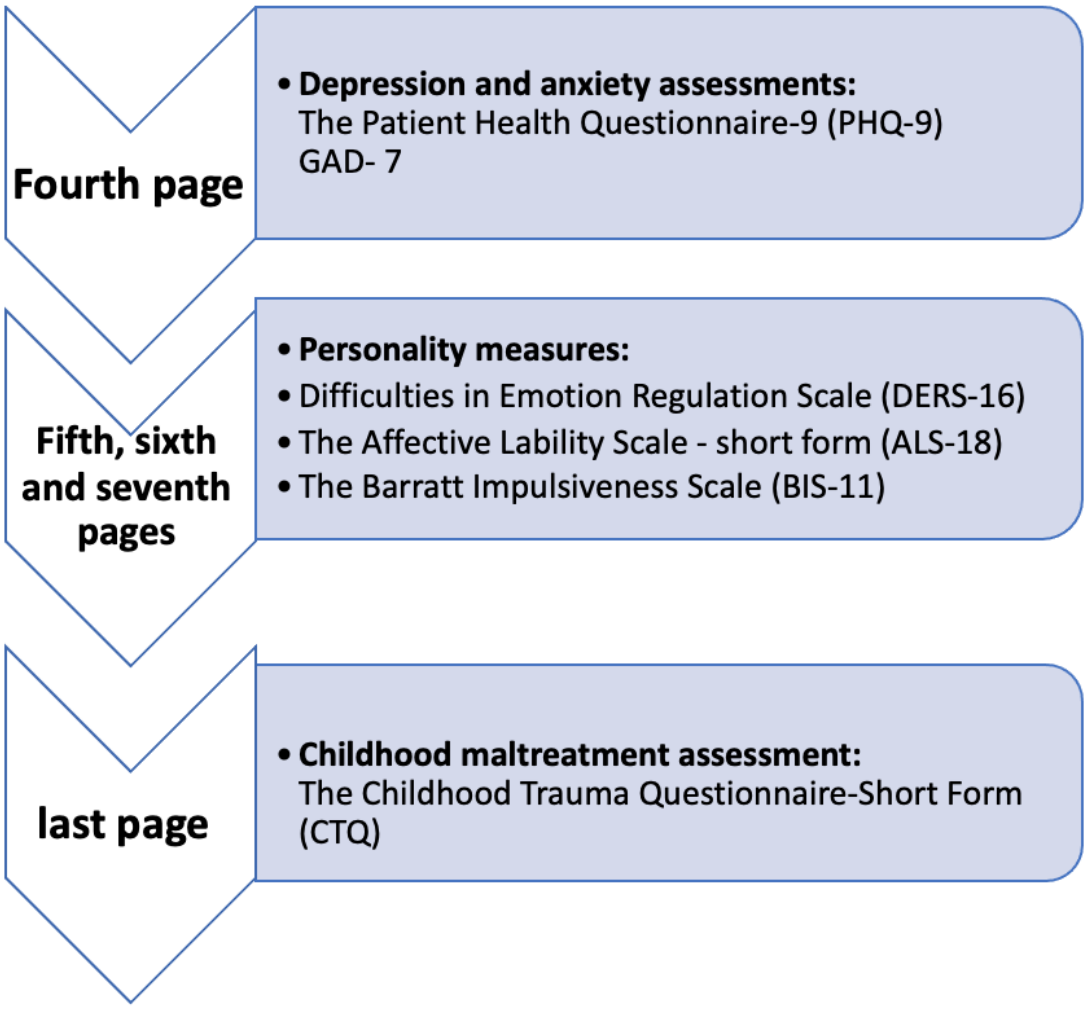


DIAGRAM 2: ORDER OF THE STUDY QUESTIONNAIRES