BABEȘ-BOLYAI UNIVERSITY
FACULTY OF PSYCHOLOGY AND EDUCATIONAL SCIENCES
EVIDENCE-BASED ASSESSMENT AND PSYCHOLOGICAL INTERVENTIONS DOCTORAL SCHOOL

Ph.D. THESIS SUMMARY

DEATH ANXIETY AS A TRANSDIAGNOSTIC FACTOR IN PSYCHOPATHOLOGY

AUTHOR: Ph.D. CANDIDATE ELISA DUMITRU
SCIENTIFIC ADVISOR: PROFESSOR Ph.D. DANIEL DAVID

Cluj-Napoca
2025

ACKNOWLEDGEMENTS

In some ways, I found this section of my thesis the most difficult to write because I want to express my gratitude, but words seem insufficient. The present thesis is the result of considerable effort on my part, but bears the handprints of many people, to whom I want to offer my thanks.

I would like to express my gratitude to my scientific advisor, Professor Daniel David, Ph.D., for supervising this work and for all the opportunities he granted me. Having my Ph.D. application be encouraged and approved by you was one of the highlights of my career and has allowed me to reach this point. Next, I would like to thank Associate Professor loana Cristea, Ph.D. for considering my work something worthy to be part of. Thank you for teaching me what good research is and how consistent effort is what makes the difference. I would also like to thank my scientific committee, the members of the Department of Clinical Psychology and Psychotherapy at Babeș-Bolyai University and my colleagues in the Doctoral School for their insightful comments, answers to my questions, and support.

I want to thank each and every one of my friends, near and far, for all your kindness and encouragement. I also thank you for simply knowing when not to ask.

I want to give a special thanks to Assistant Professor Roxana Oltean, Ph.D. Five years is a long time. You have not let me down once. Thank you for your unwavering support, for believing in me more than I did, for sharing your resources with me and for your mentorship. This Ph.D. has been difficult. Without you, it would have been exceptionally difficult.

Lastly, I want to thank my parents. Without you, it would have been impossible. Thank you for your unconditional support, for all your prayers, and for all your sacrifices. Thank you for supporting my choices and giving me everything I needed. I thank God for you, for all His grace, and all His blessings.

Notes. _____

(1) This is to certify by Elisa Dumitru that:

(a) The thesis includes the original research work of Elisa Dumitru (author) towards the Ph.D.;

(b) Parts of the thesis have been already published, in press, or submitted for publication; appropriate citations for these publications were included in the thesis. Other co-authors have been included in the publications, if they contributed to the exposition of the published text, data interpretation etc. (their contribution was clearly explained in the footnotes of the thesis);

(c) The thesis was written according to the academic writing standards (e.g., appropriate scientific acknowledgements and citations have been made in the text by the author of the thesis). All the text of the thesis and its summary was written by Elisa Dumitru who assumes all responsibility for the academic writing; also:

- A software was used to check for the academic writing (see at http://www.plagiarismdetector.com/); the thesis has passed the critical test;
- A copy of the research dataset/database was delivered at the Department/Graduate School.
- *(electronic) Signature for certifying the Notes: Ph.D. candidate* Elisa Dumitru

TABLE OF CONTENTS

CHAPTER I. INTRODUCTION

Death anxiety, widely understood as apprehension when one thinks of death or dying (Farley, 2018), constitutes one of the most common human experiences given its universality. As death is inevitable and as humans understand this inevitability, it clashes with one of the most powerful internal drives, which is the will to live and survive (Becker, 1973). This mismatch, between what humans want and what ineluctably happens, leads to a specific form of distress, namely death anxiety. Death anxiety is a multidimensional construct, as it includes affective, cognitive and behavioral components (Lehto & Stein, 2009). Moreover, fear of death can include fear of the process of dying, fear of what happens after death, fear of premature death, fear for significant others (Hoelter, 1979) etc., but it always touches on aspects pertaining to death. While death anxiety has long been considered a fundamental aspect of human distress (James, 1902; Yalom, 2008), formal research on this specific construct started in the sociological area, with the works of Ernest Becker (1973). Becker's research was then picked up by social psychology in the works of Greenberg, Pyszczynski and Solomon (1986) where the authors laid the foundations of the Terror Management Theory (TMT), which posits that death is considered a dominant threat and thus causes death anxiety, which is then managed through coping mechanisms. Empirical support for this theory abounds (Burke, Martens & Faucher, 2010) but so does criticism and contrary evidence (Klein et al., 2022). Forty years of research regarding death anxiety yielded compelling and stimulating evidence, encouraging further research to establish the role death anxiety plays in everyday life.

However, the involvement of death anxiety in psychopathology research has only been considered in recent years, with studies starting to investigate death anxiety not only from a cultural and behavioral point of view, but from a clinical point of view, asking questions in regards to how death anxiety might be related to multiple psychological disorders. This research reveals an intricate relationship between death anxiety and psychopathology, with a landmark review showing that death anxiety is associated with symptoms of specific phobias, panic disorder, social anxiety, agoraphobia, depressive disorders, obsessive-compulsive disorder (OCD), and post-traumatic stress disorder (PTSD) (Iverach et al., 2014). Based on the included cross-sectional and experimental studies, the authors hypothesize that death anxiety may play a transdiagnostic role in the development and maintenance of several mental disorders. Further cross-sectional research showed that in the case of two hundreds participants with a current diagnosis (e.g., generalized anxiety disorder, major depressive disorder, OCD, panic disorder, PTSD) from the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association; APA, 2013), death anxiety was statistically significantly associated with psychopathology, including the number of lifetime diagnoses, medications, past hospitalizations, clinician ratings of distress, depression, anxiety and stress, even after controlling for neuroticism (Menzies, Sharpe & Dar-Nimrod, 2019). In the same study, strong positive correlations (Pearson's r ranging from 0.60 to 0.82) were observed between death anxiety and symptom severity (Menzies et al., 2019). Longitudinal data, though scarcer, supports these findings, as one longitudinal study showed that baseline death anxiety predicted symptoms of somatic distress, paranoia, depression, anxiety, and PTSD measured after one month (Waite et al., 2022). In another longitudinal study, death anxiety was prospectively associated with depression and reduced quality of life in patients diagnosed with Huntington's Disease (Sokol et al., 2023).

As death anxiety is so closely linked to psychopathology, it became a target in interventional studies. Treatment protocols and their efficiency in reducing death related distress have been investigated, with some forms of therapies doing better than others. In a meta-analysis which included fifteen randomized controlled trials investigating interventions such as desensitization (i.e., in vivo and systematic), death education, relaxation training, stress management, rational-emotive behavioral therapy and logotherapy, results showed that these interventions lead to improvements in death anxiety and that cognitive-behavioral therapies (CBT) are the most effective (Menzies et al., 2018). However, the low quality of the studies precludes any meaningful results interpretation and raise the pressing need for more rigorous study designs to reduce bias.

The current empirical results and implications indicate the need to investigate death anxiety further and establish its role in human psychopathology.

1.1 Theoretical Foundations and Review of the Literature

Death anxiety has been defined in both broad and narrow terms, but all definitions have in common the concepts of death and apprehension. For example, in 1996, Tomer and Eliason affirm that death anxiety is "a negative emotional reaction fueled by the anticipation of a state of mind in which the self doesn't exist", reflecting the writings of Becker (1973) who claimed that it is the uniquely human ability to anticipate the future and to imagine that which does not exist which predisposes us to feel death anxiety. Farley (2018) offers a simpler definition and claims that death anxiety "is a feeling of dread, apprehension of solicitude (anxiety) when one thinks of the process of dying, or ceasing to be". Malinauskaite et al. (2017) propose a similar definition and assert that death anxiety may be "a feeling of unsafety or fear related to death, … often accompanied with avoidance-focused coping strategies.". Dadfar and Lester (2017) bring to attention an important distinction and claim that death anxiety is "a fear of death of oneself as well as fear of death of others". Thus, though definitions vary, they all touch on the dread and uneasiness felt around the idea of death.

1.1.1 Theoretical Models of Death Anxiety

Death anxiety research formally started with the sociological works of Becker (1973) who claimed that human progress was facilitated by our intelligence and ability to think in symbols and abstract concepts, as well as by the ability to anticipate the future, creating a brain that is able to expect events which have not yet happened. This means that higher cognitive structures allow us to understand the inevitability of death and that one day, each of us will die. Becker further claimed that if one were to constantly think about this, one would live in a constant state of terror, so human beings have adopted certain mechanisms to cope with the anxiety

caused by the anticipated demise. He proposes self-esteem and cultural belonging expressed as shared cultural views as buffers against the final threat, theorizing that most of our everyday efforts are meant to rein in death anxiety. As an attempt to explain the need for self-esteem and our zealous search for it, as well as why humans have a tendency to be in conflict with outgroups, Becker's premises were picked up and based on his work, Greenberg et al. (1986) built the Terror Management Theory (TMT). This theory asserts that death anxiety is constantly felt, but kept at bay through defense mechanisms such as shared cultural views, offering permanence, structure and significance, and self-esteem which is boosted by adherence to these cultural views. Moreover, according to the TMT's dual process model (Pyszczynski, Greenberg, & Solomon, 1999), humans employ both distal and proximal defense mechanisms. Distal defense mechanisms are used when thoughts of death are rather subconscious, while proximal defense mechanisms are engaged when death thoughts enter consciousness. The awareness of one's own death is described in the literature as mortality salience (Greenberg et al., 1994) and it refers to the level of accessibility of thoughts related to death. This experimental paradigm plays a crucial role in the TMT and is based on the idea that if efforts to suppress death from consciousness are the foundation of human behaviors, then priming death will lead to increased defense attempts against death, manifested through higher adherence to shared cultural worldviews and self-esteem seeking.

Empirical support for the TMT comes from a meta-analysis of 164 studies with 277 included experiments (Burke et al., 2010), suggesting that death priming tasks produce observable effects, such as increased threat estimations and avoidance responses to spiders in an arachnophobic sample (Strachan et al., 2007) and increased time spent hand-washing in an OCD-diagnosed sample (Menzies & Dar-Nimrod, 2017; Strachan et al., 2007). Despite primary experimental research offering support for this theory, a recent multilab pre-registered replication study involving 21 laboratories in the US failed to replicate key predictions of the TMT (Klein et al., 2022). The authors originally attempted to address the replication crisis in psychological studies, by answering the following question: do studies which benefit from input and consultation with the original authors result in higher levels of replication than studies which were implemented by independent researchers? To test this hypothesis, the authors chose the TMT and instructed half of the 21 included labs across the USA to implement Study 1 of Greenberg et al. (1994) on their own, using available information in the published article. The other half had additional access to the original authors and underwent a feedback process along the implementation of the study. The data collected from over 2200 participants revealed that none of the labs managed to replicate the results of the study. By the end of the research effort, there were no differences between the labs which benefited from expert input and those without expert input because no lab had managed to successfully replicate the formerly identified mortality salience effect. Thus, support for this theory seems controversial, casting a shadow of doubt over its veracity. Another important question for this theory is whether mortality-related thoughts are the one and true cause of the observed defense responses (Fiedler, Kutzner & Krueger, 2012), with some authors claiming that similar responses can be observed by priming other stimuli. For example, reminding people of an incomplete task induces self-esteem seeking, a desire for order and even a conservative shift (Wicklund & Braun, 1987). This issue plagues other similar theories, such as relational theories, which assert that humans have innate gregarious instincts and needs (Bowlby, 1969). As death is viewed as the immutable separation, it appears as a threat for these affiliation needs. However, relational theories fail to explain why the abstract threat of perceiving oneself as powerless provokes similar responses to those triggered by death thoughts (Randles, Proulx & Heine, 2011). Another defense theory, the Meaning Maintenance Model (Heine, Proulx & Vohs, 2006), asserts that humans wish for meaning and consistency in the form of expected relations between mental representation, with death constituting a violation of this meaning. However, following the premises of the Meaning Maintenance Model, one could argue that a violated expectation which ended in a beneficial result would lead to defense responses in the form of self-esteem seeking or stronger adherence to cultural values, failing to justify why people are ecstatic and joyful when hopes are exceeded. According to Hart (2014), these theories need to answer whether death can be considered as the worm at the core of existence (James, 1902) and if defensiveness reflects a singular process or numerous others.

In summary, though multiple theories try to account for how death anxiety might be responsible for perceptions and experiences and how it may exert influence on human behavior, they all have limitations and shortcomings, both theoretical and methodological. However, these theories share the idea that death represents a salient emotional threat for most people, leading to negative cognitions and emotions and the activation of more or less adaptive coping mechanisms (Hart, 2014). Whilst they don't make specific predictions about psychopathology per se, they all imply that death anxiety leads to distress which can turn potent and pervasive and is often mentioned as a struggle when seeking treatment (Angst et al., 2010).

1.1.2. Death Anxiety Measures

There are multiple death anxiety measures, but the most widely used (Zucalla et al., 2022) is by far the Templer Death Anxiety Scale (DAS; Templer, 1970), even if there is no specific reason to justify its use over other death anxiety scales. The DAS offers a global score of death anxiety and items are usually answered on a 5-points Likert scale. Examples of items are "I fear dying a painful death", "The sight of a dead body is horrifying to me" and "I often think about how short life really is".

Another widely used death anxiety is the Revised Collett-Lester Fear of Death Scale (CLFDS-R; Lester, 1990) which has four subscales measuring fear of death and fear of dying for the self, respectively for others.

The Multidimensional Fear of Death Scale (MFODS; Hoelter, 1979) has eight factors, namely fear of the dying process, fear of the dead, fear of being destroyed, fear for significant other, fear of the unknown, fear of conscious death, fear for the body after death and fear of premature death.

A newly created death anxiety measure is the one proposed by Menzies, Sharpe and Dar-Nimrod (2022), the Death Anxiety Beliefs and Behaviors Scale (DABBS) which is grounded in evidence-based CBT theory, as it looks at maladaptive emotions, unhelpful beliefs and avoidance behaviors related to death. The measure also has a cut-off score of > 55, so that scores above this cut-off point suggest clinically relevant levels of death anxiety. In the second study of the thesis, we aim to translate and validate this scale into

Romanian.

Given the myriad of death anxiety measures, Zuccala et al. (2022) attempted to systematically review them and evaluate the evidence of their psychometric properties. The authors included 89 studies analyzing 21 self-report scales of death anxiety and assessed them using the instrument proposed by Terwee et al. (2007) which appraises measures based on their content, criterion and construct validity, internal consistency, reproducibility, responsiveness, floor and ceiling effects and interpretability. The results revealed none of the measures showed adequacy on all evaluated quality criteria. The DAS proved to possess the most evidence supporting its reliability and validity, offering a compelling argument for its use in future studies. However, the CLFDS-R received the best rating on the responsiveness criteria, indicating that this measure is able to detect clinically important changes over time or following an intervention (Terwee et al., 2007). This highlights that the utility of a measure cannot be determined solely based on the ratings and another factor one should take into consideration when choosing a measure is that different measures may be relevant for different purposes.

The measurement of death anxiety should account for the fact that it is a multidimensional concept (Lehto & Stein, 2009), which could be limited by the use of unidimensional measures such as the DAS. While the CLFDS-R and the MFODS contain multiple subscales assessing for different facets of death anxiety, their psychometric properties are poor or even absent (Zuccala et al., 2022) and, by choosing to focus on certain aspects of death anxiety, they may neglect other aspects. For example, the CLFD-R includes a subscale on the fear of the death of others, but no item addresses the afterlife. Beyond the need for a multidimensional assessment, there are critical issues regarding the psychometric properties of the tools currently used to assess death anxiety, especially as there is no current gold-standard instrument.

However, there is a point to the fact that self-report measures might not be adequate to assess death anxiety. The main assumption of theories such as the TMT regards the unconscious impact death anxiety has on humans, which cannot be captured by self-report measures. Nonetheless, given the currently debated status of the TMT explaining death anxiety it is not clear whether behavioral tasks would be more useful than self-report.

1.1.3 Death Anxiety in Psychopathology

The role of death anxiety in psychopathology and its link to psychological disorder has been researched in some designs under different conditions, in clinical and general populations. Though most of the data is cross-sectional, it reveals a complex and winding dynamic.

1.1.3.1. Death anxiety and anxiety disorders

Death anxiety is especially linked to anxiety disorders and is considered to aggravate anxious responses in anxious individuals (Arndt et al., 2005; Strachan et al., 2007). For example, in a series of experimental studies, Strachan et al. (2007) found that reminders of death increased anxious responses in individuals with arachnophobia, but not for non-arachnophobic individuals. The authors claimed that the heightened reaction can be understood if the spider is seen as life threatening. Another anxiety disorder that presents itself with a clear fear of death is panic disorder (Furer & Walker, 2008; Randall, 2001; Starcevic, 2007; Torres & Crepaldi, 2002). One of the diagnostic criteria for a panic attack, both in the DSM-5 (APA, 2013) and in the International Statistical Classification of Diseases and Related Health Problems (11th ed.; ICD-11; World Health Organization, 2004) is the fear of dying. In a study which included panic disorder patients, social anxiety patients and controls, the panic disorder patients reported significantly higher death anxiety than the two other groups (Furer et al., 1997). Furthermore, half of the panic disorder patients fulfilled the criteria for hypochondriasis and these patients reported higher death anxiety levels than the panic disorder patients who were not hypochondriacs (Furer et al., 1997). Supporting evidence comes from a similar study, where female patients diagnosed with panic disorders reported higher death anxiety levels than female patients diagnosed with major depressive disorder (Radanovic-Grguric et al., 2004). Moreover, 71% of the major depressive patients also met the criteria for panic disorder, and 50% of the panic disorder patients met the criteria for major depressive disorders, bringing attention to the high comorbidity rate between the disorders and to the role death anxiety may play in the symptomatology. Given that the fear of dying is such a central aspect of panic attacks and panic disorder, evidence points to the need to include it in the treatment protocol by focusing on the realistic appraisals of bodily threats, functional body scanning and adaptive attitudes to health, illness and death (Starcevic, 2007). While the association between death anxiety and the spectrum of anxiety disorders can be explained by phenomena such as the overlap of related symptoms, future experimental and longitudinal studies could determine if there is a causal effect involved, as well as the directionality of the effect. Currently, though death anxiety is hypothesized to be the causal factor, empirical data is limited and controversial, disallowing any certain conclusions. Phenomenologically, different types of anxieties may express similarly (Walser, 1985), so further studies need to clarify whether they are indiscernible at their core or if they are distinct forms of anxieties, and if they are distinct, is death anxiety the source of all anxieties?

1.1.3.2. Death anxiety and obsessive-compulsive disorder

Initially categorized as an anxiety disorder (Stein et al., 2010), obsessive-compulsive disorder (OCD) is now considered part of a distinct category, even if characterized by high levels of anxiety (APA, 2013). The association between OCD and death anxiety benefits from more credible empirical data. In a series of experimental studies, following a mortality salience task, participants with high scores of compulsive hand washing were found to spend more time washing their hands and used more paper towels to dry their hands than participants with low scores on compulsive hand washing (Strachan et al., 2007). Given that many obsessive-compulsive concerns relate to death or mortality, either personally or towards others, this result suggests that death anxiety exacerbates compulsive behaviors. The authors propose that death-related thoughts could be a general factor in OCD, explaining the urge to eliminate germs and diseases, which are seen as life-threatening (Strachan et al., 2007). Another experimental study offers support, finding similar results in the case of contamination OCD (Jones & Menzies, 1997). Individuals participating in a laboratory task were asked to insert their

hands into a vessel containing potting soil, food scraps and animal hair and rate the anticipated severity of illness on a scale from 0 ("no symptoms") to 100 ("death"). Individuals with high hand washing compulsions were found to give significantly higher ratings, expecting much more severe health consequences, indicating that expectations of life-threatening illness are what determine washing behaviors (Jones & Menzies, 1997).

1.1.3.3. Death anxiety and post-traumatic stress disorders

Traumatic events can act as primes for death, as they often involve life-threatening incidents (APA, 2013). If death anxiety levels increase following such events, they are hypothesized to lead to the installation of PTSD symptoms (Chung et al., 2005). The support for this hypothesis is mainly correlational, as one study performed in the context of a civil war found individuals with high PTSD symptoms reported more trauma symptoms after mortality salience induction than individuals with low PTSD symptoms (Chatard et al., 2012). Additionally, the authors found that high PTSD participants reported increased immediate death thoughts accessibility after the experimental task, indicating impaired defenses against death anxiety. The findings offer empirical support for the TMT, since proximal and distal defense mechanisms are thought to be set off after death primers in order to decrease death anxiety levels (Pyszczynski et al., 1999). If these defense mechanisms are disrupted, then the individual remains vulnerable in the face of existential threats, favorizing the appearance of distress and psychopathology. Thus, the results propose a complex interaction of PTSD with death anxiety serving as both a causal and maintenance factor. Other studies replicated the results in diverse samples. In a sample of veterans and civilians with spinal cord injuries, death anxiety was found to significantly predict reactions of posttraumatic stress, and higher death awareness predicted re-experiencing, avoidance and hyper-arousal symptoms (Martz, 2004). Similarly, death anxiety was found to be significantly associated with PTSD symptoms severity in a sample of HIV-diagnosed individuals (Safren, Ghershuny & Hendriksen., 2003).

1.1.3.4. Death anxiety and depressive disorders

Depressive disorders are notably linked to death, lack of meaning and existential despair (Ghaemi, 2007). Generally, studies report higher levels of death anxiety for depressive individuals. For example, in a sample of depressive patients, more severe depression scores were related to higher death anxiety (Öngider, Özışık & Eyüboğlu, 2013). Öztürk, Çiçek and Eren (2023) found that schizophrenia diagnosed patients reported significantly higher levels of death anxiety than healthy controls and that the severity of their depressive and psychotic symptoms were related to death anxiety levels. In a study of postpartum mothers during the COVID-19 pandemic, hierarchical multiple regression analysis indicated that death anxiety, along health anxiety and coronavirus anxiety, predicted postpartum depression symptoms, highlighting the intensifying role of death anxiety in this disorder (Andrei, Webb & Enea, 2023).

1.1.3.5. Death anxiety and eating disorders

In the case of eating disorders, data is scarce, as few studies investigated this relationship. Generally, studies report higher levels of death anxiety for women diagnosed with eating disorders (Giles, 1995). A recent series of experiments used a mortality salience task to investigate if the priming of death leads to more severe eating disorders symptoms (Forrester, Sharpe & Menzies, 2024). Results were mixed, as in the first study, in a sample of undergraduates, the participants in the experimental group (i.e., primed with death) did not choose smaller food portions and were not significantly more discontented with their current aspect than participants in the control group (i.e., primed with dental pain). In the second study however, in a clinical sample (i.e., participants who reported clinically relevant levels of eating disorders symptoms) of 154 participants, the experimental tasks of mortality salience led to increased dissatisfaction with current thinness and choosing smaller portions of high-fat food. These results suggest death anxiety may play a partial role in disordered eating, but also emphasize the need for clinical samples.

1.1.4 Death Anxiety in Clinical and Health-Related Contexts

Based on the TMT assumptions, a medical diagnosis could act as a reminder of death, exerting a priming effect of mortality salience, leading to increased levels of death anxiety (Juhl & Routledge, 2016). This hypothesis has been supported in numerous studies, as Turan and Polat (2024) found that death anxiety increased linearly with illness perception in a sample of patients with advanced gastrointestinal cancer. In a study with severely ill people and their relatives, the highest death anxiety levels were reported by the relatives, followed by the cancer patients, and the lowest by the healthy control group (Anvar, Javadpour & Zadeh, 2012), emphasizing not only the fears of death and dying for the self, but for closed ones as well. In another study which compared myocardial infarction patients, cancer patients and healthy controls, contradicting results were found (Şahan et al., 2018). Myocardial infarction patients reported the highest death anxiety levels, followed by healthy controls, with cancer patients reporting the lowest death anxiety level (Sahan et al., 2018). Explanations offered by the authors suggest habituation with the cancer diagnosis or denial of diagnosis. However, the cancer stages were not specified, which is an important limitation seeing as the survival rates vary greatly across cancer types and stages (Yang et al., 2020). Moreover, the sample was small (i.e., N = 60 participants per group), the recruiting source of the healthy volunteers for the control group was not stated and confounding variables relevant to the hypotheses (e.g., gender, age, social support etc.) were not analyzed. A similar relationship was found by Gibbs and Achterberg-Lawlis (1978), where healthy controls reported significantly higher levels of death anxiety than cancer patients, and by Dougherty, Templer and Brown (1987) in their longitudinal study, who found that cancer patients reported significantly lower death anxiety than the control subjects and arthritic patients had the highest death anxiety. However, the authors used the DAS which has the item "I am not particularly afraid of getting cancer", which was excluded for all subjects, raising questions in regard to the validity of the results, seeing as the measure was not used as it was intended. Interestingly, the authors also assessed denial by asking participants "How serious is your illness?" and "How would you rate your physical health at this time?", observing that there was little evidence of denial of one's illness in the cancer patients, but noticing

a positive association between denial and death anxiety (Dougherty et al., 1986). It seems that denial served as a buffer against death anxiety, lending slight support to the TMT. Nevertheless, this result is once again observed by Emanuel et al. (2023), where cancer patients who reported being seriously and terminally ill had lower death anxiety scores than cancer patients who described themselves as seriously, but not terminally ill. Though this pattern where terminal and severe medical cases experience lower levels of death anxiety than milder diagnoses is interesting and can be explained by habituation or denial (Sahan et al., 2018), it is significant that we consistently observe higher death anxiety levels when a medical condition is present then when absent.

1.1.5 Death Anxiety in Meta-Analyses

Death anxiety has been investigated in meta-analyses as well, offering a broad view. For example, in a meta-analysis of 22 studies of cancer patients, Soleimani et al. (2020) found that death anxiety levels were moderate and influenced by factors such as type of cancer, gender and marital status. Specifically, studies which analyzed death anxiety in patients with breast cancer reported higher death anxiety levels compared to other types of cancer. This result is not surprising, as the authors also found that studies which included only female participants also reported higher death anxiety compared to mixed samples who included males as well. In another meta-analysis of 18 studies which included patients diagnosed with HIV/AIDS, there was a small to moderate effect of HIV/AIDS diagnostic status on death anxiety, and this relationship was moderated by time passed since the diagnosis in the sense that as the time passed since the diagnostic, the less death anxiety was experienced (Miller, Lee & Henderson, 2012). The authors also identified a moderate to large association between death anxiety and psychological symptoms (i.e., anxiety, depressive, and other/general symptoms). Another meta-analysis which included 52 studies singled out a few correlates of death anxiety in cancer patients and found that death anxiety correlates positively and significantly with symptom burden, anxiety and depression levels, fears of cancer recurrence and psychological distress (Li et al., 2024). On the other hand, death anxiety was negatively correlated with self-esteem, spiritual well-being, meaning in life, quality of life and resilience. A meta-analysis of nine COVID-19 studies found that death anxiety was high during the pandemic and varied according to fear of COVID-19, gender and occupation, with healthcare workers experiencing particularly high death anxiety levels (Özgüç, Serin & Tanriverdi, 2024).

1.1.6 Clinical Implications and Treatment Approaches

Given the hypothesized role in psychopathology, death anxiety started to be tested within psychological interventions. Among the investigated interventions, we can observe death education (Dadfar et al., 2016; Göriş et al., 2017; Kim et al., 2016; Miles, 1980), exposure techniques in the form of in vivo (Bohart & Bergland, 1978) and imaginal (Peal, Handal & Gilner 1982) group systematic desensitization, manualized individual psychotherapy for patients with cancer (Lo et al., 2019), relaxation training (Rasmussen et al., 1998) and logotherapy (Zuehlke & Watkins, 1977). Based on a systematic review and meta-analysis of 15 studies, results showed that the interventions lead to overall improvements in death anxiety and that CBT interventions are the most effective at reducing death anxiety (Menzies et al., 2018). However, the quality of the included randomized controlled trials was mostly low, highlighting the need for more rigorous studies. A network meta-analysis of 15 randomized controlled trials supports this finding, as the most effective intervention at reducing death anxiety was Rational-Emotive Hospice Care Therapy (Lu et al., 2024). A systematic review of existential interventions for death anxiety in terminal cancer patients included nine studies in the analysis, five of them being randomized controlled trials (Grossman et al., 2018). The existential interventions were analyzed based on their content and they mainly focused on themes such as meaning, dignity, relationships and spiritual well-being. Overall, the interventions followed the domains specified by Murata & Morita (2006) when a nationwide project was implemented, which involved 26 panels members and 100 multidisciplinary reviewers with the goal to establish an accepted conceptual framework when working with existential and spiritual suffering of palliative patients. At the end of the effort, the model presented seven categories to be studied in future studies: relationships, control, continuity of self, burden to others, generativity, death anxiety and hope. However, the meta-analysis (Grossman et al., 2018) found modest results, with improvements mainly in spiritual well-being and existential distress. Another meta-analysis which included sixteen studies of 1262 patients indicated that CBT, spirituality-based care and educational interventions for death anxiety manage to reduce death anxiety levels in chronic disease patients (Gulbahar-Eren et al., 2023).

While these studies and meta-analyses present interesting results regarding the efficacy of psychological interventions in death anxiety, it is important to note that a considerable number of studies are plagued with biases which interfere with meaningful results interpretation. Limitations and weaknesses diminish the validity and reliability of the data, precluding results generalization and urging for more rigorous design, sufficiently powered studies and better control of the study outcomes.

1.1.7 Death anxiety in a transdiagnostic approach

Death anxiety, a feeling of dread related to death (Malinauskaite et al., 2017), has been proposed as a transdiagnostic construct in psychopathology, hypothesizing that death anxiety plays a causal role in the emergence and maintenance of psychological disorders. Current nosological taxonomies, such as the DSM-5 (APA, 2013) and the ICD-11 (WHO, 2019) offer a distinct approach to mental disorders, describing symptoms which often appear together and labeling them as a specific disorder. While this system has led and advanced theory, research and practice, it has also been criticized for ignoring high comorbidity rates, heterogeneous clinical presentations within categorical diagnosis (i.e., due to polythetic criteria, two individuals with the same categorical diagnosis may present completely different symptoms) and underlying shared symptoms across these disorders (Brown et al., 2001; Kendler et al., 1992; Kotov et al., 2017). The transdiagnostic approach diverges from this path and aspires to explore common etiological and maintenance factors across mental disorders (Dalgleish et al., 2020). Taxometric evidence supports the idea that psychopathology is dimensional, existing on a continuum of severity rather than presenting itself at an exact threshold which then allows for a diagnosis. A transdiagnostic approach to psychopathology highlights symptoms and manifestations that appear across diagnostic categories. Such transdiagnostic factors constitute vulnerabilities to the development of psychological disorders and contribute to their maintenance,

amplifying the severity of the symptoms. For example, perfectionism (Egan et al., 2011; Sassaroli et al., 2008; Lo & Abbott, 2013), rumination (Abbott & Rapee, 2004; Kim et al., 2012; McEvoy et al., 2013; McLaughlin & Nolen-Hoeksema, 2011), neuroticism (Barlow, Curreri & Woodard, 2021), behavioral avoidance (Dozois, Seeds & Collins., 2009), low positive affect (Barlow & Kennedy, 2016), perceived lack of control (Gallagher, Naragon-Gainey, & Brown, 2014), intolerance of uncertainty (Mahoney & McEvoy, 2012), repetitive negative thinking (Moulds & McEvoy, 2025) and magical ideation (Einstein & Menzies, 2006) have all been investigated and explored as possible transdiagnostic factors involved in disorders such as anxiety disorders, depression, OCD and eating disorders. Thus, a transdiagnostic interventional approach is far more encompassing than the usual focus on distinct and separate disorders (Dozois et al., 2009) and promises overall symptom improvement and prevention regardless of the clinical presentation (Abbott & Rapee, 2004; Dudley, Kuyken & Padesky, 2011; Egan et al., 2011; McLaughlin & Nolen-Hoeksema, 2011). Therefore, the interest in transdiagnostic factors in psychopathology comes from the potential they carry and the encompassing manner of addressing clinical symptoms.

To highlight the need to move from the categorical system, (Menzies et al., 2024) investigated the revolving door effect which describes the tendency for individuals to present with one set of symptoms for which they receive treatment, but to return later with another set and type of symptoms. This is not a new concept (Kotov et al., 2017) and theoretical models such as the Hierarchical Taxonomy of Psychopathology model (HiTOP; Kotov et al., 2017) can provide a framework for these situations. If we were to look at clusters of symptoms instead of categorical disorders, then the HiTOP model could explain why an individual could present with a disorder and later on with another. In their meta-analysis, Menzies et al. (2024) addressed this phenomenon and based on 27 studies, it was determined that the rate of lifetime disorders was almost double (1.84 times) the rate of current disorders. Another interesting finding is that anxiety disorders tend to precede other diagnoses, giving way to mood and substance disorders. Panic disorder was the exception, as it was observed to appear a consequence of other anxiety disorders. Given these results, one might hypothesize that there are one or more common factors to most of the psychological disorders, and identifying such factors would provide a new approach to diagnosis and treatment. The categorical model of psychological disorders also leads to the fragmentation of psychological concepts. In a comment, Anvari et al. (2025) identify the increasing number of constructs and measures, with data suggesting that 79% of them are not reused more than twice (Anvari et al., 2024; Elson et al., 2023). This tendency to create more and more constructs is facilitated, among other reasons, by the categorical approach. By accepting the existence of distinct psychological disorders, we assume distinct symptoms and distinct causal factors. For example, Fried et al. (2022) demonstrates there are over 280 instruments to measure depression, many of them assessing different symptoms. Therefore, Anvari et al. (2025) call for the defragmentation of psychology by refocusing from substantive research towards the refining of existing constructs and measures. A dimensional and transdiagnostic approach would adopt the principle of parsimony by isolating symptoms rather than disorders and attempting to find common factors responsible for the onset, maintenance and exacerbation of the symptoms.

1.2. Relevance and Impact of the Research

As death is a universal experience, the interest in death anxiety as a psychological experience is apparent. As presented above, current empirical research indicates an elaborate network of relationships between death anxiety and multiple clinical disorders and symptoms. Furthermore, death anxiety is a frequent feature of most mental disorders and an often-cited reason for seeking treatment (Angst et al., 2010). In this way, death anxiety can be viewed as a vulnerability which can be prompted by emotional triggers surrounding death. Depending on the context and other individual variables, death anxiety could increase vulnerability to the onset of certain disorders, amplify their severity once they emerge and contribute to difficulties in coping effectively. Thus, the general objective of the present thesis was to investigate the role of death anxiety in distress and psychopathology, focusing on theoretical gains, as well as methodological advancements and practical implications.

While it has been postulated that the fear of death is the “worm at the core” (James, 1902) and is responsible for most of our afflictions and anguish (Yalom, 2008), data are still mixed. The TMT benefits from a great deal of empirical support, but it is also considered a controversial theory given the latest disputes (Klein et al., 2022). Though the TMT and theories of defense in general do not make specific predictions regarding psychopathology per se, they all imply death anxiety leads to distress, which can interfere with functionality, leading to considerable difficulties (Angst et al., 2010). Furthermore, confirmation of the transdiagnostic nature of death anxiety would elevate its role among the established transdiagnostic factors in psychological disorders. By proposing a new transdiagnostic psychological factor, both theory and practice can benefit, especially when individuals present with considerably high levels of death anxiety.

This represents the core of the thesis: if death anxiety is a transdiagnostic factor, then interventions targeting death anxiety could lead to overall symptom improvement, without the need to employ individual specific protocols for each disorder a person may present with. A dimensional approach to psychological disorders focuses on common etiological and maintenance factors across mental disorders and if death anxiety is one such factor, then targeting death anxiety would prevent and treat psychopathological symptoms, as well as maintain therapeutic effects long term, avoiding high relapse rates and the revolving door effect (i.e., individuals recovering from one set of symptoms and later presenting with another; Menzies et al., 2024). Such an approach would lead to improved diagnostic and treatment effects, enriching current research and proposing future directions regarding the manner of tackling disorders and general distress.

Summarizing, this thesis contributes theoretically by investigating death anxiety as a transdiagnostic factor across psychological disorders, proposing a new potential approach to mental disorders and their treatment. By investigating the magnitude of the relationship between death anxiety and psychopathology in a meta-analytic, comprehensive approach, we attempted to clarify and unravel the currently mixed empirical data. Furthermore, we aimed to test the relationship between death anxiety and symptoms of depression and anxiety. Specifically, we aimed to explore the role of death anxiety in a mediation model when considering an established

transdiagnostic factor, namely neuroticism, in the manifestations of these symptoms. Methodologically, we lend credibility to death anxiety research by attempting to validate a death anxiety measure which will allow for a reliable measurement of death anxiety levels, promoting accurate research practice. Finally, from a practical point of view, we examined the efficacy of a newly developed ACT based protocol in reducing death anxiety and investigate whether changes in death anxiety levels are what leads to changes in symptoms of depression and anxiety.

CHAPTER II. OBJECTIVES AND GENERAL METHODOLOGY

The general aim of the present thesis is to investigate the role of death anxiety across human psychopathology. Death anxiety is consistently associated with distress and psychological symptoms, but it is still unclear whether death anxiety plays a causal role in the manifestation of multiple psychological disorders. To this end, we mapped out four main objectives on a theoretical, methodological, and practical level.

Firstly, we aimed to analyze the association between death anxiety, distress and psychopathology. While we know there is a correlation between these variables, the results regarding the valence, magnitude and statistical significance of the associations are mixed, and the overall role of moderating variables is still unknown. We conducted a meta-analysis of 129 studies assessing the correlation (Pearson's r) between death anxiety and psychological distress and symptoms of mental disorders. To explain the likely heterogeneity, we aimed to investigate the moderating role four moderators: (1) sample type, (2) medical diagnosis, (3) death anxiety measures and (4) the percentage of women within the study sample. Additionally, we assessed the quality of the included studies and analyzed the evidence for small-study effects. This meta-analysis served to guide the rest of the studies, based on the observed overall effect and future directions established by reviewing the literature.

Secondly, given that discourse and empirical research on death anxiety can prove fruitless in the absence of psychometrically sound measures, we aimed to translate and validate the Death Anxiety, Beliefs and Behaviors Scale (Menzies et al., 2022). The 18-items scale was developed in a Cognitive-Behavioral framework, as it evaluates anxiety related to death, unhelpful cognitions one might have about death and behaviors one might employ when thinking of death. It was validated on Australian and British samples and has an established cut-off point of >55, meaning that death anxiety levels over this score are considered clinically relevant. We followed established procedures of translation and aimed to replicate the factorial structure (i.e., 'Affect', 'Beliefs' and 'Behaviors') in a Romanian sample using exploratory and confirmatory analyses. Multiple forms of validity and reliability were also assessed.

Thirdly, we investigated whether death anxiety mediates the relationship between neuroticism and symptoms of depression and anxiety, assessing its additional explanatory value beyond neuroticism in a general population sample.

Fourthly and lastly, the final objective was to develop and assess the efficacy of an Acceptance and Commitment Therapy (ACT) based intervention in reducing death anxiety levels in a clinically relevant sample with symptoms of depression and anxiety. To this end, we performed a randomized placebo-controlled pilot trial where we compared a newly developed ACT protocol ('From Fear to Purpose') against an attention control placebo condition. Additionally, to assess the transdiagnostic role of death anxiety, we examined if changes in death anxiety levels lead to changes in depression and anxiety symptoms.

To address the main question of the thesis - the role of death anxiety in psychopathology- we bring forth theoretical, methodological and practical advancements. Our meta-analysis provided a comprehensive overview of the empirical data on death anxiety, quantifying its association with psychopathology and identifying potential underlying mechanisms. We strengthened our findings by translating and validating a death anxiety measure into Romanian, ensuring accurate and reliable assessment. Aditionally, through a mediation model and a randomized placebo-controlled trial, we established the causal role of death anxiety and evaluated the effectiveness of targeting it in therapy, contributing both to research and to clinical practice.

Thus, the present thesis aims to enrich current empirical literature by establishing the transdiagnostic nature of death anxiety and its role in psychopathology and proposing a new perspective on understanding disorder symptoms. Additionally, we also aim to strengthen how death research anxiety is conducted by providing a psychometrically sound measure of death anxiety, to benefit both individuals who may experience high death anxiety, as well as therapists who need evidence-based strategies to evaluate and track clients' symptoms. Moreover, the main stake of the present thesis is a practical one and hinges on the hypothesized transdiagnostic nature of death anxiety. If death anxiety proves to have a causal role in the onset, course and evolution of psychopathology, then addressing this specific fear could lead to overall symptom improvement, in the long term. By investigating the efficacy of an ACT-based intervention to reduce death anxiety levels and symptoms of depression and anxiety, we aim to offer a more effective diagnostic approach and evidence-based treatments, especially for individuals with intense death anxiety.

3.1. Study 1: A Meta-Analysis of the Association of Death Anxiety with Psychological Distress and Psychopathology[1]

3.1.1. Introduction

Death anxiety, commonly conceptualized as apprehension when one thinks of death or the process of dying (Farley, 2018), has long been considered a fundamental aspect of human distress, given its inevitable and universal nature. A systematic review (Iverach et al., 2014) of cross-sectional and experimental studies showed that death anxiety was associated with symptoms of specific phobias, panic disorder, social anxiety, agoraphobia, depressive disorders, obsessive-compulsive disorder (OCD) and post-traumatic stress disorder (PTSD). The authors hypothesized that death anxiety could play a transdiagnostic role in the development and maintenance of several mental disorders.

A large number of studies have investigated the relationship between death anxiety and symptoms of mental disorder or distress resulting from psychological or physical disorders. Most of these studies were cross-sectional, with death anxiety and symptoms measured concomitantly. For example, in a cross-sectional study of 200 participants with a current DSM-5 (APA, 2013) diagnosis (for example, generalized anxiety disorder, major depressive disorder, OCD, panic disorder, post-traumatic disorder), death anxiety was statistically significantly associated with psychopathology, including the number of lifetime diagnoses, medications, past hospitalizations, clinician ratings of distress, depression, anxiety and stress, even after controlling for neuroticism (Menzies et al., 2019). Furthermore, strong positive correlations (Pearson's *r* ranging from 0.60 to 0.82) were observed between death anxiety and symptom severity (Menzies et al., 2019).

Cross-sectional studies have also indicated that death anxiety was positively associated with psychological distress measured in hemodialysis patients (Korkut, 2022), OCD severity (Chawla, Menzies & Menzies, 2022), depression and anxiety (Tang et al., 2021), PTSD (Kira et al., 2021), and fear of COVID-19 (Scrima et al., 2022). For example, one study showed that individuals with higher death anxiety experience more disorders before the onset of OCD (that is, social anxiety, specific phobias, illness anxiety and generalized anxiety), while individuals with lower death anxiety are more likely to develop OCD as a first disorder (Menzies et al., 2021). Though longitudinal studies have been fewer, they have generally reported consistent findings. One study showed that baseline death anxiety predicted symptoms of somatic distress, paranoia, depression, anxiety and post-traumatic stress measured after one month (Waite et al., 2022). In another longitudinal study, death anxiety was prospectively associated with depression and reduced quality of life in patients diagnosed with Huntington's disease (Sokol et al., 2023).

Various theories have been proposed to account for how death anxiety might impact perceptions and experiences, including psychopathology and distress. Though relying on different and often vaguely defined constructs, these theories share the idea that death represents a salient emotional threat for most people, leading to negative cognitions and emotions and the activation of more or less adaptive coping mechanisms (Hart, 2014). In turn, these cognitive, emotional and coping factors connected to the idea of death could contribute to psychopathology. For example, one of the most prominent theories, the terror management theory (TMT; Greenberg et al., 1986), asserts that death is viewed as a dominant threat, and as such, it causes death anxiety, which is then managed through the use of proximal (that is, when conscious thoughts of death are present) or distal (that is, when unconscious thoughts of death are present) coping mechanisms. Empirical support for this theory comes from a meta-analysis (Burke et al., 2010) of 164 studies with 277 included experiments, suggesting that death-priming tasks produce observable effects, such as increased threat estimations and avoidance responses to spiders in an arachnophobic sample (Strachan et al., 2007) and increased time spent hand-washing in an OCD-diagnosed sample (Menzies & Dar-Nimrod, 2017; Strachan et al., 2007). However, Fiedler et al. (2012) questioned the assumption of mortality-related thoughts being the cause of these responses. Moreover, a multilab preregistered replication study (Klein et al., 2022) involving 21 laboratories in the USA failed to replicate key predictions of the TMT. Other similar theories, such as relational theories, assert that humans have innate gregarious instincts and needs (Bowlby, 1969), which are threatened by death, as it represents the final separation. However, relational theories struggle to explain why abstract threats, such as perceiving oneself as powerless, provoke responses similar to those triggered by thoughts of death (Randles et al., 2011). The meaning maintenance model (Heine et al., 2006) contends that humans wish for meaning and consistency in the form of expected relations between mental representations, and death represents a threat to this meaning.

Though none of these theories make specific predictions about psychopathology per se, they all imply death anxiety leads to distress, which, particularly if potent and pervasive, is a frequent feature of most mental disorders and an oft-cited reason for seeking treatment (Angst et al., 2010). Existent meta-analyses on the relationship between death anxiety and distress are limited to particular types of participants or disorders. For example, Miller et al. (2012) found a positive correlation (Pearson's *r*) of 0.50 between death anxiety and psychological symptoms in HIV/AIDS-positive individuals. Another meta-analysis found moderate levels of death anxiety in cancer patients, which were higher for breast cancer patients than for those with other types of cancers, and higher in female-only samples (Soleimani et al., 2020).

---

[1] This work has been published: Dumitru, E. P., Cardoş, R. A. I., Milea, I., Gambarota, F., Altoè, G., David, D. O., & Cristea, I. A. (2025). A meta-analysis of the association of death anxiety with psychological distress and psychopathology. *Nature Human Behaviour*, 1-11. https://doi.org/10.1038/s41562-025-02115-7

E.P.D. conceptualization, methodology, formal analysis, investigation, data curation, writing—original draft, and writing—review and editing. R.A.I.C.: conceptualization, methodology, resources, data curation, visualization, writing—original draft, writing—review and editing, supervision, and project administration. I.M.: formal analysis, investigation, resources, data curation and visualization. F.G.: formal analysis, visualization, software, and writing—review and editing. G.A.: formal analysis, writing—review and editing, and supervision. D.O.D.: conceptualization, writing—review and editing, supervision, and project administration. I.A.C.: methodology, formal analysis, investigation, data curation, writing—review and editing, supervision, and project administration.

We thus conducted a comprehensive meta-analysis of all studies relating death anxiety to psychological distress. Our goal was to estimate the magnitude of this relationship across general population and clinical samples.

Overview of the present study

We included all studies reporting a correlation between death anxiety on the one hand and measures of distress and symptoms of mental disorders on the other. We included various distress types and symptoms, relevant for both the general population and clinical (that is, with symptoms or diagnoses of mental disorders) samples. Specifically, we considered measures of general distress (including perceived stress), anxiety (both general and COVID-19-related), depression, general psychopathology, symptoms of PTSD and symptoms of OCD. We also examined potential moderators of the relationship between death anxiety and distress or symptom outcomes, including the type of sample (general versus clinical), the presence of medical conditions, the measurement instrument used for death anxiety and the proportion of women in the sample. Though we had no specific, directional hypotheses, we speculated that the relationship between death anxiety and distress would be stronger in clinical samples, on the basis of literature linking death anxiety with psychopathology, and in samples with medical conditions (for example, cancer), on the basis of the idea that physical illness acts as a primer for the finitude of life (Turan & Polat, 2024).

3.1.2. Results

The meta-analysis is reported following the PRISMA 2020 guidelines (Page et al., 2021). As shown in the PRISMA 2020 flow diagram (Haddaway et al., 2022; Fig. 1), 27,519 studies were identified from database searches, and 38 were identified from citation searches. After the removal of duplicates (10,829 studies), 16,690 studies were screened on the basis of title and abstract, of which 489 were selected for full-text inspection. Full texts could not be retrieved for 14 studies; thus, 475 full texts were assessed for eligibility. Of these, 61 did not report the correlation data necessary for effect size calculation. Contact with these authors led to the retrieval of data from 5 studies. After screening, 346 studies were excluded (see Supplementary Section C for a list of excluded studies with the reasons for exclusion), leaving a total of 129 eligible for inclusion in the meta-analysis (the full list is in Supplementary Section B).

Figure 1 can be consulted in the thesis.

Characteristic of the included studies

A total of 129 studies, containing 158 independent samples for a total of 34,147 participants, were included. The studies were conducted across 38 different countries over the past 58 years. The mean sample size was 216 participants. The weighted mean age was 37 years (s.d. = 15.62; range, 13–78). Selected descriptive characteristics of the included studies are provided in Supplementary Section D. Fifteen studies (2,176 participants) included a clinical sample, and 31 studies (4,798 participants) included participants with a medical condition (for example, cancer, HIV or Huntington's disease). Fourteen studies used only male participants, whereas 15 studies used female-only samples. The mean percentage of women participants was 61% (s.d. = 24.44).

The most used instrument to measure death anxiety was the Death Anxiety Scale (DAS; Templer, 1970; 53 studies), followed by the Death Anxiety Profile—Revised (Wong, Reker & Gesser, 2015; 10 studies), the Death Anxiety Questionnaire (Conte, Weiner & Plutchick, 1982), the Collet–Lester Fear of Death Scale (CLFDS; Lester, 1990) and the Multidimensional Fear of Death Scale (Hoelter, 1979) with seven studies each. Symptom outcomes were mostly assessed with self-report measures, but some studies used structured interviews (for example, the Clinician-Administered PTSD Scale (Weathers et al., 2018).

Depression and general anxiety were the most frequent outcomes, each assessed in 52 studies. PTSD symptoms and distress were each measured in 19 studies, COVID-19 anxiety in 15 studies, general psychopathology in 14 studies and OCD symptoms in 4 studies (5 samples). Outcomes such as panic disorder, borderline personality disorder, bipolar disorder and schizophrenia had less than five effect sizes and were thus not statistically aggregated.

Quality assessment of the included studies

Of the 129 included studies, according to the categorization provided by the Study Quality Assessment Tools (NHLBI; n.d.), 128 studies were observational cohort/cross-sectional studies, and one was a single randomized controlled trial. Among the observational cohort and cross-sectional studies evaluated, 38 (30%) were rated as having 'fair' quality and 90 (70%) as having 'poor' quality, with none classified as 'good' quality." The most common issues (Fig. 2) were the lack of justification for sample size ($n = 108$), the absence of pre-outcome exposure assessment ($n = 128$) and insufficient time to observe an effect ($n = 128$). For the single randomized controlled trial included, the overall risk of bias (Sterne et al., 2019) was classified as high. Although it met several criteria for low risk in some areas, considerable concerns arose from missing data and selective reporting, which undermines the overall validity of the study's findings (Fig. 2). The quality ratings are provided in Supplementary Section E.

Figure 2 can be consulted in the thesis.

Meta-analysis

The relationship between death anxiety and distress-related outcomes

The pooled correlation coefficients were positive and statistically significant for all outcome categories (Table 1). For the distress composite outcome, which included general anxiety, depression and distress measures, 79 effect sizes were aggregated into a pooled effect size ($r = 0.41$; $P < 0.001$; 95% confidence interval (CI), (0.33, 0.47); $I2 = 94\%$). Similar results were reported for the relationship with general anxiety ($r = 0.42$; $P < 0.001$; $k = 68$; 95% CI, (0.37, 0.47); $I2 = 90\%$), COVID-19 anxiety ($r = 0.41$; $P < 0.001$; $k = 19$; 95% CI, (0.34, 0.48); $I2 = 88\%$) and depression ($r = 0.41$; $P < 0.001$; $k = 60$; 95% CI, (0.31, 0.50); $I2 = 95\%$). The relationship

with distress, including perceived stress, was also statistically significant ($r = 0.36$; $P < 0.001$; $k = 24$; 95% CI, (0.30, 0.41); $I2 = 82\%$). For outcomes related to psychopathology, the relationships were moderate, including for general psychopathology ($r = 0.32$; $P < 0.001$; $k = 16$; 95% CI, (0.16, 0.46); $I2 = 94\%$), PTSD ($r = 0.34$; $P < 0.001$; $k = 19$; 95% CI, (0.25, 0.42); $I2 = 91\%$) and OCD ($r = 0.67$; $P = 0.03$; $k = 5$; 95% CI, (0.2, 0.89); $I2 = 93\%$). The prediction interval (PI) crossed zero for each outcome category except for anxiety (both general and COVID-19-related) and distress.

Subgroup analyses

The results of the subgroup and meta-regression analyses are displayed in Table 2. The relationships between death anxiety and the composite distress outcome, general anxiety, depression and PTSD did not show statistically significant differences between samples from the general population and clinical samples.

Table 1 can be consulted in the thesis.
Table 2 can be consulted in the thesis.

However, the relationship was statistically significantly higher ($t(35.37) = -2.055$, $P = 0.047$) for the distress composite outcome in samples with medical conditions ($r = 0.47$; $P < 0.001$; $k = 25$; 95% CI, (0.36, 0.57); $I2 = 96\%$) than in those without one ($r = 0.37$; $P < 0.001$; $k = 54$; 95% CI, (0.29, 0.44); $I2 = 92\%$). For general anxiety and depression, the difference did not reach statistical significance.

The relationships did not statistically differ between studies that used the DAS and those that used any other death anxiety measures. The proportion of women in the sample did not have a statistically significant effect on the relationship between death anxiety and any of the outcome categories considered.

Sensitivity analyses

The analysis restricted to studies rated as fair quality was generally consistent with the main analysis (Table 3). The effect size was smaller for the distress composite outcome and for general anxiety, depression and distress. For all other outcomes, there were less than five effect sizes coming from studies of fair quality. The largest difference from the main analysis was identified for depression ($r = 0.33$; $P < 0.001$; $k = 19$; 95% CI, (0.23, 0.42); $I2 = 89\%$).

Table 3 can be consulted in the thesis

Estimates from studies using only the DAS as a measure of death anxiety revealed similar estimates as the main analyses. For the distress composite category ($r = 0.44$; $P < 0.001$; $k = 38$; 95% CI, (0.30, 0.56); $I2 = 96\%$) and depression ($r = 0.45$; $P < 0.001$; $k = 31$; 95% CI, (0.27, 0.60); $I2 = 97\%$), the effect size was marginally higher, while for general anxiety ($r = 0.43$; $P < 0.001$; $k = 32$; 95% CI, (0.35, 0.52); $I2 = 93\%$) and distress ($r = 0.32$; $P < 0.001$; $k = 9$; 95% CI, (0.25, 0.40); $I2 = 46\%$), the effect size was marginally lower.

Sensitivity analysis using different values for the correlation between subscales measuring the same outcome domain ($r = [0, 0.4, 0.5, 0.8]$) was almost identical to the main analysis (see Supplementary Section H for the full results).

Small-study effects

Visual inspection of the funnel plot (Supplementary Section F) showed evidence of small-study effects. Egger's test (Table 4) indicated statistically significant funnel plot asymmetry for the distress outcome ($\beta = 1.81$; $P = 0.03$; 95% CI, (0.21, 3.41)). The results from the trim-and-fill analyses are presented in Table 5. Studies were imputed in two instances, both times on the left of the pooled effect size, for the distress (seven imputed studies; corrected $r = 0.30$; 95% CI, (0.23, 0.36)) and general psychopathology outcomes (three imputed studies; corrected $r = 0.24$; 95% CI, (0.09, 0.38)).

Table 4 can be consulted in the thesis.
Table 5 can be consulted in the thesis.

3.1.3. Discussion

We report the most comprehensive meta-analysis to date on the relationship between death anxiety and various forms of psychological distress, in general and clinical populations. Our approach was broad, including all studies that reported correlations between death anxiety and distress. We considered a range of distress-related outcomes, such as general distress (including perceived stress), anxiety (general and COVID-19-related), depression, general psychopathology, PTSD symptoms and OCD symptoms. The results are based on 158 samples from 129 studies, encompassing over 34,000 participants. The quality of most studies was poor, with only a third of the studies rated as 'fair' and none as 'good' quality.

The most robust findings indicated linear correlations (Pearson's r) ranging from 0.36 to 0.42 for the relationship between death anxiety and distress, anxiety and depression, separately and combined in a composite outcome. Associations of a similar magnitude, but based on a more limited number of samples (between 5 and 19), emerged for general psychopathology, COVID-19 anxiety and symptoms of PTSD. However, heterogeneity was substantial, and most PIs crossed zero, except for anxiety (general and COVID-19-related) and distress. Analyses restricted to studies of better quality ('fair') could not be run for most outcomes because of the limited number of studies. For depression, the estimates were reduced in the studies of better quality. There was also evidence of small-study effects. Therefore, though the association between death anxiety and distress was consistently statistically significant and

of similar size across general population and clinical samples, poor overall study quality, unexplained heterogeneity and small-study effects imply that the true association might have been over- or underestimated. Several guidelines are available for interpreting the magnitude of *r* (Cohen, 1992; Sapp, 2006). However, these categorizations are general and not field-specific, which means these effect sizes could be considered large in some research areas, but small in others.

To explore the statistically significant heterogeneity observed, we conducted various subgroup analyses. The association between death anxiety and distress or symptom outcomes did not indicate statistically significant differences between general population and clinical samples. However, only a limited number of studies employed clinical samples (15/129). Moreover, these studies were heterogeneous with regard to inclusion criteria, recruitment, diagnoses and other factors. The association between death anxiety and distress categories was stronger in samples of individuals with medical conditions than in those without. The presence or anticipation (for example, COVID-19) of a physical illness could act as a primer for mortality (Turan & Polat, 2024). This finding could be seen as supportive of TMT (Greenberg et al., 1986), whereby an illness has a priming effect for mortality salience, which in turn could lead to increased levels of death anxiety. Past research also reported that elderly individuals with a physical illness (Fortner, 1999) had higher levels of death anxiety and that death anxiety linearly increased with illness perception (Turan & Polat, 2024) in a sample of patients with advanced gastrointestinal cancer. Further research could clarify the role of physical illness in exacerbating the relationship between death anxiety and distress.

We also found no statistically significant evidence that the relationship between death anxiety and distress-related outcomes might be stronger in predominantly female samples. Previous empirical data have indicated higher levels of death anxiety for women (Eshbaugh & Henninger, 2013; Quince et al. 2011; Türkarslan et al., 2020). Similarly, depression (Kuehner, 2017) is generally more prevalent in women. However, the fact that both death anxiety and depression are more prevalent in women does not imply that they should be more strongly related. Disparities in how distress is manifested across genders may obscure potential moderating effects of gender (such as greater anxiety about the physical pain, suffering and loss of dignity (Tang et al., 2011). Women may fear certain aspects of death and dying more than men, while other aspects are equally feared. For instance, Tang et al. (2002) found statistically significantly higher levels of fear of the dying process, of fear for the body after death and of fear for significant others in women, but no differences in fear of the unknown or fear of premature death. Future studies should consider developing death anxiety measures sensitive to gender, age and culture, by addressing salient aspects for each category, based perhaps on previous qualitative research. This could clarify which aspects of death are feared more by women than by men, or by various subgroups.

The high degree of heterogeneity observed was only minimally explained by the subgroup analyses performed. Another explanation for heterogeneity could be methodological. First, as already mentioned, no study could be rated as having 'good' quality, and two thirds were rated as 'poor'. The results from the sensitivity analyses restricted to studies rated as 'fair' quality were largely similar to those from the main analyses, though the estimates were reduced for each outcome. However, in the absence of any good-quality studies, it is difficult to conclude that the estimates are robust. Moreover, there was some evidence for small-study effects, but whether these indicate publication bias is unclear, as random sampling error and true heterogeneity cannot be excluded. Methods to correct for funnel plot asymmetry, such as the trim-and-fill method, imputed studies only to the left of the pooled effect size for two outcome categories, providing limited evidence for publication bias.

Second, the measurement of death anxiety poses various challenges. Most of the included studies used a unidimensional measurement of death anxiety, such as the DAS. While analyses including studies that only used the DAS as a measurement of death anxiety revealed very similar results to the overall analyses, fear of death is generally viewed as a multidimensional construct, encompassing cognitive, emotional and behavioral components. Menzies et al. (2022) tapped into this need and developed a new scale, the Death Anxiety Beliefs and Behaviors Scale, which measures affect, beliefs and behaviors related to death. This scale was not used in any of the included studies in the present meta-analysis. The measurement of death anxiety should also account for the fact that fear of dying is distinct from fear of what may happen after death. For example, measures such as the CLFDS (Lester, 1990) and the Multidimensional Fear of Death Scale (Hoelter, 1979) contain multiple subscales assessing for different facets of death anxiety. However, their psychometric properties are poor or even absent (Zuccala, 2022), and, by choosing to focus on certain aspects of death anxiety, they may neglect other aspects. For example, the CLFDS (Lester, 1990) includes a subscale on the fear of the death of others, but no item addresses the afterlife. Beyond the need for a multidimensional assessment, there are critical issues regarding the psychometric properties of the tools currently used to assess death anxiety. These instruments have been analysed in detail by Zuccala et al. (2022), with issues raised for both validity and reliability. None of the 27 measures examined received completely positive ratings on the assessed criteria, such as content validity, internal consistency and interpretability (Terwee et al., 2007), though the DAS (Templer, 1970) presented the most evidence supporting its validity and reliability. There is a crucial need to enhance measurement tools for death anxiety, as there is currently no gold-standard instrument. Moreover, self-report measures might not be adequate to assess death anxiety. The main assumption of theories such as the TMT regards the unconscious impact death anxiety has on humans, which cannot be captured by self-report measures. However, given the currently debated status of the TMT explaining death anxiety (Klein et al., 2022), it is not clear whether behavioral tasks would be more useful than self-report. Ecological Momentary Assessment (Shiffman et al., 2008), by reporting thoughts, behaviors or emotions related to death and dying several times a day, could contribute to a better understanding of the construct, particularly in samples where death anxiety is high.

The present meta-analysis has several important limitations. First, the included studies were observational and mostly cross-sectional studies, meaning that temporal precedence, reverse causality (that is, distress leading to death anxiety instead of the other way around) and third-variable effects cannot be excluded. Second, as mentioned, most studies were rated as poor from a methodological point of view. Third, the included studies used self-report measures of death anxiety, which often have poor psychometric properties (Zuccala et al., 2022), such as unreported content validity and limited ability to detect changes over a given period. These measures were also highly dependent on participants' subjectivity, as were the distress and symptom outcomes considered. Fourth, subgroup and

meta-regression analyses were limited by incomplete reporting of sample characteristics (for example, gender ratio) in several of the included studies. Fifth, few studies were conducted in clinical samples. More rigorous designs, such as experimental studies and longitudinal studies, can effectively reduce or even eliminate reverse causality and clarify the directionality between death anxiety and psychological distress. For example, large cohort studies could systematically measure death anxiety, distress and the incidence of psychological disorders at various time points.

In conclusion, in a large-scale meta-analysis, we found a consistently high association between death anxiety and outcomes related to psychological distress and psychopathology, across general population and clinical samples. However, substantial heterogeneity, low quality of the included studies and questions about the psychometric properties of the instruments used to measure death anxiety imply that the true magnitude of the association might be different. Our findings support future investigation of death anxiety in rigorously planned and reported longitudinal studies including cohorts of individuals with different mental disorders. Such studies should ideally use multiple or multidimensional instruments to measure more dimensions of death anxiety and further clarify the nature of the involvement of death anxiety in psychopathology.

3.1.4. Methods

The meta-analysis was preregistered at https://osf.io/a2yeh/ on 7 June 2022. A preliminary update was made on 22 November 2023 and a final update on 28 February 2024, owing to several deviations from the protocol. Deviations from the original preregistration and their rationale are presented in detail in the Supplementary Information (Supplementary Section G). Key deviations from the original version include the search strategy, which was revised to be broader by using only keywords related to death anxiety (Supplementary Section A) and eliminating all the previous terms related to specific types of distress. We also eliminated two initially searched databases (Clarivate Web of Science and Scopus) as they were citation databases with limited search functionality. Instead, we added two other bibliographic databases, in addition to the ones used previously (Medline via PubMed and PsychInfo): EMBASE and the Psychology and Behavioral Sciences Collection (searched via EBSCO). Content in EMBASE and Medline largely overlaps with Scopus, and they both include more instruments for tailoring the search. The categorization of distress was simplified to aid the interpretation of the results, replacing the initial vague categorization with a clearer one outlined in the 'Data extraction' section. Well-being was initially included as an outcome but was later discarded since it proved too heterogeneous, which made the interpretation of the results difficult and inconsequential. Accordingly, the primary analyses were changed to focus on separate outcomes. Moderation analyses based on clinical status were simplified to sample type (general versus clinical). Culture and age were excluded from the subgroup analyses due to limitations related to the aggregation of these individual variables at the study level or potential confounding factors. Instead, presence of medical conditions as a moderator was introduced. We also introduced measure of death anxiety as a moderator, coded as a dummy variable of studies that used the DAS, which was the most used measure, versus studies that used any other death anxiety measure. Sensitivity analyses were added to assess the impact of including only good-quality studies as evaluated by the Study Quality Assessment Tools (NHLBI). We also performed exploratory sensitivity analyses assuming different levels of correlations when a study had multiple subscales of the same outcome measure and thus needed to generate a single effect size using the method proposed by Borenstein et al. (Borenstein et al., 2021). All statistical analyses were redone using R instead of the initial commercial software Comprehensive Meta-Analysis. This was done to ensure that the analyses are entirely reproducible, as the complete data analysis code and the datasets have been made available via the Open Science Framework (https://osf.io/a2yeh/).

Selection of studies

We systematically searched PsychInfo, the Psychology and Behavioral Sciences Collection (via EBSCO), Embase, and Medline (via PubMed) from database inception up to 30 October 2023, using combinations of terms related to death anxiety such as 'death', 'dying', 'existential' and 'thanatophobia' combined with 'fear', 'anxiety', 'dread', 'phobia' and 'distress'. Complete search strings, with search dates and the number of records identified in each database, are provided in Supplementary Section A. Additionally, we used citation searching and browsed highly cited death-related studies and previous meta-analyses to identify potential articles. Screening of titles and abstracts, as well as the full-text examination, were conducted by the same pair of researchers (E.P.D. and I.M.), working independently. Disagreements were resolved by discussion and consultation with a third researcher (R.A.I.C.).

Included studies (1) investigated the association between death anxiety and distress; (2) assessed at least one type of psychological distress or symptoms, such as depression or anxiety; (3) included samples from the general population (that is, individuals not screened for mental disorders) or clinical (defined as a diagnosis or symptoms of mental disorders) samples assessed with a diagnostic interview or using validated clinical scales; (4) reported a parametric correlation coefficient (Pearson's *r*); (5) had a cross-sectional, longitudinal or experimental design (only the baseline/pre-manipulation measurements were considered for longitudinal and experimental designs); and (6) employed validated instruments for both death anxiety and distress-related outcomes. Studies using mixed samples were included as long as they reported separate correlations for the general and clinical population samples.

We excluded studies that employed unvalidated death anxiety and distress-related outcome measures, including those that proposed new instruments, and those that were not published in peer-reviewed journals. Articles written in English, Italian, Spanish, Romanian and German were eligible.

Data extraction

Two researchers (E.P.D. and I.M.) independently examined the full texts of the included articles and extracted the following information: study identification data (author and publication year), outcome, outcome measure (for example, Generalized Anxiety Disorder-7 (Spitzer et al., 2006), Beck's Depression Inventory (Beck et al., 1961) or Vancouver Obsessional Compulsive Inventory (Thordarson et al., 2004), death anxiety measure (for example, the DAS (Templer, 1970) or CLFDS (Lester, 1990)), sample size, mean

age of the participants, percentage of female participants, type of sample (that is, general or clinical population), medical conditions (that is, present or absent), and the correlation coefficient between death anxiety and all eligible measures of distress.

For the studies that reported multiple correlation coefficients between death anxiety and different instruments measuring the same outcome (for example, depression), we selected only one correlation, choosing the most commonly used instrument across studies. Conversely, for cases where studies reported multiple correlations between death anxiety and subscales of the same instrument, we included all correlations, combining them into a single effect size using the method proposed by Borenstein et al. (2021). Only parametric correlation coefficients (Pearson's r) were included. Disagreements were resolved through discussion until a consensus was reached. The interrater agreement (Cohen's κ; McHugh, 2012)) prior to resolving disagreements was excellent ($\kappa = 0.93$).

Distress-related outcome measures were grouped into the following categories: general anxiety (for example, Generalized Anxiety Disorder-7 (Spitzer et al., 2006)), depression (for example, Beck's Depression Inventory (Beck et al., 1961)) distress (for example, Kessler Psychological Distress Scale (Furukawa et al., 2003)), general psychopathology (for example, Symptom Checklist-90-R (Derogatis & Savitz, 1999)), PTSD (for example, Impact of Event Scale (Weiss, 2007)), OCD (for example, Vancouver Obsessional Compulsive Inventory (Thordarson et al., 2004)) and COVID-19 anxiety (for example, COVID-19 Anxiety Scale (Lee, 2020)). We also extracted outcomes related to symptoms of panic disorder, borderline personality disorder, bipolar disorder and schizophrenia, but these were not included in the analysis due to an insufficient number of effect sizes (that is, less than five). Additionally, to enhance the power of the subgroup analyses, we created a composite distress category that combined general anxiety, depression and distress, given the strong interrelation and high comorbidity among these constructs (Eysenck, 2018).

Assessment of study quality

Quality assessment for the observational cohort and cross-sectional studies was conducted using the Study Quality Assessment Tools developed by the NHLBI (n.d.). This 14-item tool evaluates key components of the studies to identify threats to internal validity, with responses categorized as "yes", "no" or "cannot determine/not applicable". Each study received a quality score based on the percentage of affirmative responses: ≥75%, good; 50–75%, fair; ≤50%, poor. In the case of randomized studies, the Cochrane Collaboration's RoB-2 tool (Sterne, 2019) was used to assess domains such as randomization, intervention adherence, missing data, outcome measurement and selective reporting. Two independent reviewers (E.P.D. and I.M.) conducted the overall quality assessments, achieving an excellent inter-rater agreement (Cohen's κ; McHugh, 2012; 0.91). Disagreements were resolved through discussion and consultation with a third rater (R.A.I.C). Further details on the extracted items, decision rules and quality assessments can be found in Supplementary Section E.

Meta-analytic procedures and effect size calculation

All analyses were conducted in R (R Core Team, 2010), version 4.2.3, using the metafor package (version 4.6-0; Viechtbauer, 2010). All data, codebooks and scripts for data analysis are available in the Open Science Framework repository at https://osf.io/a2yeh/. Effect sizes for the relationship between death anxiety and each outcome category were calculated as Pearson's r. Following Borenstein et al. (2021), the correlation coefficient was converted to Fisher's z scale, and the correlation analyses were performed using the transformed values, which were converted back to correlations to facilitate interpretation.

As some studies reported multiple subscales of the same measure, we combined them into a single effect size using the method proposed by Borenstein et al. (2021). For the main analyses, the effect sizes were aggregated assuming a correlation of $r = 0.5$ between sampling errors, as this is a reasonable assumption for correlated subscales. To test the plausibility of this assumption, we also ran sensitivity analyses using a range of correlation values $r = [0, 0.4, 0.5, 0.8]$ between subscales of the same outcome measure.

Correlation coefficients were estimated for the relationship between death anxiety and each type of distress-related outcome, categorized according to the previously mentioned groups. For each outcome category (for example, distress composite, general anxiety or PTSD), the pooled effect sizes for the relationship between death anxiety and outcomes from that category were computed using a random-effects model. Some studies reported more than one correlation measured on independent samples, creating a multilevel (three-level) data structure. This was handled by fitting a two-level model by adjusting the standard errors of estimated parameters with the robust variance estimation (RVE) approach (Pustejovsky & Tiptop, 2022) using a hierarchical effects working model (Hedges, Tipton & Johnson., 2010). RVE was implemented in the R package clubSandwich (version 0.5.11; Pustejovsky & Tipton, 2018; Tipton & Pustejovsky, 2015), and we used the Cluster Robust-2 small-sample adjustment (Pustejovsky & Tipton, 2018).

Pooled effect sizes were computed if at least five effect sizes of a relationship between death anxiety and an outcome from that category were available. Distress-related outcomes with fewer than five effect sizes (for example, panic disorder, borderline personality disorder, bipolar disorder and schizophrenia) were excluded.

τ^2, Q and I^2 statistics were used to assess heterogeneity. τ^2 is a direct measure of heterogeneity. The Q statistic and the associated P value address the null hypothesis that there is no variance and the studies share a common effect size. The I^2 statistic is a relative measure of heterogeneity representing the proportion of variability related to true differences between studies rather than to sampling error (Higgins et al., 2003). For I^2, values of 25%, 50% and 75% indicate low, moderate and high heterogeneity. For the pooled effect sizes models, we also reported the PI (Van Den Hout, 2016). The PI represents the expected range of correlation for a hypothetical new study integrating the uncertainty in estimating the pooled effect and the heterogeneity.

To assess the impact of study-level variables, we conducted a series of meta-regressions and subgroup analyses for each outcome. We used a mixed-effects model for subgroup analyses by sample type (general versus clinical population) and medical conditions (absent versus present), as well as the death anxiety scale (DAS (Templer, 1970) versus other death anxiety measures). Beyond estimating the correlation for each level of the moderator, we tested for differences between levels. As for the pooled effects model, t statistics were calculated with the RVE approach and the Satterthwaite approximation for the degrees of freedom provided by the clubSandwich package (Tipton & Pustejovsky, 2015). We conducted meta-regression analysis using the proportion of women in the

sample as a continuous variable. Subgroup analyses were performed only for the outcome categories that had at least five effect sizes in the smallest subgroup. In each model, we used the REML method to estimate the heterogeneity (Viechtbauer, 2005). *P* values were calculated for a two-sided hypothesis with an α level of 0.05.

Small-study effects, whereby smaller studies are more likely to produce higher effect sizes, providing a proxy for publication bias, were inspected by displaying and inspecting the funnel plot and through tests of funnel plot asymmetry (Egger's regression test (Egger, 1997) and the trim-and-fill method (Duval & Tweedie, 2000)). Egger's test was performed if at least ten effect sizes were included, using the RVE approach. We also performed two sets of sensitivity analyses, one restricted to the studies rated as having better quality and another assuming different levels of correlations when a study had multiple subscales of the same outcome measure.

3.2. Study 2: The Romanian Adaptation of the Death Anxiety Beliefs and Behaviors Scale[2]

3.2.1. Introduction

Death anxiety, generally understood as the dread one feels when thinking about death or dying (Farley, 2018), has preoccupied and plagued human consciousness since the beginning of time. Most famously, the Terror Management Theory (for a comprehensive overview, see Greenberg, 2012) built on the sociological works of Ernest Becker (1973), proposes that the conscious awareness of death inevitably leads to anxiety, which was accordingly named death anxiety. Hence, death anxiety represents a construct of interest with major implications in human distress. In the clinical psychology field, death anxiety has been proposed as a transdiagnostic construct (Iverach et al., 2014), playing an important role in the expression of psychopathology. Past empirical research, which is mostly cross-sectional, has shown that death anxiety is strongly related to psychopathology such as obsessive-compulsive disorder (Chawla, Menzies & Menzies., 2022), post-traumatic stress disorder (Kira et al., 2021), depression and anxiety (Tang et al., 2021), phobias and social anxiety (Strachan et al., 2007) and addictions (Menzies, Sharpe & Dar-Nimrod, 2019). Thus, the relevance of death anxiety becomes apparent. If death anxiety is a transdiagnostic construct, novel approaches to psychopathology can be developed. A meta-analysis and systematic review which included 15 interventions targeting death anxiety found that, overall, interventions lead to improvements in death anxiety, with CBT interventions being the most efficient (Menzies et al., 2018), justifying further interest into death anxiety.

However, talk of death anxiety as a subjective state is inconsequential in the absence of psychometrically sound measures. In this direction, a number of death anxiety measures have been proposed throughout the years. Many of them have been validated and possess varying psychometrics properties, but all have their shortcomings (Zuccala, 2022) . None of the included measures was found to possess adequacy on the evaluated quality criteria (Terwee et al., 2007). This leads to the inevitable conclusion that this research area needs better instruments, which could be used in both research and clinical contexts.

To address this issue, (Menzies et al., 2022) have proposed a new death anxiety measure, the Death Anxiety Beliefs and Behaviors Scale (DABBS), which was developed with the purpose of assessing unhelpful beliefs and behaviors related to death. The 18-item scale, structured through exploratory and confirmatory factor analyses into three factors - 'Affect', 'Beliefs', and 'Behaviors' - reflects a cognitive-behavioral paradigm. Through additional validity and reliability analyses, the DABBS exhibited strong construct and criterion validity, alongside robust internal consistency and test-retest reliability. Notably, the authors assessed discriminant validity, establishing a cut-off score of ≥ 55 to signify clinically significant levels of death anxiety.

The DABBS has been adapted in Farsi as well, on a population of adolescents (12-18 years; Mazidi et al., 2024; OSF preprint) and the confirmatory factor analysis has supported the three-factor structure. The goodness-of-fit indices were acceptable, but they improved upon eliminating the 15th item. Inconsistent with expectations, the 'Behaviors' subscale correlated significantly and negatively with depression and stress, and insignificantly and negatively with anxiety and neuroticism. This could be explained, among others, by the fact that the scale was developed on adults, not adolescents, and by cultural differences. A Chinese adaptation of the DABBS (Dong et al., 2024), this time on elderly participants, revealed the same three-factor structure following exploratory and confirmatory analyses.

In Romania, however, there are currently no validated death anxiety measures. This is important because, while death is a universal experience, it is culturally experienced (Hidalgo et al., 2020). Aspects pertaining to the funeral process, what it means to have a good death, viewpoints of the afterlife, as well as the response of the community have a role in how death anxiety is experienced and understanding these cultural nuances is crucial to accurately assess death anxiety within the Romanian population, ensuring that interventions and support mechanisms are culturally sensitive and effective.

Therefore, the aim of the present study is to translate, adapt, and validate the DABBS on a Romanian population to ensure a culturally sensitive and psychometrically sound measure of death anxiety. The adaptation process will follow the recommended guidelines (Guillemin, Bombardier & Beaton, 1993). We will assess criterion and construct validity, as well as the internal consistency of the DABBS and the test-retest reliability at three weeks.

3.2.2. Methods

Design

The current study is part of a larger project of translating and validating death anxiety measures in Romanian, which has been pre-registered and is available for consultation on the OSF platform (https://osf.io/yqc67). The study has a cross-sectional design, using

[2] This work is under review: Dumitru, E. P., Cardoș, R. A. I., David, D. O. (under review). The Romanian Adaptation of the Death Anxiety Beliefs and Behaviors Scale. *Death Studies*.

EPD: conceptualization, methodology, formal analysis, investigation, data curation, writing - original draft, writing - review & editing; RAIC: conceptualization, methodology, writing - review & editing, supervision; DOD: conceptualization, methodology, writing - review & editing, supervision, project administration

convenience sampling. It was approved by the University Ethical Review Authority (461/26.05.2023) and is in compliance with ethical standards for research.

Participants

Generally, rules of thumb in sample size estimation are criticized for failing to consider aspects such as the level of communality of the variables (MacCallum et al., 1999) and for focusing purely on the number of variables included in the study. However, the minimum recommended sample size is usually 10 participants per item (Comrey & Lee, 1992), which means it was necessary to recruit a minimum of 180 participants. The sample was drawn from the general population and the main inclusion criteria were (1) age between 18-65, (2) being a Romanian citizen, (3) able to understand instructions and (4) able to understand Romanian. The main exclusion criteria were a history of mental illness that might interfere with the accuracy of the reported data (e.g., psychotic disorders, bipolar disorder). The study was promoted online, using paid advertisements on Facebook, targeted to adults over the age of 18 who reside in Romania. The recruitment lasted for one year, from July 2023 to July 2024. Participants were not paid for their responses, but they were entered into a raffle to win one 25€ gift card for a Romanian ecommerce platform. A total of 544 answers were registered at Time 1 (T1). 30 responses failed the attention check, 18 responses were excluded based on the exclusion criteria and 14 answers were excluded because they were multiple entries from the same participants. Thus, for the main analyses, 482 participants were included in the study. As for the test-retest reliability, 298 participants completed the same measures at Time 2 (T2) three weeks later. Of these, 5 failed the attention check, which led to a sample of 293 participants at T2. The sample was predominantly composed of women (391 women, 77 men and 14 individuals who did not report their gender). The mean age of the sample was $M_{age} = 29.57$. SD = 10.41 (range 18-61)

Measures

The Death Anxiety Beliefs and Behaviors Scale (DABBS; Menzies et al., 2022)

The DABBS is an 18-item self-report measure, recently developed, to assess unhelpful beliefs and behaviors relevant to death anxiety. The scale has a three-factor structure (i.e., 'Affect', 'Beliefs' and 'Behaviors') and has demonstrated good construct validity, criterion validity, internal consistency and test-retest reliability in the validation study. Furthermore, the DABBS effectively distinguished participants with clinically significant levels of death anxiety and distress from those without at a cut-off point of ≥ 55. Internal consistency coefficients obtained in the present study for the scale and its subscales can be consulted in Table 3.

Criterion Validity:

Death Anxiety Scale (DAS; Templer, 1970)

The DAS is one of the most widely used instruments to evaluate death anxiety. It includes 15 affirmations and items are rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree) and is currently undergoing the adaptation process as well. In the present study, the DAS exhibited good internal consistency with α = .87 (T1) and α = .87 (T2).

Construct Validity:

Beck's Depression Inventory - II (BDI-II; Beck, Steer & Brown, 1996; David, Dobrean & Sucala, 2012)

The BDI-II is a 21-item self-report measure that evaluates the presence and the severity of depressive symptoms based on the DSM-IV (APA, 1994) diagnostic criteria for major depression. Scores range from 0 to 63, with higher scores indicating more severe depressive symptoms. The BDI-II shows excellent internal consistency in this study, with a Cronbach's α = .93 (T1) and α = .94 (T2)

Beck's Anxiety Inventory (BAI; Beck et al., 1988)

The BAI is a 21-item self-report measure that evaluates anxiety symptoms. Items are rated on a Likert scale from 0 to 3 and the total score ranges from 0 to 63. As a measure of general anxiety symptoms, the BAI is considered reliable and suitable. The internal consistency of the BAI in this study was α = .93 (T1) and α = .93 (T2), indicating excellent internal consistency.

The 5 NEO-PI-R Broad Domains (NEO-PI-R; Iliescu, Popa & Dimache., 2019)

The Romanian adaptation of the Neuroticism subscale of the NEO-PI-R Broad Domains was chosen to measure neurotic traits. The 10 items are rated on a 5-point Likert scale and the last 5 items are reversed. The neuroticism subscale was selected to test the convergent validity of the DABBS, as past empirical literature suggests neuroticism is significantly, positively correlated with death anxiety. The internal consistency of the NEO-PI-R Neuroticism subscale in this study was good, with α = .89 (T1) and α = .89 (T2).

The Rosenberg Self-esteem Scale (RSES; Rosenberg, 1965; David, 2020)

The RSES is a 10-item self-report measure of global self-esteem. The empirical literature suggests self-esteem acts as a defense against death anxiety (Burke et al., 2010) and should therefore be negatively correlated to death anxiety. Items are rated on a 4-point scale (from 0 to 3). The internal consistency in this study was excellent, as α = .91 (T1) and α = .91 (T2).

Procedure

Translation procedure

The DABBS was translated from English to Romanian by two bilingual researchers, both native Romanian speakers and fluent in English, who worked independently. A third researcher synthesized the two resulting translations into a single version. This version was subsequently back-translated from Romanian to English by two additional researchers. The two back-translated versions were then

compared by the same researcher who created the initial synthesis to verify the quality of the translation, and a final Romanian version of the DABBS was built based on this comparison.

Validation procedure

After signing the informed consent form, the participants proceeded to provide demographic data and answer the psychological measures included in the study using a Google form link. Three weeks later, the participants received another Google Forms link containing the same measures to assess test-retest reliability. The usual guidelines have been followed for cross-cultural adaptations (Guillemin et al., 1993).

Analytical plan

All collected answers, at both time points, were coded and scored. Data was entered in JAMOVI (Version 2.3.28.0; The JAMOVI Project) to be analyzed. There were no incomplete questionnaires and no missing data.

Confirmatory factor analysis

At the present moment, there is only one identified model for the structure of the DABBS (Menzies et al., 2022). The authors of the scale propose a three-factor structure for DABBS, and to determine the goodness of fit between their model and the sample data of the present study, confirmatory factor analysis (CFA; Brown, 2015) was employed. Thus, a CFA with the full information maximum likelihood estimation method was conducted on our sample. A goodness-of-fit chi-square test was employed, where the fit is considered best when the chi-square (χ^2; Satorra & Bentler, 2001) is not statistically significant. To evaluate the degree of fit, the indices that were computed were the comparative fit index (CFI; Bentler, 1990), the Tucker-Lewis index (TLI; Bentler & Bonett, 1980), and the root mean square error of approximation (RMSEA; Steiger, 1998) with a 90% confidence interval to assess the fit of the model with the data. Generally, CFI and TLI values of .90 are considered an acceptable model fit and CFI and TLI values of over .95 are considered a good model fit (Hu & Bentler, 1999). As for RMSEA, a value greater than 0.08 indicates an acceptable fit, while a value of .05 or less represents a good fit (Browne & Cudeck, 1992).

Exploratory factor analysis

When the CFA does not identify a good fit between the model and the sample data, an exploratory factor analysis (EFA; Cudeck, 2000) can be employed to test for other factorial structures that might show a better fit for the data. In the second stage of analysis, an EFA was performed to identify an alternative factor structure. Thus, an EFA using a principal axis extraction method with Oblimin rotation was conducted for the 18 items of the DABBS. Bartlett's test of sphericity (Bartlett, 1950) and the KMO measure of sampling adequacy (Cerny & Kaiser, 1977) were used as assumption checks. The number of factors was decided based on parallel analysis. Items with factor loadings ≥ 0.40 and those that did not load on more than one factor were retained.

Reliability and validity analyses

Cronbach's alpha was employed to evaluate the internal consistency reliability for the newly identified factors. Pearson's correlation coefficient is considered an imprecise method to evaluate test-retest reliability because it does not take into account systematic differences (Streiner, Norman & Cairney, 2024). Terwee et al. (2007) recommend the Intraclass Correlation Coefficient (ICC) as the most suitable parameter for continuous measure because systematic differences are considered part of the measurement error, which is why a two-way random effects model, "single rater" unit, "absolute agreement" type ICC (JAMOVI, 'irr' package, version 0.84.1) was employed. To evaluate criterion and construct validity, Pearson's correlation was used. A t-test was also performed to compare death anxiety scores as a function of gender.

Deviations from protocol:

In the OSF pre-registration (https://osf.io/yqc67), the target sample size was minimum 500 participants. We decided to stop the recruitment at 544 registered answers. Following the inclusion criteria, we were left with 482 participants, less than the intended sample size, but still sufficient for factor analysis (Comrey & Lee, 1992). Pearson's r was proposed to assess test-retest reliability, but we decided to use the ICC for reasons outlined in the Analytical Plan. We had not planned in the original protocol to compare female and male participants based on death anxiety scores, but decided to do it since gender is a relevant construct in regard to death anxiety.

3.2.3. Results

Means, standard deviations and skewness values for the 18 items of DABBS are presented in Table 1. The data presents univariate normality of the items as no item displays a skewness value greater than the recommended cut-off of 3 (Kline, 2005).

Table 1 can be consulted in the thesis.

CFA

To test the goodness of fit between the pre-existent model identified by Menzies et al. (2022) and the sample data ($N = 482$), we performed a confirmatory factor analysis with the full information maximum likelihood estimation method. The original model has three factors (i.e., 'Affect', 'Beliefs', and 'Behaviors'). The model was identified by fixing factor variances at 1. The indices do not meet the values for acceptable fit. Firstly, the chi test was significant ($\chi^2(132) = 815$, $p < 0.001$). Additionally, the CFI (0.87) and the TLI (0.85) were beneath the acceptable threshold of .90. Finally, the RMSEA [.104 (90% CI = .096; .111)] was far from the

recommended value of .05. Since the fit statistics indicated such poor fit, the CFA does not support the original three-factors model and thus calls for an EFA.

EFA

The 18 items were introduced in an EFA analysis using principal axis extraction with an Oblimin rotation. Bartlett's test of sphericity was significant ($\chi^2(153) = 5574$, $p < 0.001$ and the Kaiser-Meyer-Olkin measure of sampling adequacy was .89, suggesting a good basis for the factor structure analysis. Based on a parallel analysis using 100 bootstraps samples, a structure of five factors was suggested. The scree plot also supported the 5-factor solution and the extracted factors explain 66.1% of the total variance. The factor loading can be consulted in Table 2. Factor loadings >.4 were considered, which revealed each item loaded >.4 on the new factorial structure. Thus, no item was removed from the analysis and each item loaded on a single factor. The model fit indices resulting from the EFA show good model fit, with TLI (.97) crossing the recommended .95 value and RMSEA [.043 (90% CI = .032; .054)] well below the suggested value of .06.

The five factors were examined and interpreted based on their content. Only one factor was equivalent to a previously identified factor ('Affect', F1), which included the first four items. The second factor, formerly named 'Beliefs', has been split into two and renamed 'Death Beliefs about Self' (F2; items 5, 6, 7, 8, 10) and 'Death Beliefs about Others' (F3; items 9, 11). Finally, the factor formerly named 'Behaviors' has also been split into two and renamed 'Behavioral Avoidance' (F4; items 12, 14, 16, 18) and 'Experiential Avoidance' (F5; items 13, 15, 17).

Table 2 can be consulted in the thesis.

Reliability statistics:

Internal consistency was analyzed at both time points, revealing the scale has good internal consistency. As for the subscales, which are organized based on the new factorial structure identified through EFA, they have excellent and good internal consistency, except 'Experiential Avoidance' (F5), which presents acceptable internal consistency. The Cronbach's alpha coefficients can be consulted in Table 3.

Table 3 can be consulted in the thesis.

Test-retest:

The intra-class correlation coefficient was computed to evaluate the agreement between T1 and T2 in measuring death anxiety using the DABBS instrument. For the total scale, the ICC coefficient is .88, $p < .001$ (95% CI = .86; .91). According to Koo and Li (2016), it is better to estimate the level of reliability based on the 95% confidence interval of the ICC estimate, rather than on the estimate itself, which suggests the test-retest reliability was good to excellent. As for the subscales of the DABBS, the ICC coefficients are lower, indicating good reliability (Table 4).

Table 4 can be consulted in the thesis.

Validity

Confirming our expectations, the DABBS correlates positively and significantly with the Death Anxiety Scale (Templer, 1970), suggesting good criterion validity. The correlation coefficient of r = .77 exceeds the recommended cut-off (Terwee et al., 2007).

Regarding construct validity, as can be seen in Table 5, the DABBS correlates positively and significantly with depression, anxiety and neuroticism scores, as well as negatively and significantly with self-esteem. Since the correlation coefficients are small to moderate, the measures are not redundant (Terwee et al., 2007). The relationship between the DABBS and age is negative, as expected, but it is not statistically significant.

Table 5 can be consulted in the thesis.

Moreover, after performing an independent samples t-test, we found significant differences in DABBS scores as a function of gender. Given the significant imbalance of the gender ratio in the study and since the distribution of the total DABBS score does not meet normality based on the Kolmogorov Smirnov test ($p = .02$), but meets homogeneity following Levene's test (F [1, 466) = 0.24, $p = 0.62$), the Mann Whitney U test was chosen, which revealed the difference between the two groups is significant. Women report higher death anxiety scores ($Mdn = 48$, N = 391) than men ($Mdn = 41$, N = 77), $U = 10973$, $p = < .001$.

3.2.4. Discussion

The purpose of the present study was to validate the DABBS on a sample of Romanian adults. Following the translation procedure, we tested the original three-factor structure of the DABBS on the Romanian sample, but the CFA did not support the original model on our sample. Thus, an EFA was necessary, which suggested a five-factor structure with excellent goodness-of-fit indices. The first factor, 'Affect', remained the same, but the remaining two factors were each split into two other factors. Upon the content analysis of the items, the 'Beliefs' factor was divided into 'Death Beliefs Related about Self' and 'Death Beliefs about Others', and the 'Behaviors' factor was divided into' Behavioral Avoidance' and 'Experiential Avoidance'.

The new factorial structure can be explained through the content of the items themselves. While the 'Affect' factor is very clearly focused on the emotional part of death anxiety, when it comes to 'Beliefs' and 'Behaviors', the items are a bit more heterogeneous. Thus, one could draw a demarcation between items that are specifically targeted towards the self (e.g. 'It would be horrible to die alone'; 'My death will be a painful experience') and those that involve others (e.g. 'I will lose a loved one suddenly and it will destroy me'). The new factorial structure supports a more nuanced approach, similar to the Collet-Lester Fear of Death Scale (Lester, 1990) which has four subscales: 'death of self', 'death of others', 'dying of self' and 'dying of others'. This distinction could prove useful in future research and clinical work, because different individuals may experience specific aspects of death anxiety. Based on previous research, it appears women have greater fears for their significant others (Tang et al., 2002). Upon closely examining the 'Behaviors' subscale, it is evident why certain items were grouped differently. For instance, "Watching a film or TV show with a character who is dying" is qualitatively different from "Thinking of myself dying". The former is a common activity that people might not actively avoid, while the latter involves deeply personal and emotionally intense thoughts. This distinction helps explain why items like "Thinking of myself dying" formed a separate factor. These items involve more personal and distressing contemplation, making them qualitatively distinct from passive or external behaviors like watching a TV show. This difference in emotional engagement and personal relevance led to splitting into distinct factors during the analysis.

Regarding reliability, the DABBS shows good internal consistency, and its new subscales show excellent to acceptable internal consistency. The test-retest reliability, which was evaluated using ICC, was proven to be good, establishing consistency of the scale over time.

As for the validity of the DABBS, results indicate good criterion validity, according to the recommended values (Terwee et al., 2007). Criterion validity was established through the most frequently used death anxiety scale (DAS; Templer, 1970), which is also undergoing translation and validation in Romanian, and indicates that the DABBS is effective in its purpose of measuring death anxiety. The associations between the DABBS and the psychological variables measured in the study were all in the expected direction, indicating good construct validity. Depression, anxiety and neuroticism correlated positively with death anxiety, while self-esteem and age correlated negatively, relationships that have been well-established in previous research (Bianco et al., 2024; Li et al., 2024) The small-to-moderate magnitude of the correlations suggest non-redundancy of the scale.

Moreover, according to past literature, women seem to experience higher death anxiety levels than men (Eshbaugh & Henninger, 2013; Quince et al., 2011; Türkarslan et al., 2020), which the present study also found, but it is important to note that the sample was predominantly female (83%), which affects the interpretability of the results and precludes further inferences.

A strength of the present study is that the measures used to establish construct validity have all been translated and validated in Romanian, with the exception of the BAI (Beck et al., 1988), allowing for a greater confidence regarding the results of the study. Another strength is the appropriate size of the sample, supplying satisfactory statistical power for the CFA and EFA (Comrey & Lee, 1992).

There are a few limits of the study. Mainly, the gender imbalance of the sample, which is more pronounced than the gender ratio in Menzies' sample. The high percentage of female participants in the study might explain why the CFA did not replicate the original factor structure. This aspect becomes all the more relevant when considering past literature which suggests women tend to experience higher levels of death anxiety (Eshbaugh & Henninger, 2013; Quince et al., 2011; Türkarslan et al., 2020). Further studies with a more balanced gender ratio are needed to investigate whether the new factorial structure is supported. Another limit regards the overall young age of the participants. 306 participants were under 30 years old, so the sample was not representative of all age categories, which limits the interpretability of the data since death anxiety and age have an intricate relationship which is in turn influenced by variables such as health, religiosity and loneliness (Guner, Erdogan & Demir, 2023; Missler et al., 2012).

To our knowledge, this is the first death anxiety measure validated in Romanian. The resulting psychometric properties indicate the Romanian version of the DABBS has good validity and reliability, which makes it appropriate to use in both research and clinical contexts. The adapted version of the DABBS can be used to further investigate death anxiety, opening new research directions, such as testing death anxiety as a causal factor in longitudinal and experimental studies. Furthermore, the Romanian DABBS can be used in assessment and treatment protocols, offering clinicians a reliable measure of death anxiety levels experienced by patients.

3.3. Study 3: Exploring the Link Between Neuroticism, Depression and Anxiety: the Mediating Role of Death Anxiety[3]

3.3.1. Introduction

Depression and Anxiety

Depression, usually characterized by persistent low affect and loss of pleasure and interest in activities (APA, 2013), is one of the leading causes of distress (WHO, 2021), affecting over 300 million people globally. In its most severe forms, suicidal ideation can be a common symptom (Cai et al., 2021; Riera-Serra et al., 2024), which is a concerning aspect as suicide remains one of the leading causes of mortality (Centers for Disease Control and Prevention, n.d). Along with its psychological impact, depression also carries a significant economic burden, contributing to a societal cost of $382.3 billion (Greenberg et al., 2023). Beyond the economic impact, data suggest major depressive disorder accounted for 2.7 million disability-adjusted life-years in 2016, the largest burden of all mental

[3] This work is under review: Dumitru, E. P., Cardoș, R. A. I., David, D. O. (under review). Exploring the Link Between Neuroticism, Depression and Anxiety: the Mediating Role of Death Anxiety. *Current Psychology*.

EPD: conceptualization, methodology, formal analysis, writing - original draft, writing - review & editing; RAIC: conceptualization, writing - original draft, writing - review & editing, supervision; DOD: conceptualization, writing - review & editing, supervision, project administration

disorders (Mokdad & Ballestros, 2018). Along with depressive disorders, anxiety disorders are often cited as another leading cause of distress (GBD 2019 Mental Disorders Collaborators, 2022), affecting mental, physical, and social health (Kariuki-Nyuthe & Stein, 2015; Santabárbara et al., 2021; Szuhany & Simon, 2022). The prevalence of anxiety disorders varies according to age, gender, socioeconomic status, and other variables (Mwinyi et al., 2017). These disorders are frequently disabling and have a high rate of relapse (Bandelow & Michaelis, 2015). Of concern is the rise in the incidence of depressive and anxiety disorders since the COVID-19 pandemic, with data indicating a 28% increase in major depressive disorder and a 26% increase in anxiety disorders (Da Silva et al., 2021; Santomauro et al., 2021).

Neuroticism

Though theories regarding the emergence of depressive and anxiety disorders vary, one commonly mentioned risk factor is neuroticism (Weinstock & Whisman, 2006). Neuroticism, a personality trait, is usually understood as a disposition towards experiencing negative affect such as anger, irritability, anxiety, depression, and overall emotional instability (Widiger & Oltmanns, 2017). Higher levels of neuroticism are associated with poor responses to stress (Luo et al., 2023), potent negativity bias (Bunghez et al., 2024), and psychological distress (Lei et al., 2020). Neuroticism is strongly and differentially related to internalizing syndromes (Barlow et al., 2014) and is a factor involved in the etiology of various forms of psychopathology (Paulus et al., 2016). Kessler et al. (2011) found that neuroticism accounts for 20-45% of comorbidity between psychological disorders. Neuroticism influences psychological disorders both directly and indirectly, as evidence suggests it increases vulnerability to their onset, amplifies their severity once they emerge, and contributes to difficulties in coping effectively (Widiger & Oltmanns, 2017). According to the Functional Model of Emotional Disorders proposed by Barlow et al. (2021), emotional triggers can lead to either functional or dysfunctional outcomes—potentially resulting in emotional disorders—depending on the individual's level of neuroticism. Though specific contexts may trigger specific psychological disorders, neuroticism is regarded as a core transdiagnostic mechanism which boosts the emergence of psychopathological symptoms after experiencing emotional contexts. Current theories on the development of neuroticism emphasize genetic factors, which are estimated to account for 40–60% of its variance (Bouchard & Loehlin, 2001; Kendler et al., 2003). Additionally, they highlight the role of acquired perceptions of unpredictability or uncontrollability in shaping neuroticism (Chorpita & Barlow, 2018). Farchione et al. (2024) synthesize this dynamic by explaining that biological factors interact with the psychological predisposition to view events as unpredictable and uncontrollable to produce a psychological disorder.

Death Anxiety

When talking about unpredictable and uncontrollable events, none holds as much sway over the human mind as death. While the reality of death is inarguable, exactly how and when death comes is less of a certainty. One of the most influential theories in social psychology, Terror Management Theory (TMT; Greenberg et al., 1986), analyzes the impact of death on human behavior and asserts death is viewed as a dominant threat, which eventually leads to experiencing death anxiety. Empirical support for this theory comes from a meta-analysis (Burke et al., 2010) of 164 studies with 277 included experiments, indicating that death priming tasks produce observable effects. However, a multi-lab pre-registered replication study (Klein et al., 2012) involving 21 laboratories in the US failed to replicate key predictions of the TMT, calling its validity into question. From a clinical point of view, death anxiety has gained traction, especially in recent years, as it has been proposed as a transdiagnostic factor. Death anxiety, generally defined as apprehension when one thinks about death (Farley, 2018), shows promise as a compelling variable in human psychopathology. Based on available empirical data, death anxiety has been proposed as a contributing factor in the emergence of emotional distress and psychological disorders (Dumitru et al., 2025; Iverach et al., 2014; Menzies et al., 2024). Cross-sectional data indicated death anxiety is positively related to psychological distress (Korkut, 2022), depression, and anxiety (Tang et al., 2021). One study showed that higher levels of death anxiety are associated with more disorders before the onset of obsessive-compulsive disorder, such as social anxiety, illness anxiety, specific phobias, and generalized anxiety (Menzies et al., 2021). Longitudinal data supports these findings, as one study showed baseline death anxiety predicts symptoms of somatic distress, paranoia, post-traumatic stress disorders, depression, and anxiety measured one month later (Waite et al., 2022).

Following the premise of the Functional Model of Emotional Disorders proposed by (Barlow et al., 2021), one could look at death anxiety as another vulnerability which, when particularly intense, could lead to the emergence and development of psychological disorders. By examining death anxiety as a mediator, we can better understand how neuroticism may heighten sensitivity to existential fears, which, in turn, intensify symptoms of anxiety and depression. Gaining insight into this process could lead to the development of more targeted treatments, particularly for individuals with high neuroticism who may be at greater risk for severe depression or anxiety.

Overview of the present study

The aim of the present study was to test the role of death anxiety in the relationship between neuroticism and symptoms of depression and anxiety. We propose two mediation models where neuroticism as a dispositional trait will be the predictor, death anxiety will be the mediating variable, and depression, respectively anxiety symptoms, will be the dependent variables. We hypothesize that death anxiety will have a statistically significant mediating effect, offering empirical support to the theoretical assumption that death anxiety is a transdiagnostic risk factor playing a role in the manifestation of psychopathology in the form of depression and anxiety symptoms.

3.3.2. Methods

Design

The present study is part of a larger project. The study was pre-registered and can be consulted on the OSF platform (https://osf.io/yqc67). A cross-sectional design was employed, along with convenience sampling. The study received ethical approval from the University Ethical Review Authority (461/26.05.2023) and is in compliance with ethical standards for research.

Participants

The sample of the study was selected from the general population, and the inclusion criteria were (1) age between 18-65 and (2) able to understand instructions. Participants were excluded if they reported a history of mental illness associated with difficulties in reporting accurate data (e.g., psychotic disorders, bipolar disorder). Paid Facebook advertisements were the main promotion strategy. Recruitment lasted from July 2023 to July 2024. Participants were entered into a raffle to win a 25€ gift card for an e-commerce platform. No other payments were offered to the participants. A total of 544 answers were registered. 30 responses failed the attention check, 18 responses were excluded based on the exclusion criteria, and 14 answers were excluded because they were multiple entries from the same participants. Thus, 482 participants were included in the study. The sample was predominantly composed of women (391 women, 77 men, and 14 individuals who did not report their gender). The mean age of the sample was $M_{age} = 29.57$, SD = 10.41 (range 18-61).

Measures

The 5 NEO-PI-R Broad Domains (NEO-PI-R; Iliescu et al., 2019)

The Romanian adaptation of the Neuroticism subscale of the NEO-PI-R Broad Domains was chosen to measure neurotic traits. The 10 items are rated on a 5-point Likert scale, and the last 5 items are reversed.

The Death Anxiety Beliefs and Behaviors Scale (DABBS; Menzies et al., 2022)

The DABBS is an 18-item self-report measure, recently developed, which assesses unhelpful beliefs and behaviors relevant to death anxiety. The scale has a three-factor structure (i.e., 'Affect', 'Beliefs', and 'Behaviors') and has demonstrated good construct validity, criterion validity, internal consistency, and test-retest reliability in the validation study. Furthermore, the DABBS effectively distinguished participants with clinically significant levels of death anxiety and distress from those without at a cut-off point of ≥ 55.

Beck's Depression Inventory-II (BDI-II Beck et al., 1996; David et al., 2012)

The BDI-II is a 21-item self-report measure which evaluates the presence and severity of depressive symptoms based on the DSM-IV (APA, 1994) diagnostic criteria for major depression. Scores range from 0 to 63, with higher scores indicating more severe depressive symptoms.

Beck's Anxiety Inventory (BAI; Beck et al., 1988)

The BAI is a 21-item self-report measure which evaluates anxiety symptoms. Items are rated on a Likert scale from 0 to 3, and the total score ranges from 0 to 63. As a measure of general anxiety symptoms, the BAI is considered reliable and suitable.

Analytical Plan

All collected answers were coded and scored. Data was entered in JAMOVI (Version 2.3.28.0; The JAMOVI Project) to be analyzed. There were no incomplete questionnaires and no missing data. Internal consistency for the study measures was evaluated using Cronbach's alpha coefficient (Table 1). Associations between the main variables of the study were performed using Pearson's r. The simple mediation analysis was performed with the 'medmod 1.1.0' module (Selker, 2017). Neuroticism was introduced as the predictor, death anxiety was introduced as the mediator, and depression, respectively, anxiety symptoms were introduced in two separate models as the dependent variable. To assess the significance of the mediation effect, a percentile bootstrap with 5000 samples, and a 95% confidence interval were estimated (Hayes, 2017). The effect is considered statistically significant if the confidence interval does not include zero.

3.3.3. Results

Descriptive analysis:

The results of the descriptive analysis (mean, standard deviations, skewness) can be consulted in Table 2, while the correlation matrix of the study variables is presented in Table 3. The data presents univariate normality of the variables as none of them exhibits a skewness value greater than the recommended cut-off of 3 (Kline, 2005). The associations between the main variables of the study are all positive and range in strength from small to moderate.

Table 1 can be consulted in the thesis.
Table 2 can be consulted in the thesis.
Table 3 can be consulted in the thesis.

Mediation analysis: depression symptoms

In the case of the first mediation model, where death anxiety is hypothesized to mediate between neuroticism and depression symptoms, no statistically significant mediation effect was detected. While the path from neuroticism to death anxiety (path a: b = .546, SE = .07 p = .001, 95% CI [.40; .68]), and the one from neuroticism to depression symptoms (direct effect: b = 1.001, SE = .05, p = .001, 95% CI [.90; .1.10]) were statistically significant, the path from death anxiety to depression symptoms was not statistically significant (path b: b = .028, SE = .02 p = .30, 95% CI [-.02; .08]). The mediation effect was not statistically significant as well (indirect effect: b = .01, SE = .01 p = .32, 95% CI [-.01; .04]).

Mediation analysis: anxiety symptoms

As for the second model, where death anxiety is hypothesized to mediate between neuroticism and anxiety symptoms, a statistically significant effect was detected. All path estimates were statistically significant: the one from neuroticism to death anxiety

(path a: b = .547, SE = .07 p = .001, 95% CI [.41; .69]), from death anxiety to anxiety symptoms (path b: b = .021, SE = .03 p = .001, 95% CI [.13; .29]), as well as the direct path from neuroticism to anxiety symptoms (direct effect: b = .930, SE = 05, p = .001, 95% CI [.81; 1.03]). The mediation effect was statistically significant (indirect effect: b = .119, SE = .02, p = .001, 95% CI [.07; .17]), suggesting death anxiety mediates 11.3% of the total effect from neuroticism to anxiety symptoms.

3.3.4. Discussion

The main objective of the present study was to investigate the nature of the relationships between neuroticism, death anxiety, and depression and anxiety symptoms. To this end, we proposed two mediation models where neuroticism was introduced as the predictor, death anxiety as the mediator, and symptoms of depression, respectively, symptoms of anxiety were introduced as the dependent variable. Results are based on data collected from 482 participants.

We found that only one of the two mediation models was supported by our data: the model in which death anxiety mediates the relationship between neuroticism and anxiety symptoms. This result suggests an interesting connection between neuroticism and death anxiety and between death anxiety and anxiety symptoms, pinpointing death anxiety as a risk factor in addition to neuroticism. However, these results need to be interpreted with care, since the mediation effect is partial and the mediation percentage is small. The direct effect was responsible for 89% of the total effect, which suggests neuroticism plays a much more important role in the manifestation of anxiety symptoms. Interpreting these results from a clinical and practical point of view, it would seem neuroticism deserves more attention during the therapeutic process.

While it is interesting that the depressive symptoms model did not show statistical significance, this could be indeed explained by the lack of a death anxiety effect in the relationship, but it could also be explained by the distribution of depression and anxiety scores in the study sample. Skewness values of the two variables indicate that there were more participants with no or subclinical symptoms of depression and anxiety. Furthermore, based on the descriptive analysis, more participants experienced higher levels of anxiety as measured by the BAI (Beck et al., 1988) than depression as measured by the BDI-II (Beck et al., 1996). Additionally, Pearson's r shows the magnitude of the relationship between death anxiety and anxiety symptoms is stronger than the one between death anxiety and depression. This also represents one of the limitations of the study - the sample was drawn from the general population using convenience sampling. If the study had included only clinical participants, screened by clinical interviews, the results could have been interpreted with more confidence. A more balanced distribution of depression scores may lead to different results. Additionally, though the sample size is sufficient, the sample was predominantly female (81%) and young (M_{age} = 29.57. SD = 10.41). Both gender and age interact distinctively with death anxiety. Cross-sectional data has shown that death thoughts and anxiety decline with age (Cicirelli, 2001; Russac et al., 2007), and in a longitudinal study, adults followed over four years reported lower death anxiety levels over time (Chopik, 2017). As for gender, women consistently report higher death anxiety (Kirchberger et al., 2011; Russac et al., 2007), though Tang et al. (2002) found women fear certain aspects of death and dying more than men, while other aspects are equally feared. Such fears which are more frequently experienced by women include fear of the dying process, fear for significant others, and fear for the body after death, while both women and men show the same level of fear of premature death and fear of the unknown. Moreover, depression (Kuehner, 2017) and anxiety (Burani & Nelson, 2020) are generally more prevalent in women. The lack of a more balanced sample age- and gender-wise also interferes with the interpretation of the results, precluding any meaningful generalization of the data.

However, the main limitation of the study regards its cross-sectional design. A mediation model is a causal framework that allows us to test whether a causal effect is directed through a mediating variable. This means that the study data must be longitudinal to assess the temporality requirement. Given the cross-sectional nature of the data, which was collected at one point in time, any causal inferences are ruled out, and all results need to be interpreted on a purely associative basis. Future studies need to employ experimental and longitudinal designs to accurately and confidently investigate the causality and directionality between death anxiety and affective disorders and establish whether death anxiety is a transdiagnostic causal factor.

In conclusion, the present study offers limited support for the role of death anxiety in the relationship between neuroticism and anxiety symptoms. The study limitations preclude any causal inferences, but the empirical results encourage the further study of death anxiety to clarify its role in human psychopathology.

3.4. Study 4: From Fear to Purpose: an ACT-based Pilot Trial on Death Anxiety, Depression and Anxiety[4]

3.4.1. Introduction

Effective treatments for depression and anxiety continue to face difficulties when it comes to being accessed by the public, despite strong evidence supporting the efficacy of psychotherapy (McManus et al., 2016; Mahmud et al., 2023). Cuijpers et al. (2023) conducted a meta-analysis and discovered that psychotherapies for depression with comorbid anxiety might have significant effects on depression and anxiety conditions. Another meta-analysis revealed that depression treatments have considerable effects on anxiety (Weitz et al., 2018), a conclusion that was supported by additional research on depression and anxiety interventions efficacy (Cuijpers et al., 2019; Cuijpers et al., 2023; Hunot et al., 2013; Stein et al., 2021). Although third-generation behavioral and cognitive-behavioral therapies have encouraging outcomes, conclusive findings are constrained by substantial heterogeneity and biases. Given the substantial

[4] This protocol based on this study is under review: Dumitru, E. P., Susan, B., Tînc, L. C. I., Cardoș, R. A. I., David, D. O. (under review). From Fear to Purpose: an ACT-based Pilot Trial on Death Anxiety, Depression and Anxiety. *Behavioural and Cognitive Psychotherapy*.

EPD: conceptualization, methodology, formal analysis, writing - original draft, writing - review & editing; BS: methodology, T, writing - original draft, writing - review & editing; LCIT: methodology, T, writing - original draft, writing - review & editing; RAIC: methodology, formal analysis, investigation, data curation, writing – original draft; DOD: conceptualization, writing - review & editing, supervision, project administration

comorbidity (50–81%) between anxiety and depression, similar results across several therapies raise concerns about treatment specificity (Groen et al., 2020; Rosellini et al., 2018).

The transdiagnostic approach is one of the mechanisms proposed to solve these issues. It focuses on the underlying factors involved in developing and maintaining psychological disorders (Cuijpers et al., 2023; Dalgleish et al., 2020; Harvey et al., 2009; McEvoy et al., 2009; Sauer-Zavala et al., 2017), particularly in affective disorders. While clinical symptoms are typically used for diagnosis, these disorders remain widely studied yet poorly defined (Bullis et al., 2019).

One such proposed transdiagnostic mechanism is death anxiety, which has been found to be a factor that underlies several mental health disorders (Iverach et al., 2014). Research suggests it may contribute to conditions such as Post-Traumatic Stress Disorder (PTSD), Obsessive-Compulsive Disorder (OCD), anxiety, and depression (Dumitru et al., 2025; Menzies et al., 2024). Innovative therapies that focus on death anxiety may thus provide a comprehensive solution, reducing relapses and maintaining therapeutic effects on a long-term basis (Iverach et al., 2014).

Psychological interventions, particularly Acceptance and Commitment Therapy (ACT), have shown promise in reducing death anxiety and improving mental health, especially in older adults (Ahmadi & Valizadeh, 2021; Nejad-Ebrahim Soumee et al., 2024). As an evidence-based treatment for anxiety and depressive disorders (Dimidjian et al., 2016; Ferreira et al., 2022), ACT emphasizes acceptance of distressing thoughts and commitment to meaningful actions. However, its specific role in alleviating anxiety and depression by targeting death anxiety remains underexplored. Given the high prevalence of these disorders, further research is essential to establish if ACT is a scalable and effective intervention.

Because it addresses underlying psychological mechanisms rather than just symptom reduction, the ACT framework is consistent with the transdiagnostic view. ACT suggests that distress intensifies when individuals try to suppress or control difficult emotions, leading to long-term inflexibility (Sianturi et al., 2018). Instead, ACT promotes psychological flexibility - the ability to adapt behaviors in line with one's values despite discomfort (Rolffs, 2019). By fostering acceptance, cognitive defusion, awareness of the present moment, self-as-context, values clarification, and committed action (Hayes et al., 2012), ACT has demonstrated efficacy in treating several conditions, such as anxiety and depression (Ferreira et al., 2022; Fledderus et al., 2013), OCD (Nielsen et al., 2025; Twohig et al., 2010), disordered eating (Weineland et al., 2012), perfectionism (Ong et al., 2019), burnout (Hayes et al., 2004), chronic pain (Trompetter et al., 2015), and death anxiety (Davazdahemami et al., 2020; Farahi & Khalatbari, 2019). Given its broad application, ACT offers a flexible and effective approach to mental health treatment, targeting core psychological processes rather than specific symptoms. Fostering psychological flexibility may help to address the underlying mechanisms driving distress across various disorders, making it a valuable transdiagnostic intervention.

Developing and testing an ACT protocol designed to reduce transdiagnostic death anxiety offers several compelling advantages, particularly in addressing the root causes of both anxiety and depression. Death anxiety may be a transdiagnostic factor (Iverach et al., 2014), fostering and exacerbating both these psychological disorders which frequently share common cognitive and affective processes. An ACT-based treatment can offer a more extensive and successful method of treating these symptoms by focusing on this common underlying problem. ACT helps people in confronting and embracing challenging thoughts, feelings, and bodily experiences, including those associated with dying. ACT encourages people to embrace their fear of dying and act in ways that are consistent with their values, while letting them know that attempting to suppress or ignore this dread can worsen their distress. Death anxiety could be minimized through this process, which may decrease its impact on anxiety and depressive symptoms.

This approach attempts to reduce avoidance behaviors which usually worsen symptoms, while also managing the symptom of death anxiety. Reconnecting with one's values and goals can help individuals regain control over their lives, rather than being consumed by the fear of death. Additionally, by assessing and enhancing this ACT protocol, we can gain a better understanding of its capacity to reduce depression and anxiety in those who have death anxiety as a primary transdiagnostic component. By concentrating on the shared underlying causes of these prevalent and frequently co-occurring diseases, such a protocol might provide an evidence-based treatment option. In the end, this strategy can improve mental health outcomes for those with anxiety, depression and existential fears while improving overall emotional resilience and decreasing psychological distress.

Overview of the present study

The main objective of the proposed study was to evaluate the pilot efficacy of the ‘Fear to Purpose’ ACT-based intervention, a newly developed protocol which aims to reduce death anxiety and alleviate symptoms of anxiety and/or depression. By focusing on death anxiety, the study also investigated whether death anxiety acts as a transdiagnostic construct, influencing anxiety and/or depression symptoms. This double-blind, randomized controlled trial compared the efficacy of the ACT protocol to a placebo condition. We hypothesized that the ACT protocol will be superior to a placebo condition in the reduction of self-reported levels of death anxiety as measured by the Death Anxiety Beliefs and Behaviors Scale (DABBS; Menzies et al., 2022), will reduce self-reported levels of depression measured with the Patient Health Questionnaire - 9 (PHQ-9; Kroenke et al., 2001), anxiety symptoms (Generalized Anxiety Disorder-7; GAD-7; Spitzer et al., 2006), and will lead to better well-being levels (The World Health Organization-5 Well-Being Index; WHO-5; WHO; 1998). We predict that changes in death anxiety levels will predict changes in symptoms of depression, anxiety and well-being. The intervention relies on ACT mechanisms, so we expected an increase in psychological flexibility levels (Comprehensive assessment of Acceptance and Commitment Therapy processes; CompACT; Francis, 2016), consistency with self-determined values (The Valuing Questionnaire; VQ; Smout et al., 2014), and a reduction in experiential avoidance levels (Brief Experiential Avoidance Questionnaire; BEAQ; Gámez, 2014).

3.4.2. Methods

Design

We conducted a double-blind (blinded participants and blinded outcome assessors), randomized (1:1), placebo controlled, parallel-group pilot trial to evaluate the efficacy of the 'From Fear to Purpose' ACT-based intervention in reducing death anxiety. In addition to this, we also examined the effect of the intervention on anxiety and depression symptoms, investigating the transdiagnostic effect of death anxiety. The study included adults with moderate-to-high levels of death anxiety and mild-to-severe levels of depression and/or anxiety. The study was registered on clinicaltrials.gov (ID: NCT06810999). The study was approved by the University Ethical Review Authority (816/22.01.2025). We used the SPIRIT reporting guidelines (Chan et al., 2013). Before the baseline assessment, participants were required to provide informed consent. They received comprehensive information about the study, including their right to withdraw at any time without providing a reason. No significant risks were expected during or after the study.

Participants

A priori power analysis using G*Power estimated the required sample size for detecting a condition-by-time interaction, assuming an effect size of an effect size of f=0.25 with an alpha level of $\alpha = 0.05$ and power of 0.95, a sample size of 210 was suggested (105/per treatment arm). However, as this is a pilot trial, we decided on a maximum of 40 participants. Participants were recruited from the general population by promoting the study on online social media platforms. By accessing the enrollment link, interested individuals read the study information section, signed the consent forms and completed the screening measures. Inclusion criteria were as follows: (1) age over 18 years old, (2) death anxiety score ≥ 37 and (3) depression (PHQ-9) and/or anxiety (GAD-7) score ≥ 5. Participants were excluded if they were (1) minors, (2) reported suicidal ideation, (3) were currently diagnosed with a psychological/psychiatric diagnosis other than depression or anxiety disorder, or (4) were undergoing active psychological/psychiatric treatment. A total of 160 people completed the screening form. Based on the inclusion criteria, 64 people were eligible for participation and were randomly allocated to the two treatment conditions of the study. The Consolidated Standards of Reporting Trials flow chart of the trial is shown in Figure 1.

Figure 1 can be consulted in the thesis.

Measures

Primary outcome measure:

The Death Anxiety Beliefs and Behaviors Scale (DABBS; Menzies et al., 2022)

The DABBS is an 18-item self-report measure developed to assess unhelpful beliefs and behaviors relevant to death anxiety. The original scale has a three-factor structure (i.e., 'Affect', 'Beliefs' and 'Behaviors') and has demonstrated good construct validity, criterion validity, internal consistency and test-retest reliability in the validation study. Furthermore, the DABBS effectively distinguished participants with clinically significant levels of death anxiety and distress from those without at a cut-off point of ≥ 55. The scale has been adapted and validated in Romanian (Dumitru, Cardoș & David, under review), where the factorial analyses highlighted a 5-factor structure ('Affect', 'Death Beliefs about Self,' 'Death Beliefs about Others,' 'Behavioral Avoidance,' and 'Experiential Avoidance'). While a cut-off point could not be established in the Romanian version, for the present pilot we employed the strategy described in Goodwin (1996), where we established a cut-off score of one standard deviation below the mean. In the present study, the DABBS showed an internal consistency of $\alpha = 0.85$.

Secondary outcome measures

Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001)

The PHQ-9 is one of the most widely used measures of depression and it is based on the diagnostic criteria for major depressive disorder in the Diagnostic and Statistical Manual (DSM-IV; APA, 1994). Scores vary from 0 to 27, where a greater score indicates more severe depressive symptoms over the last two weeks. A cut-off score greater than 5 indicates the presence of depressive symptoms which may cause some difficulty in everyday activities. In the present study, the PHQ-9 showed an internal consistency of $\alpha = 0.87$.

Generalized Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006)

The GAD-7 measures symptoms of anxiety based on the generalized anxiety disorder criteria in DSM-IV (APA, 1994). Scores vary from 0 to 27, with a higher score indicating more severe anxiety symptoms. Respondents report the level of their symptoms over the last two weeks and a cut-off score greater than 5 indicated anxiety symptoms occasionally interfere with daily activities. In the present study, the GAD-7 showed an internal consistency of $\alpha = 0.92$.

The World Health Organization-Five Well-Being Index (WHO-5; World Health Organization, 1998)

The WHO-5 is one of the most widely used assessments of subjective psychological well-being, having high clinimetric validity and good sensitivity in controlled trials (Topp et al., 2015). The instrument has five items, rated on a 6-point Likert scale. Higher scores indicate better well-being over the last two weeks. In the present study, the WHO-5 showed an internal consistency of $\alpha = 0.85$.

Comprehensive Assessment of Acceptance and Commitment Therapy Processes Scale (CompACT; Francis et al.,, 2016; Călinici & Călinici, 2021)

The CompACT is a 23-item self-report questionnaire designed to measure core psychological flexibility processes within Acceptance and Commitment Therapy. Items are rated on a 7-point Likert scale (0 = "Strongly Disagree" to 6 = "Strongly Agree"). The total score ranges from 0 to 138, with higher scores indicating greater psychological flexibility. We used the Romanian adaptation of the instrument. In the present study, the compACT showed an internal consistency of $\alpha = 0.91$.

Brief Experiential Avoidance Questionnaire (BEAQ; Gámez et al., 2014)

The BEAQ is a 15-item self-reports questionnaire that measures experiential avoidance. Items are rated on a 6-point Likert scale (1 = "strongly disagree" to 6 = "strongly agree"). Item 6 is a reversed item, and scores range from 15 to 90 points. Higher scores reflect higher experiential avoidance. In the present study, the BEAQ showed an internal consistency of $\alpha = 0.87$.

The Valuing Questionnaire (VQ; Smout et al., 2014)

The VQ is a self-report measure designed to assess the extent to which individuals engage in valued living, a key process in ACT (Smout et al., 2014). It consists of 10 items divided into two subscales: 1) progress, which measures how consistently a person behaves in ways that align with their values, and 2) obstruction, which assesses the extent to which internal or external barriers interfere with valued living. Items are rated on a 7-point Likert scale (0 = "Not at all true" to 6 = "Completely true"). Higher progress scores indicate greater engagement in valued living, while higher obstruction scores suggest more barriers to valued action. In a study (Levin et al., 2017), the VQ was sensitive to treatment effects following a web-based self-help program for students who struggle with a range of psychological problems. In the present study, the progress subscale of the VQ showed an internal consistency of $\alpha = 0.80$, while the obstruction subscale showed an internal consistency of $\alpha = 0.80$.

Procedure:

Participants' eligibility was established based on the screening form. Following the application of the inclusion and exclusion criteria, eligible participants were randomly allocated to one of the two study conditions in a 1:1 ratio using a random sequence generator. The intervention administrators and outcome assessors were blind to the group allocation up to the completion of the data analysis. Participants were emailed a Google Forms link containing all baseline measures. If the participants did not complete the measures, they were sent up to three email reminders. Both conditions underwent one single online session. The online session took place on a Zoom link sent to the participants by email. Two therapists conducted each session for 90 minutes, following the newly developed 'From Fear to Purpose' ACT-based intervention (experimental condition) and the attention control intervention (placebo condition). The post-intervention assessment was sent to the participants by email, two weeks after the intervention.

The 'From Fear to Purpose' ACT-based intervention

The program involves a group session format and includes established components of ACT (Ferreira et al., 2022). The group session is 90 minutes long and aims to provide participants strategies to increase cognitive flexibility with their fear of death. The session also focuses on facilitating the exploration of personal values that help shift thoughts about death, guiding participants towards actions that can steer their lives in the direction of accepting death anxiety as a natural component of their existence. An overview of the session content is provided in Table 1.

Table 1 can be consulted in the thesis.

Attention control intervention

Participants randomized to the attention control group attended the 90-minute online group format session, designed to match the structure and engagement level of the experimental intervention without delivering active therapeutic components. The session began with a brief check-in, allowing participants to share general thoughts and experiences in a neutral, non-therapeutic manner. The facilitator then guided the group through structured discussions on neutral topics, such as daily routines, general well-being, or light educational content unrelated to psychological treatment (stress management tips without intervention strategies). Simple activities, such as guided discussions on psychoeducation about stress were included to maintain engagement. The facilitator ensured a supportive, structured environment without introducing core therapeutic elements. The session concluded with a general reflection and a brief check-out, maintaining consistency across meetings while avoiding psychological techniques that could influence treatment outcomes.

Analytical Plan

Demographic and clinical data are reported as means and standard deviations. Internal consistency for the study measures was evaluated using Cronbach's alpha coefficient. Statistical analyses were conducted using IBM SPSS Statistics 29 (IBM Corp, n.d.). Data were checked for missing values, outliers, and normality. Little's (1988) test was used to assess if the data was missing completely at random (MCAR). RMSSD values were log-transformed. Linear mixed models (LMM) assessed group differences in change scores from pre- to post-treatment for DABBS (primary outcome), PHQ-9, GAD-7, WHO-5, CompACT, BEAQ, and VQ (secondary outcomes). Data were structured hierarchically, with time (Level 1) nested within individuals (Level 2). All participants with at least one measurement were included. Models were fitted using maximum likelihood (ML) estimation, with a random intercept per subject, variance components for the random intercept, and an autoregressive (AR1) structure for within-subject variance. A diagonal repeated covariance matrix was used. Significant effects and interactions were followed by Bonferroni-corrected pairwise comparisons.

The reliable change index (RCI; Jacobson & Truax, 1991) was used to assess whether participants showed clinically significant changes from pre- to post-treatment based on their individual scores. The RCI is calculated using the standard error of the measure to estimate the range of variation (Ferguson, Robinson & Splaine, 2002).

The feasibility and acceptability of the intervention were evaluated via the recruiting progress (i.e., the percent of eligible participants following the screening process) and the adherence to the study (i.e., the percent of included participants who completed the baseline, underwent the intervention and completed the post-treatment measures).

3.4.3. Results

Participants:

From February to March 2025, 160 individuals enrolled in the present study (Fig. 1). Of the 160 screened individuals, only 64 were eligible. 55 participants were excluded for expressing suicidal ideation or for undergoing active psychiatric/psychotherapeutic treatment. A further 41 participants were excluded for scores below the cut-off points on death anxiety, depression and anxiety. Of the 64 randomized participants, 10 did not complete baseline measurements (i.e., four participants allocated to the experimental condition and six participants allocated to the placebo condition), indicating a relatively high assessment retention (84%). Of the remaining 54 participants, 21 participants were allocated to the experimental condition and 22 were allocated to the placebo condition and participated in the study. Of these 18, respectively, 17 participants completed the post-test measurements. The final sample of 54 participants who provided at least one measurement was disproportionately female (52 women) and young (M_{age} = 34.5, SD = 10.7). The youngest participant was 18 years old and the oldest was 61 years old.

Descriptive results

The data presents univariate normality of the variables as none of them exhibits a skewness value greater than the recommended cut-off of 3 (Kline, 2005). The results of the descriptive analysis (mean, standard deviations, skewness) can be consulted in Table 2, while the correlation matrix is presented in Table 3.

Table 2 can be consulted in the thesis.
Table 3 can be consulted in the thesis.

Intervention outcomes:

No data were missing at pre-treatment, as all were collected during baseline evaluation. There were no significant differences between the experimental and control conditions in the primary and secondary outcomes measured at baseline. 35% of the data was missing at post-treatment, with a non-significant Little's MCAR test ($\chi2$ (8) = 8.45, p = 0.38), indicating randomness. LMM analyses accounted for missing data under the missing-at-random assumption. Results from the LMM indicate that there were no significant differences between the experimental and control groups, nor significant group differences or changes over time (pre- vs. post-intervention) for any of the outcome measures ($p > 0.05$). Furthermore, the interaction between group and time was not significant ($p > 0.05$), suggesting that the intervention did not have differential effects for the two groups (see Table 4).

Table 4 can be consulted in the thesis.

Given the lack of significant differences between groups based on group means, we decided to perform RCI analyses to investigate individual data and see if any participants showed change from pre- to post-treatment. The results (Table 5) indicate that several participants in the experimental group showed clinically significant improvements in mental health outcomes, which are mainly absent in the control group.

Table 5 can be consulted in the thesis.

3.4.4. Discussion

This pilot trial aimed to investigate the feasibility and preliminary efficacy of a single-session 'From Fear to Purpose' ACT intervention designed to reduce death anxiety levels. Another aim of the present study was to examine whether changes in death anxiety scores lead to changes in depression and anxiety scores, therefore testing the transdiagnostic role of death anxiety.

Regarding the feasibility and acceptability of the intervention, results paint a cautious picture. Of the 160 participants, only 64 were eligible (40%), even with lenient inclusion criteria. Recruitment would have been considerably more difficult with depression and anxiety scores over the cut-off ≥ 10, instead of the cut-off of ≥ 5 that was used in this pilot. However, of the 28 participants in experimental condition who provided at least the baseline measurement, 64% of them participated in the intervention and completed post-treatment measurements as well. Past studies on group-based, online ACT interventions report both low and high attrition rates. Brandolin et al. (2024) mention a dropout of 11% in their study, while Sanabria-Mazo et al. (2023) report a dropout of 33% at post-treatment. Therefore, our rate of 36% dropout could be seen as worrisome, especially given the single-session format and the short time between the intervention and the post-treatment measurement. However, past interventions offering multiple sessions of ACT to prevent mental health problems among college students were found to have low acceptability because of the effort required for adherence (Levin et al., 2017). Since the 'From Fear to Purpose' ACT intervention is a single session, no participant dropped out of the intervention itself but rather refused to complete the post-treatment measurement. Thus, it is unclear if the intervention itself was a cause of discontent or if the effort necessary for the post-treatment measurements was the cause of the dropout.

Contrary to our expectations, the study hypothesis regarding the intervention's efficacy in reducing death anxiety levels was not confirmed and the hypothesis regarding death anxiety as a transdiagnostic factor could not be tested as there was no statistically significant effect of the intervention. This could be explained by several factors. Firstly, the pilot trial was underpowered. Following the power analysis, to detect a medium effect, a total sample of 210 participants was recommended. Given the difficulties in recruitment, the final total sample was 54 (i.e., participants who provided at least the baseline measurement), of which only 35 provided post-treatment measurements. Thus, assuming there is an intervention effect, it would be very difficult to detect it with such a small sample. The type-II error increases significantly in insufficiently sized samples (Freiman et al., 2019), which may have been the case here.

Secondly, though shorter interventions can be effective, one session of ACT could be considered insufficient. The 90-minutes 'From Fear to Purpose' protocol covered a broad range of ACT components, such as psychological flexibility, experiential avoidance, values and committed action, all of them complex concepts that could benefit from more time and effort spent on each component. With at least two or three sessions, perhaps an intervention effect might be more readily observed. However, Odgers et al. (2022) found no statistically significant differences between multiple- and single-session interventions in a meta-analysis of exposure therapies for phobias, and Dochat et al. (2021) found that single-session ACT interventions generally had positive results, especially for mental health and ACT processes. Interestingly, the meta-analysis identified a medium-sized but statistically insignificant effect of single-session ACT on well-being and functioning, a result that the authors interpret cautiously as it comes from five size effects, of which two were extracted from pilot/feasibility trials (Dochat et al., 2021). As Bowe et al. (2009) argue, the role of a pilot trial is to inform treatment acceptability and feasibility rather than efficacy. Only a fully powered randomized controlled trial would allow us to interpret such a result with confidence. Thirdly, the use of a psychological placebo could have been a reason for the lack of a statistically significant effect of the intervention. Past meta-analyses and experimental studies suggest waitlist or no-treatment controls generate bigger effect sizes estimates for the experimental condition (Cunningham, Kypri & McCambridge, 2013; Furukawa et al., 2014; Olatunji et al., 2013) than placebo controls. Thus, while a placebo control is more rigorous (Gaab et al., 2019), in the absence of a sufficiently large sample, it can hinder the detection of an effect size. Fourthly, the online format of the intervention may have also hindered the intervention, as a number of participants chose to have their cameras turned off, making it unclear if they effectively benefited from the intervention.

Based on the RCI analyses, a few participants showed clinically significant improvements in mental health outcomes, which were mostly absent in the control group. Though this result needs to be interpreted cautiously given the pilot limitations, it shows promise and encourages further evaluation in a fully powered randomized controlled trial.

The study's limitations mainly regard the study sample, which was insufficient to allow for confident inferences. Additionally, the sample was predominantly female. Even if the results were significant, they would not allow for generalization to the broader population. As for the strengths of the study, one considerable strength is the use of a placebo group. Though waitlist conditions can be advantageous, a placebo condition allows us to conclude with confidence that the intervention is effective. Another strength of the study is the development of the first ACT-based protocol specifically designed for death anxiety, as well as for depressive and anxious symptoms. We chose ACT because it is an evidence-based therapy (Ferreira et al., 2022; Thompson et al., 2021; Hughes et al., 2017; Davis et al., 2015), established across different disorders, populations and therapy formats.

For future directions, subsequent randomized controlled trials need to employ larger samples. Ensuring sufficient power would allow us to evaluate the efficacy of the intervention in reducing death anxiety levels, as well as depression and anxiety symptoms. In addition, future studies could test the intervention in multiple formats, such as face-to-face instead of online participation, individual therapy instead of group therapy and even multiple sessions.

In conclusion, we did not detect any statistically significant effect, which may be due to the considerable limitations regarding the small sample size. However, some improvements were noted in the primary and secondary outcomes of the study. Given that this is the first study to investigate the newly developed 'From Fear to Purpose' ACT intervention, future studies are needed to establish if the intervention can be efficient in better and more superior trial conditions.

CHAPTER IV. GENERAL CONCLUSIONS AND IMPLICATIONS

4.1. General Conclusions

Current empirical research identifies death anxiety as a potential transdiagnostic factor in psychopathology, with major implications responsible for the onset, maintenance and exacerbation of psychological symptoms. However, the data are mixed, predominantly correlational, and often lack methodological rigor. This thesis investigates death anxiety as a transdiagnostic factor in psychopathology, focusing on its association with various symptoms. It aims to expand the current empirical literature and guide future practice.

Firstly, we performed a systematic review and meta-analysis of all the published and peer-reviewed literature on associations of death anxiety to distress and psychopathology. This was done to estimate the relationship between death anxiety and distress or symptoms of mental disorders. We included all studies that reported a correlation between death anxiety and distress or symptoms of mental disorders across general and clinical samples, using previously validated measures for all outcomes. We searched multiple bibliographic databases and total of 129 studies were included, reporting on 158 independent samples, for a total of 34,147 participants. Study quality was evaluated with the Study Quality Assessment Tools (NHLBI, n.d.) and most studies were rated as poor quality. The findings indicated consistently positive associations between death anxiety and distress outcomes (Pearson's r ranging from 0.36 to 0.66). We found no moderation by death anxiety measure, sample type or the proportion of women in the sample. However, the association was stronger when medical conditions were present than when they were absent. There was evidence of small-study effects, indicating possible publication bias. The results of the meta-analysis indicate death anxiety is robustly, significantly associated with distress and psychopathology and deserving of future consideration.

Secondly, we conducted a methodological study to assess the validity of the DABBS after undergoing the translation and adaptation process. The study sample consisted of 482 participants who completed the assessment. Construct validity was tested via confirmatory factor analysis, which did not confirm the original three-factor model (i.e., 'Affect', 'Beliefs', and 'Behaviors'; Menzies et al., 2022). Exploratory factor analysis identified a new five-factor structure: 'Affect,' 'Death Beliefs about Self,' 'Death Beliefs about Others,' 'Behavioral Avoidance,' and 'Experiential Avoidance.' The Romanian DABBS demonstrated good construct validity, good internal consistency, and good test-retest reliability. Although the Romanian version differs factorially, the findings support the use of the scale as a reliable and valid measure of death anxiety in Romanian samples.

Thirdly, using mediation analyses, we investigated the role of death anxiety in the relationship between neuroticism and symptoms of depression and anxiety, hypothesizing that the two relationships between neuroticism symptoms of depression, respectively symptoms of anxiety are mediated by death anxiety. 482 participants completed the measures, and the results confirmed a mediation effect in the case of anxiety symptoms, but not in the case of depression symptoms. The mediation effect was partial and small, but consistent with past literature.

Lastly, through an experimental design, we tested the efficacy of an ACT-based intervention specifically designed to reduce death anxiety in individuals with symptoms of anxiety and/or depression. By targeting the proposed underlying mechanisms of these disorders, the study sought to provide a comprehensive, evidence-based approach to improving mental health outcomes. The RCT was pre-registered and received ethical approval. The design was a parallel-group pilot trial, double blinded, and it compared the 90 minutes 'From Fear to Purpose' group intervention to an attention control placebo condition. 64 participants with elevated death anxiety levels and clinically significant symptoms of depression and anxiety were randomized into the two study conditions. The intervention focused on enhancing cognitive flexibility around death anxiety, helping participants reframe thoughts about death, explore personal values, and accept death anxiety as a natural experience. Outcome measures were collected at baseline and two weeks post-intervention. The primary outcome was death anxiety, while the secondary outcomes were depression, anxiety, well-being, psychological flexibility, experiential avoidance and valued living. The analysis revealed no significant interaction effect, which could be explained by the small sample, the inclusion of participants with subclinical symptoms, the choice of a psychological placebo as a comparator and the online format of the intervention. However, RCI analyses signaled a few clinically significant improvements in the experimental group, which were mainly absent in the control group.

Summarizing, the general results of this thesis are: 1) the magnitude of the association between death anxiety and distress and psychopathology is moderate, 2) the Romanian version of DABBS, though it present a different factorial structure from the original version, has sound psychometric properties and can be used confidently in Romanian samples, 3) death anxiety may add explanatory power in addition to a known transdiagnostic factor such as neuroticism in regards to the emergence of anxiety symptoms, but not depressive symptoms and 4) some participants showed improvement following the 'From Fear to Purpose' ACT intervention, with lower death anxiety, depression and anxiety symptoms, as well as higher well-being. These results, though some of them contrary to our expectations, reveal a series of broader implications, theoretical, methodological and practical.

4.2. Implications of the present work

4.2.1. Theoretical Implications

The present thesis managed to bring clarity regarding the relationship between death anxiety and psychological distress. Firstly, by performing a systematic review and meta-analysis, we reduced the ambiguity caused by the mixed data and identified an association of moderate strength between death anxiety and psychopathology. While it is not surprising that one form of psychological distress correlates significantly with another form of distress, it is notable that we have quantified these relationships and understand just how strongly associated these variables are. Furthermore, based on the subgroup analyses, we now know that the presence of a medical diagnosis exacerbates the relationship between death anxiety and distress. This suggests that further attention should be paid to medical samples and individuals who present somatic disorders in addition to psychological disorders. This result comes in support of the TMT, in the sense that a medical diagnosis can act as a primer, inducing mortality salience, which in turn leads to elevated death anxiety and psychopathological symptoms. Though subgroup analyses regarding the clinical status of the sample did not yield statistically significant results, this can be explained by the low number of clinical samples, which were also heterogeneous in regard to diagnoses, inclusion criteria, recruitment and other factors. This also highlights the pressing need for larger clinical samples who are screened with gold-standard measures, such as clinical interviews. Secondly, by validating the DABBS in Romanian, we provide further theoretical validity to the concept of death anxiety. Following the failed confirmatory factor analysis, we performed an exploratory analysis which revealed a different factorial structure. The original structure (i.e., 'Affect', 'Beliefs', 'Behaviors') was grounded in classical CBT theory, but in our Romanian sample, the new structure seemed to reflect third-wave CBT, in the form of ACT. Specifically, the 'Affect' factor remained unchanged, the 'Beliefs' factor was split into 'Death Beliefs about Self' and 'Death Beliefs about Others', and the final 'Behaviors' factor was split into 'Behavioral Avoidance' and 'Experiential Avoidance'. This result is interesting and may reflect a cultural particularity, but it also served to inform the choice of intervention in the pilot trial. Finally, the third study, though limited by the cross-sectional design, offers further support for the study of death anxiety, particularly in anxiety disorders. The detected mediation effect of death anxiety in the relationship between neuroticism and anxiety symptoms, but not in the relationship between death anxiety and depressive symptoms, reflects past research. Specifically, the work of Menzies et al. (2024) who found in their review that anxiety disorders tend to precede other diagnoses. Our result comes in support of this finding and suggests that anxiety disorders should be studied in relation to death anxiety.

4.2.2. Methodological Implications

The thesis also brought forth methodological advancements. Firstly, by employing meta-analytical design, we lend credibility to the research domain. This large-scale meta-analysis included a considerable number of studies and managed to fill a few blind spots, mainly regarding the proposed moderators. Furthermore, our review offered a critical view of the current state of death anxiety research and pinpointed a series of methodological issues, namely the low quality of the studies, the incomplete data reporting, the paucity of longitudinal and experimental designs, the dearth of clinical samples and the use of death anxiety measures with poor psychometric properties. Furthermore, the second study from the present thesis is the first in the field that translated and validated a death anxiety measure in Romanian. Through this research process, we offer a reliable measure of death anxiety in Romanian samples, encouraging

rigorous and accurate research practices. Finally, we developed a new intervention protocol, namely the 'From Fear to Purpose' ACT intervention which aims to increase cognitive flexibility surrounding death, as well as facilitate the exploration and embracing of personal values to live a meaningful life. The pilot study was double-blinded (i.e., blinded participants and blinded outcome assessors) and the control condition was a placebo one (i.e., attention control), which is a strength considering the usual waitlist or treatment-as-usual employed in trials.

Additionally, each study was pre-registered (i.e., Open Science Framework, ClinicalTrials.gov), and the associated data was published in online data repositories (i.e., Open Science Framework), encouraging transparent research practices and open science as well.

4.2.3. Clinical Implications

As for the practical implications, the results of the present thesis also benefit therapists and practitioners. Based on our meta-analysis, we established that death anxiety can be a considerable factor in regard to psychopathology. Thus, when clients present with particularly high levels of death anxiety, there is empirical background to consider it as a relevant factor in their symptomatology. Furthermore, special care should be given to individuals who are diagnosed with somatic disorders as well.

Another important clinical implication is the fact that the DABBS is an appropriate measure of death anxiety. The scale can be effectively employed in therapeutic contexts to measure and evaluate death anxiety levels. Seeing as the scale is grounded in CBT theory, it can be an appropriate instrument especially when working within a CBT context.

Though the pilot trial did not identify a significant effect for the intervention, RCI analyses offer encouraging results, seeing as a few participants showed clinically significant improvements. Interpreted cautiously, these results suggest that future trials should use larger samples and include participants with more severe symptoms to detect significant changes. Still, upon further research, the strategies included in the intervention protocol could be used in therapeutic contexts with the purpose of reducing clinically relevant levels of death anxiety.

4.3. Limitations and Future Directions

While this thesis brings forth significant contributions, it also presents a series of limitations. The limitations of each study are presented in the appropriate sections of the corresponding studies. This section focuses on the general limitations of the thesis and the required future directions given these limitations.

Firstly, the cross-sectional design employed in the third study precludes any causal inferences. To test for causality, a longitudinal design is needed to consider temporality which allows us to test for the directionality of the effect. Given the lack of multiple time points in the assessment of neuroticism, death anxiety and symptoms of depression and anxiety, it is unclear whether the detected mediation effect in the case of anxiety symptoms is authentic. Moreover, the cross-sectional design could be responsible for the rejection of the depressive mediation model. Had we employed a longitudinal effect, the results could have been interpreted with more confidence regarding the presence or absence of an effect.

Secondly, the samples of the studies were afflicted with a few issues. Specifically, they were extracted from the general population. While participants in the fourth study presented depressive and anxious symptoms of mild to severe intensity, they were not screened with gold-standard instruments, such as clinical interviews. Additionally, the samples were imbalanced gender-wise, composed predominantly of women. This hinders meaningful generalizations, as death anxiety presents differently in men from women (Eshbaugh & Henninger, 2013; Quince et al., 2011; Türkarslan et al., 2020). Lastly, though the fourth study was a pilot trial, the sample was too small to detect an effect, even if one existed.

Thirdly, the instruments utilized in this thesis are all self-report instruments, some not yet validated in Romanian. This could reduce confidence in some of the results, especially as symptoms of anxiety and depression were not evaluated with formal screening measures and clinical interviews.

As for future directions, future studies investigating death anxiety should employ longitudinal designs that allow for causal testing. By allowing multiple time points, one can test for temporality and directionality, therefore authoritatively interpreting a mediation effect as a causal effect. Furthermore, experimental designs can be used to test certain hypotheses as these designs allow for confident comparisons between conditions, inferring that a variable is indeed the cause of an observed effect.

Secondly, future studies should explore death anxiety in diverse samples to evaluate if relationships or effects are maintained across various individual characteristics. This research domain needs more clinical samples that are screened for symptoms and disorders, which will allow us to infer with confidence if death anxiety has a role in psychopathology. Moreover, medical samples are of great interest, especially given the moderating role of a medical diagnosis in the relationship between death anxiety and distress which was found in our meta-analysis. Future studies should specify their inclusion criteria and describe the particularities of the sample, especially regarding the medical diagnosis, stage, severity and how it is perceived by the patient. This information could be of great value in further meta-analyses, as they can be aggregated and analyzed. Samples should also be balanced gender- and age-wise, as these variables have a known impact on how death anxiety is felt and expressed (Tang et al., 2002). Lastly, future studies should be sufficiently powered to reduce type II errors and allow for accurate effect detection.

Finally, given the current fragmentation of psychological concepts (Anvari et al., 2025) and the multiple issues with death anxiety measures (Zuccala et al., 2022), future studies should first ensure we unify the death anxiety research area. This means using uniform nomenclature, establishing what aspects and dimensions of death anxiety are of interest and sift through the currently available death anxiety measure to choose the most apt ones and only then develop new ones based on identified needs. This theoretical and methodological work is of foremost importance to refine this area of research and to generate knowledge.

To summarize, this PhD thesis intended to shed light on death anxiety and its role in human psychopathology. Through the implemented studies and applied methods, we believe we succeeded in bringing added clarity and increasing the level of scientific knowledge surrounding this particular form of apprehension, which is quintessential to the human experience.

REFERENCES

Abbott, M. J., & Rapee, R. M. (2004). Post-event rumination and negative self-appraisal in social phobia before and after treatment. *Journal of abnormal psychology*, *113*(1), 136.

Ahmadi, V., & Valizadeh, H. (2021). The effectiveness of acceptance and commitment-based therapy on the quality of life and death anxiety in the elderly. *Aging Psychology*, *7*(2), 166-153. 10.22126/JAP.2021.6370.1528

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders (4th ed.).* American Psychiatric Association

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Andrei, A. M., Webb, R., & Enea, V. (2023). Health anxiety, death anxiety and coronaphobia: Predictors of postpartum depression symptomatology during the COVID-19 pandemic. *Midwifery*, *124*, 103747. https://doi.org/10.1016/j.midw.2023.103747

Angst, J., Gamma, A., Clarke, D., Ajdacic-Gross, V., Rössler, W., & Regier, D. (2010). Subjective distress predicts treatment seeking for depression, bipolar, anxiety, panic, neurasthenia and insomnia severity spectra. *Acta Psychiatrica Scandinavica*, *122*(6), 488-498. https://doi.org/10.1111/j.1600-0447.2010.01580.x

Anvar, M., Javadpour, A., & Zadeh, S. M. (2012). Assessing death anxiety and its correlates among severe medically ill in-patients. *Shiraz E-Medical Journal*, *13*(3), 122-127.

Anvari, F., Alsalti, T., Oehler, L. A., Hussey, I., Elson, M., & Arslan, R. C. (2025). Defragmenting psychology. *Nature Human Behaviour*, 1-4. https://doi.org/10.1038/s41562-025-02138-0

Anvari, F., Alsalti, T., Oehler, L., Hussey, I., Elson, M., & Arslan, R. C. (2024). A fragmented field: Construct and measure proliferation in psychology. doi:10.31234/osf.io/b4muj

Arndt, J., Routledge, C., Cox, C. R., & Goldenberg, J. L. (2005). The worm at the core: A terror management perspective on the roots of psychological dysfunction. *Applied and Preventive Psychology*, *11*(3), 191-213. https://doi.org/10.1016/j.appsy.2005.07.002

Bandelow, B., & Michaelis, S. (2015). Epidemiology of anxiety disorders in the 21st century. *Dialogues in clinical neuroscience*, *17*(3), 327-335. https://doi.org/10.31887/DCNS.2015.17.3/bbandelow

Barlow, D. H., & Kennedy, K. A. (2016). New approaches to diagnosis and treatment in anxiety and related emotional disorders: A focus on temperament. *Canadian Psychology/Psychologie canadienne*, *57*(1), 8.

Barlow, D. H., Curreri, A. J., & Woodard, L. S. (2021). Neuroticism and disorders of emotion: A new synthesis. *Current Directions in Psychological Science*, *30*(5), 410-417. https://doi.org/10.1177/09637214211030253

Barlow, D. H., Sauer-Zavala, S., Carl, J. R., Bullis, J. R., & Ellard, K. K. (2014). The nature, diagnosis, and treatment of neuroticism: Back to the future. *Clinical Psychological Science*, *2*(3), 344-365. https://doi.org/10.1177/2167702613505532

Bartlett, M. S. (1950). Tests of significance in factor analysis. British Journal of Psychology, 3, 77–85.

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. Journal of Consulting and Clinical Psychology, 56(6), 893–897. https://doi.org/10.1037/0022-006X.56.6.893

Beck, A. T., Steer, R. A., & Brown, G. (1996). Beck depression inventory–II. *Psychological assessment*. https://doi.org/10.1037/t00742-000

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of general psychiatry*, *4*(6), 561-571. 10.1001/archpsyc.1961.01710120031004

Becker, E. (1973). *The denial of death*. Free Press

Bentler, P. M. (1990). Comparative fit indexes in structural models. Psychological bulletin, 107(2), 238. https://doi.org/10.1037/0033-2909.107.2.238

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. Psychological Bulletin, 88(3), 588–606. https://doi.org/10.1037/0033-2909.88.3.588

Bianco, S., Testoni, I., Palmieri, A., Solomon, S., & Hart, J. (2024). The psychological correlates of decreased death anxiety after a near-death experience: The role of self-esteem, mindfulness, and death representations. Journal of Humanistic Psychology, 64(3), 343-366. https://doi.org/10.1177/0022167819892107

Bohart, J. B., & Bergland, B. W. (1978). The impact of death and dying counseling groups on death anxiety in college students. *Death Studies*, *2*(4), 381-391. https://doi.org/10.1080/07481187908253321

Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2021). *Introduction to meta-analysis*. John wiley & sons.

Bouchard, T. J., & Loehlin, J. C. (2001). Genes, evolution, and personality. *Behavior genetics*, *31*, 243-273. https://doi.org/10.1023/A:1012294324713

Bowen, D. J., Kreuter, M., Spring, B., Cofta-Woerpel, L., Linnan, L., Weiner, D., ... & Fernandez, M. (2009). How we design feasibility studies. *American journal of preventive medicine*, *36*(5), 452-457. https://doi.org/10.1016/j.amepre.2009.02.002

Bowlby, J. (1969). *Attachment and loss* (No. 79). Random House.

Brandolin, F., Lappalainen, P., Gorinelli, S., Muotka, J., & Lappalainen, R. (2024). Examining the effectiveness and acceptability of a group-based ACT intervention delivered by videoconference to international university students during the COVID-19 pandemic. *Counselling Psychology Quarterly*, *37*(4), 517-541. https://doi.org/10.1080/09515070.2023.2254726

Brown, T. A. (2015). Confirmatory factor analysis for applied research (2nd ed.). The Guilford Press.

Brown, T. A., Campbell, L. A., Lehman, C. L., Grisham, J. R., & Mancill, R. B. (2001). Current and lifetime comorbidity of the DSM-IV anxiety and mood disorders in a large clinical sample. *Journal of abnormal psychology*, *110*(4), 585-599. https://doi.org/10.1037/0021-843X.110.4.585

Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. Sociological methods & research, 21(2), 230-258. https://doi.org/10.1177/0049124192021002005

Bullis, J. R., Boettcher, H., Sauer-Zavala, S., Farchione, T. J., & Barlow, D. H. (2019). What is an emotional disorder? A transdiagnostic mechanistic definition with implications for assessment, treatment, and prevention. *Clinical psychology: Science and practice*, *26*(2), 20. https://doi.org/10.1111/cpsp.12278

Bunghez, C., Rusu, A., De Houwer, J., Perugini, M., Boddez, Y., & Sava, F. A. (2024). The moderating role of neuroticism on evaluative conditioning: Evidence from ambiguous learning situations. *Social Psychological and Personality Science*, *15*(6), 718-727. https://doi.org/10.1177/19485506231191861

Burani, K., & Nelson, B. D. (2020). Gender differences in anxiety: The mediating role of sensitivity to unpredictable threat. *International Journal of Psychophysiology*, *153*, 127-134. https://doi.org/10.1016/j.ijpsycho.2020.05.001

Burke, B. L., Martens, A., & Faucher, E. H. (2010). Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality and social psychology review*, *14*(2), 155-195. https://doi.org/10.1177/1088868309352321

Cai, H., Jin, Y., Liu, S., Zhang, Q., Zhang, L., Cheung, T., ... & Xiang, Y. T. (2021). Prevalence of suicidal ideation and planning in patients with major depressive disorder: a meta-analysis of observation studies. *Journal of affective disorders*, *293*, 148-158. 10.1016/j.jad.2021.05.115

Călinici, M. S., & Călinici, T. (2021). Comprehensive Assessment of ACT Processes CompACT. Romanian adaptation and short form validation. *Journal of Evidence-Based Psychotherapies*, *21*(2), 209-226. 10.24193/jebp.2021.2.19

Centers for Disease Control and Prevention. (n.d.). *WISQARS leading causes of death visualization tool*. U.S. Department of Health & Human Services. Retrieved February 12, 2025, from https://wisqars.cdc.gov/lcd/

Cerny, B. A., & Kaiser, H. F. (1977). A study of a measure of sampling adequacy for factor-analytic correlation matrices. Multivariate behavioral research, 12(1), 43-47. https://doi.org/10.1207/s15327906mbr1201_3

Chan, A. W., Tetzlaff, J. M., Gøtzsche, P. C., Altman, D. G., Mann, H., Berlin, J. A., ... & Moher, D. (2013). SPIRIT 2013 explanation and elaboration: guidance for protocols of clinical trials. *Bmj*, *346*. https://doi.org/10.1136/bmj.e7586

Chatard, A., Pyszczynski, T., Arndt, J., Selimbegović, L., Konan, P. N., & Van der Linden, M. (2012). Extent of trauma exposure and PTSD symptom severity as predictors of anxiety-buffer functioning. *Psychological Trauma: Theory, Research, Practice, and Policy*, *4*(1), 47.

Chawla, S., Menzies, R. E., & Menzies, R. G. (2022). Existential concerns in OCD with aggressive and sexual obsessions. *Journal of obsessive-compulsive and related disorders*, *32*, 100710. https://doi.org/10.1016/j.jocrd.2022.100710

Chopik, W. J. (2017). Death across the lifespan: Age differences in death-related thoughts and anxiety. *Death studies*, *41*(2), 69-77. https://doi.org/10.1080/07481187.2016.1206997

Chorpita, B. F., & Barlow, D. H. (2018). The development of anxiety: The role of control in the early environment. In D.H. Barlow (Ed). *The Neurotic Paradox, Vol 2*, 227-264 (1st ed). Routledge

Chung, M. C., Dennis, I., Easthope, Y., Werrett, J., & Farmer, S. (2005). A multiple-indicator multiple-cause model for posttraumatic stress reactions: personality, coping, and maladjustment. *Biopsychosocial Science and Medicine*, *67*(2), 251-259. https://doi.org/10.1097/01.psy.0000155675.56550.5f

Cicirelli, V. G. (2001). Personal meanings of death in older adults and young adults in relation to their fears of death. *Death studies*, *25*(8), 663-683. https://doi.org/10.1080/713769896

Cohen J. (1992). A power primer. *Psychological bulletin*, *112*(1), 155–159. https://doi.org/10.1037//0033-2909.112.1.155

Comrey, A. L., & Lee, H. B. (1992). A first course in factor analysis (2nd ed.). Lawrence Erlbaum Associates, Inc. https://doi.org/10.4324/9781315827506

Conte, H. R., Weiner, M. B., & Plutchik, R. (1982). Measuring death anxiety: Conceptual, psychometric, and factor-analytic aspects. *Journal of Personality and Social Psychology, 43*(4), 775–785. https://doi.org/10.1037/0022-3514.43.4.775

Cudeck, R. (2000). Exploratory factor analysis. In H. E. A. Tinsley & S. D. Brown (Eds.), Handbook of applied multivariate statistics and mathematical modeling (pp. 265–296). Academic Press. https://doi.org/10.1016/B978-012691360-6/50011-2

Cuijpers, P., Eylem, O., Karyotaki, E., Zhou, X., & Sijbrandij, M. (2019). Psychotherapy for depression and anxiety in low-and middle-income countries. In *Global mental health and psychotherapy* (pp. 173-192). Academic Press. https://doi.org/10.1016/B978-0-12-814932-4.00008-2

Cuijpers, P., Miguel, C., Ciharova, M., Ebert, D., Harrer, M., & Karyotaki, E. (2023). Transdiagnostic treatment of depression and anxiety: a meta-analysis. *Psychological Medicine*, *53*(14), 6535-6546. 10.1017/S0033291722003841

Cuijpers, P., Miguel, C., Ciharova, M., Quero, S., Plessen, C. Y., Ebert, D., ... & Karyotaki, E. (2023). Psychological treatment of depression with other comorbid mental disorders: systematic review and meta-analysis. *Cognitive Behaviour Therapy*, *52*(3), 246-268. https://doi.org/10.1080/16506073.2023.2166578

Cunningham, J. A., Kypri, K., & McCambridge, J. (2013). Exploratory randomized controlled trial evaluating the impact of a waiting list control design. *BMC medical research methodology*, *13*, 1-7. https://doi.org/10.1186/1471-2288-13-150

da Silva, M. L., Rocha, R. S. B., Buheji, M., Jahrami, H., & Cunha, K. D. C. (2021). A systematic review of the prevalence of anxiety symptoms during coronavirus epidemics. *Journal of Health Psychology*, *26*(1), 115-125. https://doi.org/10.1177/1359105320951620

Dadfar, M., & Lester, D. (2017). Religiously, spirituality and death anxiety. *Austin J Psychiatry Behav Sci*, *4*(1), 1061

Dadfar, M., Farid, A. A. A., Lester, D., Vahid, M. K. A., & Birashk, B. (2016). Effectiveness of death education program by methods of didactic, experiential, and 8A model on the reduction of death distress among nurses. *International Journal of Medical Research & Health Sciences*, *5*(7), 60-71.

Dalgleish, T., Black, M., Johnston, D., & Bevan, A. (2020). Transdiagnostic approaches to mental health problems: Current status and future directions. *Journal of consulting and clinical psychology*, *88*(3), 179. https://doi.org/10.1037/ccp0000482

Davazdahemami, M. H., Bayrami, A., Petersen, J. M., Twohig, M. P., Bakhtiyari, M., Noori, M., & Kheradmand, A. (2020). Preliminary evidence of the effectiveness of acceptance and commitment therapy for death anxiety in Iranian clients diagnosed with obsessive-compulsive disorder. *Bulletin of the Menninger Clinic*, *84*(Supplement A), 1-11. https://doi.org/10.1521/bumc.2020.84.suppA.1

David, D. (2020). Sistem de evaluare clinică (SEC). Cluj-Napoca. RTS.

David, D., Dobrean, A., and Sucala, M. (2012). BDI II-Inventarul de depresie BECK: Manual. [Beck's depression inventory] Cluj-Napoca. RTS.

Davis, M. L., Morina, N., Powers, M. B., Smits, J. A., & Emmelkamp, P. M. (2015). A meta-analysis of the efficacy of acceptance and commitment therapy for clinically relevant mental and physical health problems. *Psychotherapy and psychosomatics*, *84*(1), 30-36. https://doi.org/10.1159/000365764

Derogatis, L. R., & Savitz, K. L. (1999). The SCL-90-R, Brief Symptom Inventory, and Matching Clinical Rating Scales.

Dimidjian, S., Arch, J. J., Schneider, R. L., Desormeau, P., Felder, J. N., & Segal, Z. V. (2016). Considering meta-analysis, meaning, and metaphor: A systematic review and critical examination of "third wave" cognitive and behavioral therapies. *Behavior therapy*, *47*(6), 886-905. https://doi.org/10.1016/j.beth.2016.07.002

Dochat, C., Wooldridge, J. S., Herbert, M. S., Lee, M. W., & Afari, N. (2021). Single-session acceptance and commitment therapy (ACT) interventions for patients with chronic health conditions: A systematic review and meta-analysis. *Journal of contextual behavioral science*, *20*, 52-69. https://doi.org/10.1016/j.jcbs.2021.03.003

Dong, A., Zhang, H., Ai, F., Kong, L., Lu, T., Zheng, C., & Feng, F. (2024). Chinese version of the Death Anxiety Beliefs and Behaviours Scale: Psychometric properties based on CTT and IRT. Geriatric Nursing, 60, 207-214. https://doi.org/10.1016/j.gerinurse.2024.09.005

Dougherty, K., Templer, D. I., & Brown, R. (1986). Psychological states in terminal cancer patients as measured over time. *Journal of Counseling Psychology*, *33*(3), 357 – 359. https://doi.org/10.1037/0022-0167.33.3.357

Dozois, D. J., Seeds, P. M., & Collins, K. A. (2009). Transdiagnostic approaches to the prevention of depression and anxiety. *Journal of Cognitive Psychotherapy*, *23*(1). 10.1891/0889-8391.23.1.44

Dudley, R., Kuyken, W., & Padesky, C. A. (2011). Disorder specific and trans-diagnostic case conceptualisation. *Clinical Psychology Review*, *31*(2), 213-224. https://doi.org/10.1016/j.cpr.2010.07.005

Dumitru, E. P., Cardoș, R. A., Milea, I., Gambarota, F., Altoè, G., David, D. O., & Cristea, I. A. (2025). A meta-analysis of the association of death anxiety with psychological distress and psychopathology. *Nature Human Behaviour*, 1-11. https://doi.org/10.1038/s41562-025-02115-7

Duval, S., & Tweedie, R. (2000). Trim and fill: a simple funnel-plot–based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, *56*(2), 455-463. https://doi.org/10.1111/j.0006-341X.2000.00455.x

Egan, S. J., Wade, T. D., & Shafran, R. (2011). Perfectionism as a transdiagnostic process: A clinical review. *Clinical psychology review*, *31*(2), 203-212. https://doi.org/10.1016/j.cpr.2010.04.009

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *bmj*, *315*(7109), 629-634. https://doi.org/10.1136/bmj.315.7109.629

Einstein, D. A., & Menzies, R. G. (2006). Magical thinking in obsessive-compulsive disorder, panic disorder and the general community. *Behavioural and Cognitive Psychotherapy*, *34*(3), 351-357.

Elson, M., Hussey, I., Alsalti, T., & Arslan, R. C. (2023). Psychological measures aren't toothbrushes. *Communications Psychology*, *1*(1), 25. https://doi.org/10.1038/s44271-023-00026-9

Emanuel, L. L., Solomon, S., Chochinov, H. M., Delgado Guay, M. O., Handzo, G., Hauser, J., ... & Fitchett, G. (2023). Death anxiety and correlates in cancer patients receiving palliative care. *Journal of palliative medicine*, *26*(2), 235-243. https://doi.org/10.1089/jpm.2022.0052

Eshbaugh, E., & Henninger, W. (2013). Potential Mediators of the Relationship Between Gender and Death Anxiety. *Individual Differences Research*, *11*(1).

Eysenck, M. W., & Fajkowska, M. (2018). Anxiety and depression: toward overlapping and distinctive features. *Cognition and emotion*, *32*(7), 1391-1400. https://doi.org/10.1080/02699931.2017.1330255

Farahi, S., & Khalatbari, J. (2019). Effectiveness of acceptance and commitment therapy on the life expectancy, resilience and death anxiety in women with cancer. *International Journal of Applied Behavioral Sciences*, *6*(3), 9-19. https://doi.org/10.22037/ijabs.v6i3.21470

Farchione, T. J., Long, L. J., Spencer-Laitt, D., Moreno, J., & Barlow, D. H. (2024). State of the science: The unified protocol for transdiagnostic treatment of emotional disorders. *Behavior Therapy*. https://doi.org/10.1016/j.beth.2024.04.007

Farley, G. (2018). Death anxiety and death education: a brief analysis of the key issues. In Foyle, L. & Hostad, J. (Eds.), Delivering Cancer and Palliative Care Education. (1st ed., pp. 73-78). CRC Press.

Ferguson, R. J., Robinson, A. B., & Splaine, M. (2002). Use of the reliable change index to evaluate clinical significance in SF-36 outcomes. *Quality of Life Research*, *11*, 509-516. https://doi.org/10.1023/A:1016350431190

Ferreira, M. G., Mariano, L. I., de Rezende, J. V., Caramelli, P., & Kishita, N. (2022). Effects of group Acceptance and Commitment Therapy (ACT) on anxiety and depressive symptoms in adults: A meta-analysis. *Journal of affective disorders*, *309*, 297-308. https://doi.org/10.1016/j.jad.2022.04.134

Fiedler, K., Kutzner, F., & Krueger, J. I. (2012). The long way from α-error control to validity proper: Problems with a short-sighted false-positive debate. *Perspectives on Psychological Science*, *7*(6), 661-669. https://doi.org/10.1177/1745691612462587

Fledderus, M., Bohlmeijer, E. T., Fox, J. P., Schreurs, K. M., & Spinhoven, P. (2013). The role of psychological flexibility in a self-help acceptance and commitment therapy intervention for psychological distress in a randomized controlled trial. *Behaviour research and therapy*, *51*(3), 142-151. https://doi.org/10.1016/j.brat.2012.11.007

Forrester, M., Sharpe, L., & Menzies, R. E. (2024). Starving off death: Mortality salience impacts women's body image and disordered eating. *Death Studies*, 1-10. https://doi.org/10.1080/07481187.2024.2352732

Fortner, B.V., Neimeyer, R. A., (1999). Death anxiety in older adults: A quantitative review. *Death studies*, *23*(5), 387-411. https://doi.org/10.1080/074811899200920

Francis, A. W., Dawson, D. L., & Golijani-Moghaddam, N. (2016). The development and validation of the Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT). *Journal of contextual behavioral science*, *5*(3), 134-145. https://doi.org/10.1016/j.jcbs.2016.05.003

Freiman, J. A., Chalmers, T. C., Smith, H. A., & Kuebler, R. R. (2019). The importance of beta, the type II error, and sample size in the design and interpretation of the randomized controlled trial: survey of two sets of "negative" trials. In *Medical uses of statistics* (pp. 357-389). CRC Press.

Fried, E. I., Flake, J. K., & Robinaugh, D. J. (2022). Revisiting the theoretical and methodological foundations of depression measurement. *Nature Reviews Psychology*, *1*(6), 358-368. https://doi.org/10.1038/s44159-022-00050-2

Furer, P., & Walker, J. R. (2008). Death anxiety: A cognitive-behavioral approach. *Journal of Cognitive Psychotherapy*, *22*(2), 167-182. https://doi.org/10.1891/0889-8391.22.2.167

Furer, P., Walker, J. R., Chartier, M. J., & Stein, M. B. (1997). Hypochondriacal concerns and somatization in panic disorder. *Depression and Anxiety*, *6*(2), 78-85. https://doi.org/10.1002/(SICI)1520-6394(1997)6:2<78::AID-DA4>3.0.CO;2-1

Furukawa, T. A., Kessler, R. C., Slade, T., & Andrews, G. (2003). The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being. *Psychological medicine*, *33*(2), 357-362. 10.1017/s0033291702006700

Furukawa, T. A., Noma, H., Caldwell, D. M., Honyashiki, M., Shinohara, K., Imai, H., ... & Churchill, R. (2014). Waiting list may be a nocebo condition in psychotherapy trials: A contribution from network meta-analysis. *Acta Psychiatrica Scandinavica*, *130*(3), 181-192. https://doi.org/10.1111/acps.12275

Gaab, J., Kossowsky, J., Ehlert, U., & Locher, C. (2019). Effects and components of placebos with a psychological treatment rationale–three randomized-controlled studies. *Scientific reports*, *9*(1), 1421. https://doi.org/10.1038/s41598-018-37945-1

Gallagher, M. W., Naragon-Gainey, K., & Brown, T. A. (2014). Perceived control is a transdiagnostic predictor of cognitive–behavior therapy outcome for anxiety disorders. *Cognitive therapy and research*, *38*, 10-22. https://doi.org/10.1007/s10608-013-9587-3

Gámez, W., Chmielewski, M., Kotov, R., Ruggero, C., Suzuki, N., & Watson, D. (2014). The brief experiential avoidance questionnaire: development and initial validation. *Psychological assessment*, *26*(1), 35. 10.1037/a0034473

GBD 2019 Mental Disorders Collaborators. (2022). Global, regional, and national burden of 12 mental disorders in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet Psychiatry*, *9*(2), 137-150. https://doi.org/10.1016/S2215-0366(21)00395-3

Ghaemi, S. N. (2007). Feeling and time: the phenomenology of mood disorders, depressive realism, and existential psychotherapy. *Schizophrenia bulletin*, *33*(1), 122-130. https://doi.org/10.1093/schbul/sbl061

Gibbs, H. W., & Achterberg-Lawlis, J. (1978). Spiritual values and death anxiety: Implications for counseling with terminal cancer patients. *Journal of Counseling Psychology*, *25*(6), 563. https://doi.org/10.1037/0022-0167.25.6.563

Giles, A. H. (1994). *Death anxiety toward self and mother in clients with anorexia nervosa*. California School of Professional Psychology-Fresno.

Goodwin, L. D. (1996). Determining cut-off scores. *Research in Nursing & Health*, *19*(3), 249-256. https://doi.org/10.1002/(SICI)1098-240X(199606)19:3<249::AID-NUR8>3.0.CO;2-K

Göriş, S., Taşcı, S., Özkan, B., Ceyhan, Ö., Kartın, P. T., Çeliksoy, A., ... & Eser, B. (2017). Effect of terminal patient care training on the nurses' attitudes toward death in an oncology hospital in Turkey. *Journal of Cancer Education*, *32*, 65-71. https://doi.org/10.1007/s13187-015-0929-6

Greenberg, J. (2012). Terror management theory: From genesis to revelations. In P. R. Shaver & M. Mikulincer (Eds.), Meaning, mortality, and choice: The social psychology of existential concerns (pp. 17–35). American Psychological Association. https://doi.org/10.1037/13748-001

Greenberg, J., Pyszczynski, T., Solomon, S. (1986). The Causes and Consequences of a Need for Self-Esteem: A Terror Management Theory. In: Baumeister, R.F. (eds) Public Self and Private Self. Springer Series in Social Psychology. Springer, New York, NY. https://doi.org/10.1007/978-1-4613-9564-5_10

Greenberg, J., Pyszczynski, T., Solomon, S., Simon, L., & Breus, M. (1994). Role of consciousness and accessibility of death-related thoughts in mortality salience effects. *Journal of Personality and Social Psychology, 67*(4), 627–637. https://doi.org/10.1037/0022-3514.67.4.627

Greenberg, P., Chitnis, A., Louie, D., Suthoff, E., Chen, S. Y., Maitland, J., ... & Kessler, R. C. (2023). The economic burden of adults with major depressive disorder in the United States (2019). *Advances in Therapy*, *40*(10), 4460-4479. https://doi.org/10.1007/s12325-023-02622-x

Groen, R. N., Ryan, O., Wigman, J. T., Riese, H., Penninx, B. W., Giltay, E. J., ... & Hartman, C. A. (2020). Comorbidity between depression and anxiety: assessing the role of bridge mental states in dynamic psychological networks. *BMC medicine*, *18*, 1-17. https://doi.org/10.1186/s12916-020-01738-z

Grossman, C. H., Brooker, J., Michael, N., & Kissane, D. (2018). Death anxiety interventions in patients with advanced cancer: A systematic review. *Palliative medicine*, *32*(1), 172-184. https://doi.org/10.1177/0269216317722123

Guillemin, F., Bombardier, C., & Beaton, D. (1993). Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. Journal of clinical epidemiology, 46(12), 1417-1432. https://doi.org/10.1016/0895-4356(93)90142-N

Gulbahar Eren, M., Üçgül, K., & Sert, H. (2023). Effectiveness of interventions on death anxiety and fear in adults with chronic disease: A systematic review and meta-analysis of randomized controlled trials. *OMEGA-Journal of Death and Dying*. https://doi.org/10.1177/00302228231167725

Guner, T. A., Erdogan, Z., & Demir, I. (2023). The effect of loneliness on death anxiety in the elderly during the COVID-19 pandemic. OMEGA-journal of Death and Dying, 87(1), 262-282. https://doi.org/10.1177/00302228211010587

Haddaway, N. R., Page, M. J., Pritchard, C. C., & McGuinness, L. A. (2022). PRISMA2020: An R package and Shiny app for producing PRISMA 2020-compliant flow diagrams, with interactivity for optimised digital transparency and Open Synthesis. *Campbell systematic reviews*, *18*(2), e1230. 10.1002/cl2.1230

Hart, J. (2014). Toward an integrative theory of psychological defense. *Perspectives on psychological science*, *9*(1), 19-39. https://doi.org/10.1177/1745691613506018

Harvey, A., Mansell, W., Shafran, R., & Watkins, E. (2009). Conceptual foundations of the transdiagnostic approach to CBT. *Journal of Cognitive Psychotherapy: An International Quarterly*, *23*, 6-19. 10.1891/0889-8391.23.1.6

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford publications.

Hayes, S. C., Bissett, R., Roget, N., Padilla, M., Kohlenberg, B. S., Fisher, G., ... & Niccolls, R. (2004). The impact of acceptance and commitment training and multicultural training on the stigmatizing attitudes and professional burnout of substance abuse counselors. *Behavior therapy*, *35*(4), 821-835. https://doi.org/10.1016/S0005-7894(04)80022-4

Hayes, S. C., Pistorello, J., & Levin, M. E. (2012). Acceptance and commitment therapy as a unified model of behavior change. *The counseling psychologist*, *40*(7), 976-1002. https://doi.org/10.1177/0011000012460836

Hedges, L. V., Tipton, E., & Johnson, M. C. (2010). Robust variance estimation in meta-regression with dependent effect size estimates. *Research synthesis methods*, *1*(1), 39-65. https://doi.org/10.1002/jrsm.5

Heine, S. J., Proulx, T., & Vohs, K. D. (2006). The meaning maintenance model: On the coherence of social motivations. *Personality and social psychology review*, *10*(2), 88-110. https://doi.org/10.1207/s15327957pspr1002_1

Hidalgo, I., Brooten, D., Youngblut, J. M., Roche, R., Li, J., & Hinds, A. M. (2021). Practices following the death of a loved one reported by adults from 14 countries or cultural/ethnic group. Nursing open, 8(1), 453-462. https://doi.org/10.1002/nop2.646

Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *bmj*, *327*(7414), 557-560. https://doi.org/10.1136/bmj.327.7414.557

Hoelter, J. W. (1979). Multidimensional treatment of fear of death. *Journal of Consulting and Clinical Psychology, 47*(5), 996–999. https://doi.org/10.1037/0022-006X.47.5.996

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural equation modeling: a multidisciplinary journal, 6(1), 1-55. https://doi.org/10.1080/10705519909540118

Hughes, L. S., Clark, J., Colclough, J. A., Dale, E., & McMillan, D. (2017). Acceptance and commitment therapy (ACT) for chronic pain: a systematic review and meta-analyses. *The Clinical journal of pain*, *33*(6), 552-568. 10.1097/AJP.0000000000000425

Hunot, V., Moore, T. H., Caldwell, D. M., Furukawa, T. A., Davies, P., Jones, H., ... & Churchill, R. (2013). 'Third wave'cognitive and behavioural therapies versus other psychological therapies for depression. *Cochrane Database of Systematic Reviews*, (10). https://doi.org/10.1002/14651858.CD008704.pub2

IBM Corp. (2023). *IBM SPSS Statistics for Windows (Version 29.0)* [Computer software]. IBM Corp.

Iliescu, D., Popa, M., & Dimache, R. (2019). Adaptarea românească a Setului Internațional de Itemi de Personalitate: IPIP-Ro. Psihologia Resurselor Umane, 13(1), 83–112. Retrieved from https://hrp-journal.com/index.php/pru/article/view/148

Iverach, L., Menzies, R. G., & Menzies, R. E. (2014). Death anxiety and its role in psychopathology: Reviewing the status of a transdiagnostic construct. *Clinical psychology review*, *34*(7), 580-593. https://doi.org/10.1016/j.cpr.2014.09.002

Jacobson, N. S., & Truax, P. (1992). Clinical significance : A statistical approach to defining meaningful change in psychotherapy research. In A. E. Kazdin (Ed.), *Methodological issues & strategies in clinical research* (pp. 631–648). American Psychological Association. https://doi.org/10.1037/10109-042

James, W. (1902). *The varieties of religious experience: A study in human nature*. (pp. 155) Longmans, Green & Co.

Jones, M. K., & Menzies, R. G. (1997). The cognitive mediation of obsessive-compulsive handwashing. *Behaviour research and therapy*, *35*(9), 843-850. https://doi.org/10.1016/S0005-7967(97)00035-1

Juhl, J., & Routledge, C. (2016). Putting the terror in terror management theory: Evidence that the awareness of death does cause anxiety and undermine psychological well-being. *Current Directions in Psychological Science*, *25*(2), 99-103. https://doi.org/10.1177/0963721415625218

Kariuki-Nyuthe, C., & Stein, D. J. (2015). Anxiety and related disorders and physical illness. *Sartorius N, Holt RIG, Maj M, editors. Comorbidity of mental and physical disorders. Berlin: Karger*, 81-7. doi.10.1159/000365538

Kendler, K. S., Neale, M. C., Kessler, R. C., Heath, A. C., & Eaves, L. J. (1992). Major depression and generalized anxiety disorder: same genes,(partly) different environments?. *Archives of general psychiatry*, *49*(9), 716-722. 10.1001/archpsyc.1992.01820090044008

Kendler, K. S., Prescott, C. A., Myers, J., & Neale, M. C. (2003). The structure of genetic and environmental risk factors for common psychiatric and substance use disorders in men and women. *Archives of general psychiatry*, *60*(9), 929-937. doi.10.1001/archpsyc.60.9.929

Kessler, R. C., Ormel, J., Petukhova, M., McLaughlin, K. A., Green, J. G., Russo, L. J., ... & Uestuen, T. B. (2011). Development of lifetime comorbidity in the World Health Organization world mental health surveys. *Archives of general psychiatry*, *68*(1), 90-100. doi:10.1001/archgenpsychiatry.2010.180

Kim, B. R., Cho, O. H., & Yoo, Y. S. (2016). The effects of Dying Well Education Program on Korean women with breast cancer. *Applied Nursing Research*, *30*, 61-66. https://doi.org/10.1016/j.apnr.2015.11.007

Kim, S., Yu, B. H., Lee, D. S., & Kim, J. H. (2012). Ruminative response in clinical patients with major depressive disorder, bipolar disorder, and anxiety disorders. *Journal of Affective Disorders*, *136*(1-2), e77-e81. https://doi.org/10.1016/j.jad.2011.06.034

Kira, I. A., Shuwiekh, H. A., Alhuwailah, A., Ashby, J. S., Sous Fahmy Sous, M., Baali, S. B. A., ... & Jamil, H. J. (2021). The effects of COVID-19 and collective identity trauma (intersectional discrimination) on social status and well-being. *Traumatology*, *27*(1), 29-39. https://doi.org/10.1037/trm0000289

Kirchberger, I., Heier, M., Kuch, B., Wende, R., & Meisinger, C. (2011). Sex differences in patient-reported symptoms associated with myocardial infarction (from the population-based MONICA/KORA Myocardial Infarction Registry). *The American journal of cardiology*, *107*(11), 1585-1589. https://doi.org/10.1016/j.amjcard.2011.01.040

Klein, R. A., Cook, C. L., Ebersole, C. R., Vitiello, C., Nosek, B. A., Hilgard, J., ... & Ratliff, K. A. (2022). Many Labs 4: Failure to replicate mortality salience effect with and without original author involvement. *Collabra: Psychology*, *8*(1), 35271. https://doi.org/10.1525/collabra.35271

Kline, R. B. (2005). Principles and practise of structural equation modeling. New York: Guilford Press

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of chiropractic medicine*, *15*(2), 155-163. https://doi.org/10.1016/j.jcm.2016.02.012

Korkut, S. (2022). Evaluation of psychopathological symptoms, death anxiety, coronavirus anxiety, suicide risk, and associated risk factors among hemodialysis patients in the COVID-19 pandemic. *Therapeutic apheresis and dialysis*, *26*(5), 941-949. https://doi.org/10.1111/1744-9987.13905

Kotov, R., Krueger, R. F., Watson, D., Achenbach, T. M., Althoff, R. R., Bagby, R. M., ... & Zimmerman, M. (2017). The Hierarchical Taxonomy of Psychopathology (HiTOP): A dimensional alternative to traditional nosologies. *Journal of abnormal psychology*, *126*(4), 454. https://doi.org/10.1037/abn0000258

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine*, *16*(9), 606-613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Kuehner, C. (2017). Why is depression more common among women than among men?. *The lancet psychiatry*, *4*(2), 146-158. 10.1016/S2215-0366(16)30263-2

Lee, S. A. (2020). Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety. *Death studies*, *44*(7), 393-401. https://doi.org/10.1080/07481187.2020.1748481

Lehto, R. H., & Stein, K. F. (2009). *Death anxiety: An analysis of an evolving concept*. Research and Theory for Nursing Practice, 23(1), 23–41. https://doi.org/10.1891/1541-6577.23.1.23

Lei, L. Y. C., Ismail, M. A. A., Mohammad, J. A. M., & Yusoff, M. S. B. (2020). The relationship of smartphone addiction with psychological distress and neuroticism among university medical students. *BMC psychology*, *8*, 1-9. https://doi.org/10.1186/s40359-020-00466-6

Lester, D. (1990). The Collett-Lester fear of death scale: The original version and a revision. *Death studies*, *14*(5), 451-468. https://doi.org/10.1080/07481189008252385

Levin, M. E., Haeger, J. A., Pierce, B. G., & Twohig, M. P. (2017). Web-based acceptance and commitment therapy for mental health problems in college students: A randomized controlled trial. *Behavior modification*, *41*(1), 141-162. https://doi.org/10.1177/0145445516659645

Li, Y., Dong, W., Tang, H., Guo, X., Wu, S., Lu, G., ... & Chen, C. (2024). Correlates of death anxiety for patients with cancer: A systematic review and meta-analysis. *Journal of Clinical Nursing*, *33*(5), 1933-1947. https://doi.org/10.1111/jocn.17021

Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American statistical Association*, *83*(404), 1198-1202. 10.1037//0022-006x.59.1.12

Lo, A., & Abbott, M. J. (2013). Review of the theoretical, empirical, and clinical status of adaptive and maladaptive perfectionism. *Behaviour Change*, *30*(2), 96-116. https://doi.org/10.1017/bec.2013.9

Lo, C., Hales, S., Chiu, A., Panday, T., Malfitano, C., Jung, J., ... & Rodin, G. (2019). Managing Cancer And Living Meaningfully (CALM): randomised feasibility trial in patients with advanced cancer. *BMJ supportive & palliative care*, *9*(2), 209-218. 10.1136/bmjspcare-2015-000866

Lu, J., Yang, Y., Chen, H., Ma, H., & Tan, Y. (2024). Effects of different psychosocial interventions on death anxiety in patients: a network meta-analysis of randomized controlled trials. *Frontiers in Psychology*, *15*, 1362127. https://doi.org/10.3389/fpsyg.2024.1362127

Luo, J., Zhang, B., Cao, M., & Roberts, B. W. (2023). The stressful personality: A meta-analytical review of the relation between personality and stress. *Personality and social psychology review*, *27*(2), 128-194. https://doi.org/10.1177/10888683221104002

MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. Psychological Methods, 4(1), 84–99. https://doi.org/10.1037/1082-989X.4.1.84

Mahmud, S., Mohsin, M., Dewan, M. N., & Muyeed, A. (2023). The global prevalence of depression, anxiety, stress, and insomnia among general population during COVID-19 pandemic: A systematic review and meta-analysis. *Trends in Psychology*, *31*(1), 143-170. https://doi.org/10.1007/s43076-021-00116-9

Mahoney, A. E., & McEvoy, P. M. (2012). A transdiagnostic examination of intolerance of uncertainty across anxiety and depressive disorders. *Cognitive behaviour therapy*, *41*(3), 212-222. https://doi.org/10.1080/16506073.2011.622130

Malinauskaite, I., Slapikas, R., Courvoisier, D., Mach, F., & Gencer, B. (2017). The fear of dying and occurrence of posttraumatic stress symptoms after an acute coronary syndrome: a prospective observational study. *Journal of health psychology*, *22*(2), 208-217. https://doi.org/10.1177/1359105315600233

Martz, E. (2004). Death anxiety as a predictor of posttraumatic stress levels among individuals with spinal cord injuries. *Death studies*, *28*(1), 1-17. https://doi.org/10.1080/07481180490249201

Mazidi. (2024, April 30). Death Anxiety and Psychopathology. Retrieved from osf.io/jnak3

McEvoy, P. M., Nathan, P., & Norton, P. J. (2009). Efficacy of transdiagnostic treatments: A review of published outcome studies and future research directions. *Journal of Cognitive Psychotherapy*, *23*(1), 20-33. 10.1891/0889-8391.23.1.20

McEvoy, P. M., Watson, H., Watkins, E. R., & Nathan, P. (2013). The relationship between worry, rumination, and comorbidity: Evidence for repetitive negative thinking as a transdiagnostic construct. *Journal of affective disorders*, *151*(1), 313-320. https://doi.org/10.1016/j.jad.2013.06.014

McHugh, M. L. (2012). Interrater reliability: the kappa statistic. *Biochemia medica*, *22*(3), 276-282.

McLaughlin, K. A., & Nolen-Hoeksema, S. (2011). Rumination as a transdiagnostic factor in depression and anxiety. *Behaviour research and therapy*, *49*(3), 186-193. https://doi.org/10.1016/j.brat.2010.12.006

McManus, S., Bebbington, P., Jenkins, R., & Brugha, T. (2016). Mental health and wellbeing in England: Adult Psychiatric Morbidity Survey 2014. A survey carried out for NHS Digital by NatCen Social Research and the Department of Health Sciences, University of Leicester.

Menzies, R. E., & Dar-Nimrod, I. (2017). Death anxiety and its relationship with obsessive-compulsive disorder. *Journal of Abnormal Psychology*, *126*(4), 367. 10.1037/abn0000263

Menzies, R. E., McMullen, K., Riotto, G., Iliescu, S., Petrovic, B., & Remfrey, M. (2024). From dread to disorder: A meta-analysis of the impact of death anxiety on mental illness symptoms. *Clinical Psychology Review*, 102490. https://doi.org/10.1016/j.cpr.2024.102490

Menzies, R. E., Richmond, B., Sharpe, L., Skeggs, A., Liu, J., & Coutts-Bain, D. (2024). The 'revolving door'of mental illness: A meta-analysis and systematic review of current versus lifetime rates of psychological disorders. *British Journal of Clinical Psychology*, *63*(2), 178-196. https://doi.org/10.1111/bjc.12453

Menzies, R. E., Sharpe, L., & Dar-Nimrod, I. (2019). The relationship between death anxiety and severity of mental illnesses. *British Journal of Clinical Psychology*, *58*(4), 452-467. https://doi.org/10.1111/bjc.12229

Menzies, R. E., Sharpe, L., & Dar-Nimrod, I. (2022). The development and validation of the Death Anxiety Beliefs and Behaviours Scale. *British Journal of Clinical Psychology*, *61*(4), 1169-1187. https://doi.org/10.1111/bjc.12387

Menzies, R. E., Zuccala, M., Sharpe, L., & Dar-Nimrod, I. (2018). The effects of psychosocial interventions on death anxiety: A meta-analysis and systematic review of randomised controlled trials. *Journal of anxiety disorders*, *59*, 64-73. https://doi.org/10.1016/j.janxdis.2018.09.004

Menzies, R. E., Zuccala, M., Sharpe, L., & Dar-Nimrod, I. (2021). Are anxiety disorders a pathway to obsessive-compulsive disorder? Different trajectories of OCD and the role of death anxiety. *Nordic journal of psychiatry*, *75*(3), 170-175. https://doi.org/10.1080/08039488.2020.1817554

Miles, M. S. (1980). The effects of a course on death and grief on nurses' attitudes toward dying patients and death. *Death Studies*, *4*(3), 245-260. https://doi.org/10.1080/07481188008252974

Miller, A. K., Lee, B. L., & Henderson, C. E. (2012). Death anxiety in persons with HIV/AIDS: A systematic review and meta-analysis. *Death studies*, *36*(7), 640-663. https://doi.org/10.1080/07481187.2011.604467

Missler, M., Stroebe, M., Geurtsen, L., Mastenbroek, M., Chmoun, S., & Van Der Houwen, K. (2012). Exploring death anxiety among elderly people: A literature review and empirical investigation. OMEGA-Journal of Death and Dying, 64(4), 357-379. https://doi.org/10.2190/OM.64.4.e

Mokdad, A. H., Ballestros, K., Echko, M., Glenn, S., Olsen, H. E., Mullany, E., ... & US Burden of Disease Collaborators. (2018). The state of US health, 1990-2016: burden of diseases, injuries, and risk factors among US states. *Jama*, *319*(14), 1444-1472. 10.1001/jama.2018.0158

Moulds, M. L., & McEvoy, P. M. (2025). Repetitive negative thinking as a transdiagnostic cognitive process. *Nature Reviews Psychology*, 1-15. https://doi.org/10.1038/s44159-024-00399-6

Murata, H., & Morita, T. (2006). Conceptualization of psycho-existential suffering by the Japanese Task Force: The first step of a nationwide project. *Palliative & Supportive Care*, *4*(3), 279-285. 10.1017/s1478951506060354

Mwinyi, J., Pisanu, C., Castelao, E., Stringhini, S., Preisig, M., & Schiöth, H. B. (2017). Anxiety disorders are associated with low socioeconomic status in women but not in men. *Women's health issues*, *27*(3), 302-307. https://doi.org/10.1016/j.whi.2017.01.001

National Heart Lung and Blood Institute. (n.d.). *Study quality assessment tools*. U.S. Department of Health and Human Services. Retrieved February 28, 2024, from https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools

Nejad-Ebrahim Soumee, Z., tajigharajeh, S., Mousavi, S. E., Nazarali, Z., Bakhshani, N. M., Nasrabadi, S., ... & Sarani Yaztappeh, J. (2024). Group training based on acceptance and commitment therapy for death anxiety and mental health in the older adults: A randomized clinical trial. *Current Psychology*, *43*(42), 32651-32664. https://doi.org/10.1007/s12144-024-06801-z

Nielsen, S. K. K., Stuart, A. C., Winding, C., Øllgaard, M., Wolitzky-Taylor, K., Daniel, S. I., ... & Jørgensen, M. B. (2025). Group Acceptance and Commitment Therapy versus Cognitive Behavioral Therapy/Exposure Response Prevention for Obsessive Compulsive Disorder: A Block Randomized Controlled Trial. *Psychotherapy and Psychosomatics*. https://doi.org/10.1159/000544070

Odgers, K., Kershaw, K. A., Li, S. H., & Graham, B. M. (2022). The relative efficacy and efficiency of single-and multi-session exposure therapies for specific phobia: A meta-analysis. *Behaviour Research and Therapy*, *159*, 104203. https://doi.org/10.1016/j.brat.2022.104203

Olatunji, B. O., Davis, M. L., Powers, M. B., & Smits, J. A. (2013). Cognitive-behavioral therapy for obsessive-compulsive disorder: A meta-analysis of treatment outcome and moderators. *Journal of psychiatric research*, *47*(1), 33-41. https://doi.org/10.1016/j.jpsychires.2012.08.020

Ong, C. W., Lee, E. B., Krafft, J., Terry, C. L., Barrett, T. S., Levin, M. E., & Twohig, M. P. (2019). A randomized controlled trial of acceptance and commitment therapy for clinical perfectionism. *Journal of Obsessive-Compulsive and Related Disorders*, *22*, 100444. https://doi.org/10.1016/j.jocrd.2019.100444

Öngider, N., & Özışık Eyüboğlu, S. (2013). Investigation of death anxiety among depressive patients. *TURKISH JOURNAL CLINICAL PSYCHIATRY*, *16*(1), 34-46.

Özgüç, S., Kaplan Serin, E., & Tanriverdi, D. (2024). Death anxiety associated with coronavirus (COVID-19) disease: A systematic review and meta-analysis. *OMEGA-Journal of Death and Dying*, *88*(3), 823-856. https://doi.org/10.1177/00302228211050503

Öztürk, S. S., Çiçek, İ. E., & Eren, İ. (2023). Death anxiety and related factors in schizophrenia patients: Controlled study. *OMEGA-Journal of Death and Dying*, *87*(4), 1048-1062. https://doi.org/10.1177/00302228211033122

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & McDonald, S. (2021). & Moher, D.(2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *International journal of surgery*, *88*(105906), 10-1016. 10.1136/bmj.n71

Paulus, D. J., Vanwoerden, S., Norton, P. J., & Sharp, C. (2016). From neuroticism to anxiety: Examining unique contributions of three transdiagnostic vulnerability factors. *Personality and Individual Differences*, *94*, 38-43. https://doi.org/10.1016/j.paid.2016.01.012

Peal, R. L., Handal, P. J., & Gilner, F. H. (1982). A group desensitization procedure for the reduction of death anxiety. *OMEGA-Journal of Death and Dying*, *12*(1), 61-70. https://doi.org/10.2190/8EEE-T21E-JNAB-GFK5

Pustejovsky, J. E., & Tipton, E. (2018). Small-sample methods for cluster-robust variance estimation and hypothesis testing in fixed effects models. *Journal of Business & Economic Statistics*, *36*(4), 672-683. https://doi.org/10.1080/07350015.2016.1247004

Pustejovsky, J. E., & Tipton, E. (2022). Meta-analysis with robust variance estimation: Expanding the range of working models. *Prevention Science*, *23*(3), 425-438. https://doi.org/10.1007/s11121-021-01246-3

Pyszczynski, T., Greenberg, J., & Solomon, S. (1999). A dual-process model of defense against conscious and unconscious death-related thoughts: an extension of terror management theory. *Psychological review*, *106*(4), 835. 10.1037/0033-295x.106.4.835

Quince, T. A., Barclay, S. I., Spear, M., Parker, R. A., & Wood, D. F. (2011). Student attitudes toward cadaveric dissection at a UK medical school. *Anatomical Sciences Education*, *4*(4), 200-207. https://doi.org/10.1002/ase.237

Radanovic-Grguric, L., Filakovic, P., Laufer, D., Vuksic-Mihaljevic, Z., Koic, O., & Barkic, J. (2004). Panic disorder and depression. *Socijalna Psihijatrija*, *32*, 155-159.

Randall, E. (2001). Existential therapy of panic disorder: A single system study. *Clinical Social Work Journal*, *29*, 259-267. https://doi.org/10.1023/A:1010459712685

Randles, D., Proulx, T., & Heine, S. J. (2011). Turn-frogs and careful-sweaters: Non-conscious perception of incongruous word pairings provokes fluid compensation. *Journal of Experimental Social Psychology*, *47*(1), 246-249. https://doi.org/10.1016/j.jesp.2010.07.020

Rasmussen, C., Templer, D. I., Kenkel, M. B., & Cannon, W. G. (1998). Indirect attempt to change death attitudes: Negative findings and associated relationships. *OMEGA-Journal of Death and Dying*, *37*(3), 203-214. https://doi.org/10.2190/P1HW-09JW-47PN-PNVD

Riera-Serra, P., Navarra-Ventura, G., Castro, A., Gili, M., Salazar-Cedillo, A., Ricci-Cabello, I., ... & Roca, M. (2024). Clinical predictors of suicidal ideation, suicide attempts and suicide death in depressive disorder: a systematic review and meta-

analysis. *European archives of psychiatry and clinical neuroscience*, *274*(7), 1543-1563. https://doi.org/10.1007/s00406-023-01716-5

Rolffs, J. L. (2019). *Understanding the Predictive Role of Psychological Flexibility in Acceptance and Commitment Therapy: Baseline Flexibility and Inflexibility as Moderators of Treatment Effects*. University of Rochester.

Rosellini, A. J., Bourgeois, M. L., Correa, J., Tung, E. S., Goncharenko, S., & Brown, T. A. (2018). Anxious distress in depressed outpatients: Prevalence, comorbidity, and incremental validity. *Journal of psychiatric research*, *103*, 54-60. https://doi.org/10.1016/j.jpsychires.2018.05.006

Rosenberg, M. (1965). Rosenberg self-esteem scale. APA PsycTests. https://doi.org/10.1037/t01038-000

Russac, R. J., Gatliff, C., Reece, M., & Spottswood, D. (2007). Death anxiety across the adult years: An examination of age and gender effects. *Death studies*, *31*(6), 549-561. https://doi.org/10.1080/07481180701356936

Safren, S. A., Gershuny, B. S., & Hendriksen, E. (2003). Symptoms of posttraumatic stress and death anxiety in persons with HIV and medication adherence difficulties. *AIDS Patient Care and STDs*, *17*(12), 657-664. https://doi.org/10.1089/108729103771928717

Sanabria-Mazo, J. P., Colomer-Carbonell, A., Borràs, X., Castaño-Asins, J. R., McCracken, L. M., Montero-Marin, J., ... & Luciano, J. V. (2023). Efficacy of videoconference group Acceptance and Commitment Therapy (ACT) and Behavioral Activation Therapy for Depression (BATD) for chronic low back pain (CLBP) plus comorbid depressive symptoms: a randomized controlled trial (IMPACT study). *The Journal of Pain*, *24*(8), 1522-1540. https://doi.org/10.1016/j.jpain.2023.04.008

Santabárbara, J., Lasheras, I., Lipnicki, D. M., Bueno-Notivol, J., Pérez-Moreno, M., López-Antón, R., ... & Gracia-García, P. (2021). Prevalence of anxiety in the COVID-19 pandemic: An updated meta-analysis of community-based studies. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *109*, 110207. https://doi.org/10.1016/j.pnpbp.2020.110207

Santomauro, D. F., Herrera, A. M. M., Shadid, J., Zheng, P., Ashbaugh, C., Pigott, D. M., ... & Ferrari, A. J. (2021). Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *The Lancet*, *398*(10312), 1700-1712. https://doi.org/10.1016/S0140-6736(21)02143-7

Sapp, M. (2006). Basic psychological measurement, research designs, and statistics without math. (1st ed.). Charles C. Thomas Pub Ltd.

Sassaroli, S., Lauro, L. J. R., Ruggiero, G. M., Mauri, M. C., Vinai, P., & Frost, R. (2008). Perfectionism in depression, obsessive-compulsive disorder and eating disorders. *Behaviour research and therapy*, *46*(6), 757-765. https://doi.org/10.1016/j.brat.2008.02.007

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. Psychometrika, 66(4), 507-514. https://doi.org/10.1007/BF02296192

Sauer-Zavala, S., Gutner, C. A., Farchione, T. J., Boettcher, H. T., Bullis, J. R., & Barlow, D. H. (2017). Current definitions of "transdiagnostic" in treatment development: A search for consensus. *Behavior therapy*, *48*(1), 128-138. https://doi.org/10.1016/j.beth.2016.09.004

Scrima, F., Miceli, S., Caci, B., & Cardaci, M. (2022). The relationship between fear of COVID-19 and intention to get vaccinated. The serial mediation roles of existential anxiety and conspiracy beliefs. *Personality and Individual Differences*, *184*, 111188. https://doi.org/10.1016/j.paid.2021.111188

Selker, R. (2017). Medmod: simple mediation and moderation analysis. *R package version*, *1*(0).

Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annu. Rev. Clin. Psychol.*, *4*(1), 1-32. https://doi.org/10.1146/annurev.clinpsy.3.022806.091415

Sianturi, R., Keliat, B. A., & Wardani, I. Y. (2018). The effectiveness of acceptance and commitment therapy on anxiety in clients with stroke. *Enfermeria clinica*, *28*, 94-97. https://doi.org/10.1016/S1130-8621(18)30045-7

Smout, M., Davies, M., Burns, N., & Christie, A. (2014). Development of the valuing questionnaire (VQ). *Journal of Contextual Behavioral Science*, *3*(3), 164-172. https://doi.org/10.1016/j.jcbs.2014.06.001

Sokol, L. L., Troost, J. P., Bega, D., Paulsen, J. S., Kluger, B. M., Applebaum, A. J., ... & Carlozzi, N. E. (2023). Death anxiety in Huntington Disease: longitudinal heath-related quality-of-life outcomes. *Journal of palliative medicine*, *26*(7), 907-914. https://doi.org/10.1089/jpm.2022.0160

Soleimani, M. A., Bahrami, N., Allen, K. A., & Alimoradi, Z. (2020). Death anxiety in patients with cancer: A systematic review and meta-analysis. *European Journal of Oncology Nursing*, *48*, 101803. https://doi.org/10.1016/j.ejon.2020.101803

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of internal medicine*, *166*(10), 1092-1097. 10.1001/archinte.166.10.1092

Starcevic, V. (2007). Body as the source of threat and fear of death in hypochondriasis and panic disorder. *Psihijatrija danas*, *39*(1), 73.

Steiger, J. H. (1998). A note on multiple sample extensions of the RMSEA fit index. Structural Equation Modeling: A Multidisciplinary Journal, 5(4), 411–419. https://doi.org/10.1080/10705519809540115

Stein, A. T., Carl, E., Cuijpers, P., Karyotaki, E., & Smits, J. A. (2021). Looking beyond depression: A meta-analysis of the effect of behavioral activation on depression, anxiety, and activation. *Psychological Medicine*, *51*(9), 1491-1504. 10.1017/S0033291720000239

Stein, D. J., Fineberg, N. A., Bienvenu, O. J., Denys, D., Lochner, C., Nestadt, G., ... & Phillips, K. A. (2010). Should OCD be classified as an anxiety disorder in DSM-V?. *Depression and anxiety*, *27*(6), 495-506. https://doi.org/10.1002/da.20699

Sterne, J. A., Savović, J., Page, M. J., Elbers, R. G., Blencowe, N. S., Boutron, I., ... & Higgins, J. P. (2019). RoB 2: a revised tool for assessing risk of bias in randomised trials. *bmj*, *366*. https://doi.org/10.1136/bmj.l4898

Strachan, E., Schimel, J., Arndt, J., Williams, T., Solomon, S., Pyszczynski, T., & Greenberg, J. (2007). Terror mismanagement: Evidence that mortality salience exacerbates phobic and compulsive behaviors. *Personality and Social Psychology Bulletin*, *33*(8), 1137-1151. https://doi.org/10.1177/0146167207303018

Streiner, D. L., Norman, G. R., & Cairney, J. (2024). Health measurement scales: a practical guide to their development and use. Oxford university press. https://doi.org/10.1093/oso/9780198528470.001.0001

Szuhany, K. L., & Simon, N. M. (2022). Anxiety disorders: a review. *Jama*, *328*(24), 2431-2445. doi:10.1001/jama.2022.22744

Şahan, E., Eroğlu, M. Z., Karataş, M. B., Mutluer, B., Uğurpala, C., & Berkol, T. D. (2018). Death anxiety in patients with myocardial infarction or cancer. *The Egyptian Heart Journal*, *70*(3), 143-147. https://doi.org/10.1016/j.ehj.2018.04.003

Tang, C. S. K., Wu, A. M., & W. Yan, E. C. (2002). Psychosocial correlates of death anxiety among Chinese college students. *Death studies*, *26*(6), 491-499. https://doi.org/10.1080/07481802760139012

Tang, L., Zhang, Y., Pang, Y., Zhou, Y., Li, J., Song, L., ... & Wang, Y. (2021). Validation of death and dying distress scale-Chinese version and prevalence of death anxiety among patients with advanced cancer. *Frontiers in Psychiatry*, *12*, 715756. https://doi.org/10.3389/fpsyt.2021.715756

Tang, P. L., Chiou, C. P., Lin, H. S., Wang, C., & Liand, S. L. (2011). Correlates of death anxiety among Taiwanese cancer patients. *Cancer nursing*, *34*(4), 286-292. 10.1097/NCC.0b013e31820254c6

Team, R. D. C. (2010). R: A language and environment for statistical computing. *(No Title)*.

Templer, D. I. (1970). The construction and validation of a death anxiety scale. *The Journal of general psychology*, *82*(2), 165-177. https://doi.org/10.1080/00221309.1970.9920634

Terwee, C. B., Bot, S. D., de Boer, M. R., Van der Windt, D. A., Knol, D. L., Dekker, J., ... & de Vet, H. C. (2007). Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of clinical epidemiology*, *60*(1), 34-42. https://doi.org/10.1016/j.jclinepi.2006.03.012

The jamovi project (2024). jamovi (Version 2.3.28.0) [Computer Software]. Retrieved from https://www.jamovi.org

Thompson, E. M., Destree, L., Albertella, L., & Fontenelle, L. F. (2021). Internet-based acceptance and commitment therapy: a transdiagnostic systematic review and meta-analysis for mental health outcomes. *Behavior Therapy*, *52*(2), 492-507. https://doi.org/10.1016/j.beth.2020.07.002

Thordarson, D. S., Radomsky, A. S., Rachman, S., Shafran, R., Sawchuk, C. N., & Hakstian, A. R. (2004). The Vancouver obsessional compulsive inventory (VOCI). *Behaviour research and therapy*, *42*(11), 1289-1314. https://doi.org/10.1016/j.brat.2003.08.007

Tipton, E., & Pustejovsky, J. E. (2015). Small-sample adjustments for tests of moderators and model fit using robust variance estimation in meta-regression. *Journal of Educational and Behavioral Statistics*, *40*(6), 604-634. https://doi.org/10.3102/1076998615606099

Tomer, A., & Eliason, G. (1996). Toward a comprehensive model of death anxiety. *Death studies*, *20*(4), 343-365. https://doi.org/10.1080/07481189608252787

Torres, A. R., & Crepaldi, A. L. (2002). Panic disorder and hypochondriasis: A review. *Brazilian Journal of Psychiatry*, *24*, 144-151. https://doi.org/10.1590/S1516-44462002000300009

Topp, C. W., Østergaard, S. D., Søndergaard, S., & Bech, P. (2015). The WHO-5 Well-Being Index: a systematic review of the literature. *Psychotherapy and psychosomatics*, *84*(3), 167-176. https://doi.org/10.1159/000376585

Trompetter, H. R., Bohlmeijer, E. T., Veehof, M. M., & Schreurs, K. M. (2015). Internet-based guided self-help intervention for chronic pain based on Acceptance and Commitment Therapy: a randomized controlled trial. *Journal of behavioral medicine*, *38*, 66-80. https://doi.org/10.1007/s10865-014-9579-0

Turan, G. B., & Polat, H. T. (2024). The effects of illness perception on death anxiety and satisfaction with life in patients with advanced gastrointestinal cancer. *Palliative & Supportive Care*, *22*(2), 360-366. 10.1017/S1478951523001244

Türkarslan, K. K., Okay, D., Çevrim, M., & Bozo, Ö. (2020). Life is short, stay awake: Death anxiety and bedtime procrastination. *The Journal of general psychology*, *147*(1), 43-61. https://doi.org/10.1080/00221309.2019.1633994

Twohig, M. P., Hayes, S. C., Plumb, J. C., Pruitt, L. D., Collins, A. B., Hazlett-Stevens, H., & Woidneck, M. R. (2010). A randomized clinical trial of acceptance and commitment therapy versus progressive relaxation training for obsessive-compulsive disorder. *Journal of Consulting and Clinical Psychology, 78*(5), 705–716. https://doi.org/10.1037/a0020508

Van Den Hout, A. (2016). *Multi-state survival models for interval-censored data*. Chapman and Hall/CRC. https://doi.org/10.1201/9781315374321

Viechtbauer, W. (2005). Bias and efficiency of meta-analytic variance estimators in the random-effects model. *Journal of Educational and Behavioral Statistics*, *30*(3), 261-293. https://doi.org/10.3102/10769986030003261

Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of statistical software*, *36*, 1-48. 10.18637/jss.v036.i03

Waite, S., Hyland, P., Bennett, K. M., Bentall, R. P., & Shevlin, M. (2022). Testing alternative models and predictive utility of the Death Anxiety Inventory-Revised: A COVID-19 related longitudinal population based study. *Acta Psychologica*, *225*, 103539. https://doi.org/10.1016/j.actpsy.2022.103539

Walser, C. B. (1984). *Death anxiety and separation anxiety in borderline and schizophrenic patients*. California School of Professional Psychology-Berkeley/Alameda.

Weathers, F. W., Bovin, M. J., Lee, D. J., Sloan, D. M., Schnurr, P. P., Kaloupek, D. G., ... & Marx, B. P. (2018). The Clinician-Administered PTSD Scale for DSM–5 (CAPS-5): Development and initial psychometric evaluation in military veterans. *Psychological assessment*, *30*(3), 383. https://doi.org/10.1037/pas0000486

Weineland, S., Arvidsson, D., Kakoulidis, T. P., & Dahl, J. (2012). Acceptance and commitment therapy for bariatric surgery patients, a pilot RCT. *Obesity research & clinical practice*, *6*(1), e21-e30. https://doi.org/10.1016/j.orcp.2011.04.004

Weinstock, L. M., & Whisman, M. A. (2006). Neuroticism as a common feature of the depressive and anxiety disorders: a test of the revised integrative hierarchical model in a national sample. *Journal of abnormal psychology*, *115*(1), 68. https://doi.org/10.1037/0021-843X.115.1.68

Weiss, D. S. (2007). The impact of event scale: revised. In *Cross-cultural assessment of psychological trauma and PTSD*(pp. 219-238). Boston, MA: Springer US.

Weitz, E., Kleiboer, A., van Straten, A., & Cuijpers, P. (2018). The effects of psychotherapy for depression on anxiety symptoms: a meta-analysis. *Psychological Medicine*, *48*(13), 2140-2152. 10.1017/S0033291717003622

Wicklund, R. A., & Braun, O. L. (1987). Incompetence and the concern with human categories. *Journal of Personality and Social Psychology, 53*(2), 373–382. https://doi.org/10.1037/0022-3514.53.2.373

Widiger, T. A., & Oltmanns, J. R. (2017). Neuroticism is a fundamental domain of personality with enormous public health implications. *World psychiatry*, *16*(2), 144. doi.10.1002/wps.20411

Wong, P. T., Reker, G. T., & Gesser, G. (2015). Death Attitude Profile—Revised: A multidimensional measure of attitudes toward death. In *Death anxiety handbook: Research, instrumentation, and application* (pp. 121-148). Taylor & Francis.

World Health Organization (WHO). Depression fact sheet 2021 [updated September 13, 2021]. https://www.who.int/news-room/fact-sheets/detail/depression. Accessed 2023 Mar 4

World Health Organization. (1998). Wellbeing measures in primary health care/the depcare project. Copenhagen: WHO Regional Office for Europe, 46(3), 0.

World Health Organization. (2019). *International statistical classification of diseases and related health problems* (11th ed.). https://icd.who.int/

Yalom, I. D. (2008). Staring at the sun: Overcoming the terror of death. *The Humanistic Psychologist*, *36*(3-4), 283-297. https://doi.org/10.1080/08873260802350006

Yang, K., Sheng, Y., Huang, C., Jin, Y., Xiong, N., Jiang, K., ... & Wu, G. (2020). Clinical characteristics, outcomes, and risk factors for mortality in patients with cancer and COVID-19 in Hubei, China: a multicentre, retrospective, cohort study. *The Lancet Oncology*, *21*(7), 904-913. 10.1016/S1470-2045(20)30310-7

Zuccala, M., Menzies, R. E., Hunt, C. J., & Abbott, M. J. (2022). A systematic review of the psychometric properties of death anxiety self-report measures. *Death Studies*, *46*(2), 257-279. https://doi.org/10.1080/07481187.2019.1699203

Zuehlke, T. E., & Watkins, J. T. (1977). Psychotherapy with terminally ill patients. *Psychotherapy: Theory, Research & Practice, 14*(4), 403–410. https://doi.org/10.1037/h0087512