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RESEARCH ARTICLE

The development and validation of the Death Anxiety Beliefs and Behaviours Scale

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Abstract

Objectives: Research spanning the fields of clinical, social and health psychology suggests that death anxiety is an important construct. However, no comprehensive, psychometrically adequate measure of the construct exists. The current studies outline the development of a new measure of death anxiety, the Death Anxiety Beliefs and Behaviours Scale (DABBS), which is the first measure to specifically assess unhelpful beliefs and behaviours that may underlie fears of death.

Methods: In Study 1, items were piloted in a large community sample ($N = 505$). In Studies 2A and 2B, exploratory and confirmatory factor analyses were performed using a treatment-seeking ($N = 200$) and non-treatment-seeking sample ($N = 200$). These analyses resulted in the final 18-item scale.

Results: The DABBS demonstrated good construct validity, criterion validity, internal consistency and test–retest reliability. In Study 3, the DABBS effectively distinguished participants with clinically significant death anxiety and distress from those without, demonstrating excellent discriminant validity.

Conclusions: The present data indicate that the DABBS is a valid and reliable measure of affect, beliefs and behaviours relating to death anxiety, in a community sample of adults and among those seeking mental health treatment. Given

the increasing recognition of the importance of death anxiety, the DABBS offers a useful research and clinical tool.

KEYWORDS
death anxiety, existential, measures, psychometric, transdiagnostic

Practitioner Points

- Death anxiety is increasingly garnering attention as an important treatment target. Despite this, no psychometrically adequate measures of the construct exist
- A measure of affect, beliefs and behaviours related to death anxiety was developed
- Across three samples, items were refined and exploratory and confirmatory factor analyses were performed
- The final 18-item measure showed good validity and reliability. It appears to be a useful clinical and research tool to assess death anxiety

INTRODUCTION

Across human history, the awareness of death has appeared as a central part of the human condition (Menzies, 2018; Yalom, 2008). Increasing research spanning the fields of clinical (e.g. Iverach et al., 2014), social (e.g. Dar-Nimrod, 2022) and health psychology (e.g. Sharpe et al., 2018) suggests that death anxiety is an important construct. For example, death anxiety is associated with important psychosocial outcomes in a number of areas, including reduced self-esteem (e.g. Özdemir et al., 2019), attachment stability (e.g. Zuccala et al., 2021) and meaning in life (e.g. Zhang et al., 2019), as well as poorer quality of life and fear of recurrence in the context of chronic illness (e.g. Curran et al., 2020; Onu et al., 2021).

In clinical psychology, death anxiety has been argued to be a transdiagnostic construct, which underlies multiple mental health conditions (Iverach et al., 2014). For example, the fear of death has been found to predict the symptom severity of at least 15 different disorders, including anxiety-related, depressive, trauma-related and addictive disorders (Caras, 1995; Martz, 2004; Menzies et al., 2019; Noyes et al., 2002). Experimental findings have also demonstrated that reminders of death worsen compulsive washing (Menzies & Dar-Nimrod, 2017), social avoidance (Strachan et al., 2007) and bodily checking and hypervigilance to physical symptoms (Menzies, Sharpe, & Dar-Nimrod, 2021) among individuals with relevant disorders, highlighting the possible causal role of death anxiety in psychopathology.

This growing number of studies has emphasized the need to address death anxiety in treatment. Iverach et al. (2014) argue that current gold standard treatments for mental health conditions typically fail to address the underlying fear of death. As a result, Iverach et al. propose that this failure may be contributing to the 'revolving door' observed in clinical practice, in which it is commonplace for individuals to receive disorder-specific treatment for one condition, only to return to therapy in the future, often with a different condition (see further, Menzies et al., 2020).

Meta-analytic evidence suggests that therapeutic orientations which focus on mortality (e.g. meaning-making interventions) have positive impacts on broad psychological outcomes including quality of life and well-being (Vos & Vitali, 2018). In one meta-analysis which specifically examined treatments for death anxiety, Menzies et al. (2018) demonstrated that cognitive behaviour therapy (CBT) can effectively reduce fears of death. This promising finding highlights the need to target death anxiety using CBT-based interventions, which specifically address the maladaptive beliefs (e.g. in contrast with helpful

beliefs associated with neutral acceptance of death; Menzies & Whittle, 2022) and behaviours which maintain death anxiety (e.g. avoidance, argued to be the most common maladaptive coping strategy used for fears of death; McKenzie et al., 2017).

Current measures of death anxiety

This accumulated research indicates the vital role of death anxiety among individuals with physical and mental health conditions, as well as the general community. However, despite the clear importance of this construct, recent evaluations have revealed various inadequacies of existing measures of death anxiety. Groebe et al. (2018) conducted a systematic review of attitudes towards the dying process, focusing on palliative care settings. This review included 37 self-report measures, of which only nine showed good internal consistency. Notably, death anxiety in medical or palliative populations is often distinct from death anxiety in non-medical settings. For example, patients in palliative care may fear specific aspects of the dying process which people in non-medical settings are less likely to contemplate (Lo et al., 2011).

A more comprehensive systematic review (Zuccala et al., 2019) examined 89 studies reporting on 21 self-report measures of death anxiety. The psychometric properties of these measures were evaluated using the Terwee quality appraisal tool (Terwee et al., 2007), a more rigorous evaluation measure than that used by Groebe et al. (2018). This review revealed that not one measure of death anxiety demonstrated both adequate psychometric properties and clinical relevance. For example, only one measure of the 21 demonstrated adequate reliability, one demonstrated adequate responsiveness to treatment and no studies examined floor and ceiling effects. The authors concluded that there is a dire need for a psychometrically rigorous measure of death anxiety. In particular, no measures have been developed specifically for use among individuals with mental health conditions, or with psychological treatments in mind. For example, not one measure has been developed using a sample of individuals seeking treatment for mental health difficulties. Further, with the exception of one measure, which was designed selectively for terminally ill patients (Lo et al., 2011), no measure has a clinical cut-off. In addition, most existing death anxiety measures were developed between the 1950s and 1980s. For example, among the measures reviewed by Zuccala et al. (2019), there is a median of 40 years since the measures were first developed, resulting in items which now appear to have less relevance (e.g. 'I shudder when I hear people talking about a World War III'). That said, as recent events demonstrate (i.e. the war in Ukraine), such worries may be cyclical rather than obsolete. In sum, there is a clear lack of contemporary, rigorous and clinically oriented measures of death anxiety.

The current study

Amidst the growing need for appropriate measures is a burgeoning realization of the need to address death anxiety in clinical interventions (Iverach et al., 2014). Measures which are specifically designed with treatment approaches in mind can serve to effectively guide interventions (i.e. by identifying relevant cognitions and behaviours), as well as predicting symptom severity (Menzies, Sharpe, Helgadóttir, & Dar-Nimrod, 2021). In particular, clients may have difficulty identifying their own maladaptive beliefs regarding death (Menzies & Veale, 2021), a problem which is likely exacerbated by the abstract nature of death in relation to the subjects of other common phobias (e.g. spiders, heights, public speaking). However, at present, no measure exists which explicitly and distinctly assesses either unhelpful beliefs or avoidance behaviours in relation to death anxiety.

To address these limitations, in the current studies, we have developed and validated the Death Anxiety Beliefs and Behaviours Scale (DABBS). The DABBS includes a focus on unhelpful beliefs and avoidance behaviours to guide assessment and treatment of death anxiety in CBT-based interventions. We utilized both community samples and samples of individuals seeking mental health treatment, located in two

countries (Australia and the United Kingdom), to evaluate this measure in varying contexts and groups. It was hypothesized that the DABBS will: (1) have a three-factor structure corresponding to affect, beliefs and behaviours (i.e. avoidance); (2) demonstrate adequate internal consistency and test–retest reliability over a 3-week period, (3) capture the construct of death anxiety as evident from convergent validity indicators, that is, correlate with theoretically relevant constructs (i.e. positively with neuroticism, depression, anxiety, stress and existing death anxiety measures; negatively with self-esteem and age; and differ as a function of gender and attachment style) in line with previous findings (e.g. Menzies et al., 2019; Mikulincer et al., 1990; Neimeyer, 2015; Russac et al., 2007), and (4) will successfully distinguish individuals with pronounced psychological distress (i.e. those seeking mental health treatment who score above the mean on an existing measure of death anxiety) from those without (i.e. those scoring below the mean on an existing measure of death anxiety with no current mental health condition).

STUDY 1

Study 1 identified which beliefs and behaviours appear most relevant to the experience of death anxiety in a large community sample of Australians. A total of 69 items were generated through discussions with experts, review of all existing measures of death anxiety and review of clinical records of treatment-seeking individuals with fears of death.

Method

Participants

For Study 1, it was necessary to recruit at least 483 participants, to reach the recommended sample size of seven times the number of items to be included in a factor analysis (Terwee et al., 2007). Paid advertisements for the study were placed on Facebook, and were targeted to users aged above 18 years, who reside anywhere in Australia. The advertisements stated that the study was investigating attitudes to death. As compensation for their time, participants were entered into a draw to win one of two $100 gift cards. A total of 589 participants responded to this online advertisement; of these, 505 (86%) completed the survey. The sample was predominantly female (82%) and White (91%), with a mean age of 56.03 years (SD = 15.07). Further demographic information is presented in Table S1. The supplementary materials can also be found on Open Science Framework, at https://osf.io/ay36v/?view_only=9e3cb912ea8e4ac59895dfdfaa664c05.

Procedure

Participants were administered all 69 pilot items (Table S2) and demographic questionnaires. Other measures relevant to death anxiety and mental health were also administered, to examine preliminary reliability and validity of the beliefs and behaviours items (see Appendix S1). Of the original 505 participants, 156 completed the survey at the second timepoint three weeks later. The study was approved by an institutional ethics committee.

Results

The pilot 69 items were refined through an iterative process involving examination of item-total correlations, inter-item correlations, communalities and modification indices for the confirmatory factor analysis (Tables S3 and S4). First, a total of 21 items had item-total correlations of less than .40, and were removed, in line with recommendations (Clark & Watson, 1995; Loiacono et al., 2002).

Second, 23 items were removed based on communalities below .30. Seven further items were eliminated due to redundancy, interpretability and low factor loadings (Stevens, 1992; Tabachnick & Fidell, 2013). This process resulted in 18 items (11 beliefs, and seven behaviours), which demonstrated good internal consistency (α = .88) and test–retest reliability after three weeks (r = .83). More details regarding the preliminary testing of these 69 items, and their reliability and validity, are presented in the Appendix S1.

STUDIES 2A AND 2B

Study 1 refined an extensive list of beliefs and behaviours that relate to death anxiety, identifying which items demonstrated the strongest psychometric properties, before more extensive analyses in different samples. The analyses identified 18 well-performing items. Following this, Study 2A examined the factor structure of these items in a subsample of individuals reporting mental health difficulties. The items generated for Study 1 focused selectively on maladaptive beliefs and behaviours, which have been largely missing from existing measures of death anxiety. Once we identified the most psychometrically promising items for these elements, we added an affect subscale to offer a better conceptual fit with the three-pronged CBT framework of emotion, beliefs and behaviour. Thus, six new items were developed to capture affective responses to death, rounding up the full scope of the measure.

Given the absence of measures which have been developed and validated specifically with clinical groups in mind, the primary aims of Study 2A were to identify the structure and items of the DABBS using a treatment-seeking sample and to assess its reliability and validity in this group. For this purpose, the factor structure of the DABBS was explored in a sample of individuals who reported having sought treatment in the last 12 months for a mental health condition (Study 2A). Finally, Study 2B examined whether this same factor structure would also be found in a non-treatment-seeking sample. A sample of individuals who did not report mental health difficulties (equivalent in age and gender to the sample in Study 2A) was recruited for this purpose.

Method

Participants were recruited via an advertisement on Prolific, an online recruitment platform. As in Study 1, the study was advertised as exploring attitudes to death. Participants were reimbursed with $3.20 AUD upon completion of the study. Out of 421 participants who responded to this online advertisement, 400 (95%) completed the survey. To meet criteria for the 'treatment-seeking' group (Study 2A: N = 200), participants needed to respond 'yes' to the following screening questions: 'Have you tried to access mental health support on the NHS in the last 12 months?', and 'Do you have – or have you had – a diagnosed, on-going mental health/illness/condition?'. Due to the in-built Prolific screening question focusing on the NHS, the samples were selectively recruited from the United Kingdom. In contrast, participants in the 'non-treatment-seeking' group (Study 2B: N = 200) needed to respond 'no' to both questions. Additional eligibility criteria for the studies were: (1) being a resident of the United Kingdom (due to the pre-screening question centring on the NHS), (2) being over 18 years old and (3) fluency in English.

Measures

In addition to the current 24 items of the measure (including the six novel affect items), all participants provided demographic information and completed the following measures:

Death anxiety

Three existing, self-report death anxiety measures were included in this study to assess the construct validity of the DABBS. These measures were chosen based on demonstrating the best psychometric properties of existing death anxiety measures for the general population (Zuccala et al., 2019).

Death anxiety scale (*DAS*; Templer, 1970): A 15-item measure, with each rated as either true or false (e.g. 'I often think about how short life really is'). The DAS has been shown to have the best psychometric properties of existing measures, with good content validity, construct validity and test–retest reliability (Zuccala et al., 2019). It is currently the most commonly used measure of death anxiety (Neimeyer, 2015). In this study, internal reliability of the DAS was good (α = .81).

Death concern scale (*DCS*; Dickstein, 1972): This 30-item measure assesses preoccupation with and negative emotions towards death on a four-point response scale (e.g. 'I think about death just before I got to sleep'). The DCS has been shown to have good internal consistency, construct validity and test–retest reliability (Zuccala et al., 2019). Internal consistency in the current sample was excellent (α = .91).

Death anxiety questionnaire (*DAQ*; Conte et al., 1982): A 15-item self-report measure of death anxiety (e.g. 'Do you worry that dying may be very painful?'), with each item rated on a three-point response scale. The DAQ has demonstrated good content validity, internal consistency and construct validity (Zuccala et al., 2019). Internal consistency in the current sample was excellent (α = .90).

Other measures

Depression anxiety stress scales-21 (*DASS-21*; Lovibond & Lovibond, 1995): A 21-item scale assessing symptoms of depression, anxiety and stress. The DASS-21 was included in the study given previous research showing positive correlations between death anxiety and this measure (Menzies et al., 2019). Internal consistency in the current sample was good to excellent for each subscale (α's between .87 and .93).

Big five aspects scale – neuroticism (*BFAS*; DeYoung et al., 2007): The 20-item neuroticism subscale of the BFAS was included to examine discriminant validity of the DABBS. The BFAS has demonstrated good psychometric properties (DeYoung et al., 2007). The internal consistency in this study was excellent (α = .91).

The rosenberg self-esteem scale (*RSES*) (*Rosenberg*, 1965): A 10-item self-report measure of global self-esteem. The RSES was included in this study to assess convergent validity, given a body of research demonstrating that robust self-esteem typically buffers fears of death (Burke et al., 2010). Each item is rated on a 4-point response scale. There is evidence for its test–retest reliability, internal consistency, and validity (Blascovich & Tomaka, 1993), and internal consistency in this study was excellent (α = .93).

Attachment measure (Hazan & Shaver, 1987): A one-item measure which assesses attachment styles by asking participants to select one of three descriptions which most accurately describes their own relationships. This measure was included given previous research showing that death anxiety differs as a function of attachment style (e.g. Florian & Mikulincer, 1998; Mikulincer et al., 1990). The measure has demonstrated acceptable test–retest reliability (Shaver & Brennan, 1992).

Results

Participants

The two groups appeared well-matched, with no significant between-group differences in age or gender (all *p*'s > .59; see Table 1). The groups significantly differed on the key hypothesized mental health variables including self-esteem, neuroticism, depression, anxiety and stress (all *p's* < .002). The mean DASS-21 scores for the treatment-seeking group indicated 'moderate' depression and stress, and 'severe' anxiety, further indicating the sample's mental health difficulties. Within the treatment-seeking group, the most common self-reported current diagnoses were major depressive disorder and generalized anxiety disorder (each reported by 37.5% of the sample), social anxiety disorder (17.5%), post-traumatic stress disorder (9%) panic disorder (8.5%) and obsessive–compulsive

TABLE 1 Characteristics of the two UK samples (studies 2A and 2B)

	Treatment-seeking		Non-treatment-seeking	
	N = 200		*N* = 200	
Variable	***n***	**%**	***n***	**%**
Gender				
Female	150	75.0%	153	76.1%
Male	44	22.0%	45	22.4%
Non-Binary	6	3.0%	3	1.5%
Ethnicity				
White	174	87.0%	158	79.0%
Asian	10	5.0%	25	12.4%
African	4	2.0%	6	3.0%
Middle Eastern	1	0.5%	2	1.0%
Other	11	5.5%	9	4.5%
Highest education level				
High school diploma/A-levels	58	29.0%	44	21.9%
Secondary education/GCSE	26	13.0%	11	5.5%
Technical/community college	20	10.0%	14	7.0%
Undergraduate degree	75	37.5%	94	46.8%
Graduate degree	19	9.5%	36	17.9%
Doctorate degree	26	13.0%	2	1.0%
	M	**SD**	***M***	**SD**
Age (years)	30.64	10.26	31.16	10.38
Range	18–68	-	18–74	-
Mental health outcomes				
DASS-21 – Depression	10.09**	5.60	5.30**	4.61
DASS-21 – Anxiety	7.63**	4.67	3.66**	3.48
DASS-21 – Stress	10.39**	4.39	6.56**	4.14
RSES	21.81**	5.62	27.89**	5.87
BFAS – Neuroticism	77.44**	11.34	58.38**	18.68
Death anxiety outcomes				
Death Anxiety Scale	9.43**	3.69	8.35**	3.28
Death Concern Scale	79.41**	14.25	68.49**	12.75
Death Anxiety Questionnaire	16.68**	7.02	12.36**	6.76
DABBS				
Total	54.67**	13.90	50.18**	11.75
Affect	13.50**	4.95	12.07**	4.37
Beliefs	22.50**	5.78	20.28**	5.40
Behaviours	18.67**	6.19	17.84**	5.72

Abbreviations: BFAS, Big Five Aspects Scales; DABBS, Death Anxiety Beliefs and Behaviours Scale; DASS-21, Depression Anxiety and Stress Scales; RSES, Rosenberg Self-Esteem Scale.

** = <.01. * = <.05.

disorder (7%; see Table S5). Of the 400 participants, 363 completed the DABBS again three weeks later.

Factor analyses

An exploratory factor analysis (EFA) was conducted on the treatment-seeking group (Study 2A; $N = 200$) using principal axis extraction with Direct-Oblimin rotation to allow for an assessment of the factors' intercorrelations. In line with recommendations, all communalities exceeded .30 and all item-total correlations surpassed .40. The Bartlett's test of sphericity was significant ($\chi^2[276] = 3392.09$, $p < .0001$), and the Kaiser–Meyer–Olkin measure of sampling adequacy was .92. These combined statistics suggested a good basis for the factor structure analysis.

To identify the factor structure of the measure, a parallel analysis using 100 bootstrap samples was run to determine how many of these factors to retain. Three observed eigenvalues were greater than the 95th percentile of eigenvalues produced by the parallel analysis. In line with the theoretical factor structure (i.e. affect, beliefs and behaviours), this suggested that three factors would be the most appropriate solution. Further examination of the scree plot supported this 3-factor solution. The extracted factors explained a total of 55.7% of the total variance.

Examination of factor loadings revealed that one item did not load >.30 on any factor, while three items had factor cross-loadings >.35. These four items were removed as a result. The loadings of the remaining 20 items are reported in Table 2. Next, the correlations between factors were examined. The correlations between these three factors ranged from .42 to .54, making them sufficiently above the $r = .32$ recommended for oblique rotation (Tabachnick & Fidell, 2007).

Following the EFA in a treatment-seeking sample, we examined whether the DABBS' factor structure would hold in a non-treatment-seeking sample. Thus, confirmatory factor analysis was conducted on the Study 2B sample ($N = 200$) using SPSS Amos version 26. Examination of the model fit indices revealed that although one index suggested adequate fit ($\chi^2[167] = 453.35$, $p < .001$, which translates to a normed $\chi^2 = 2.72$, smaller than the recommended cut-off value of <5; Schumacker & Lomax, 2004), other indices (CFI = .86; RMSEA = .09) diverged from their recommended values (e.g. Browne & Cudeck, 1993; Hu & Bentler, 1999; West et al., 2012; Xia & Yang, 2019). Given this, modification recommendations were examined allowing some covariances between items to be accounted for, where conceptually justified. Next, the principles of scale purification, outlined by Wieland et al. (2017), were used to reduce the number of affect items that have shown substantial covariation between them. Two items were removed, one at a time, based on factor loading and modification indices, leaving four affect items in the final measure.

After making these modifications, the updated model fit indices suggested adequate fit ($\chi^2[127] = 226$, CFI = .94, RMSEA = .06).[1] The factor loading matrix for this final three-factor solution is presented in Table 2. The complete version of the DABBS is presented in Table 3, and is also publicly available on Open Science Framework (https://osf.io/ay36v/?view_only=9e3cb912ea8e4ac59895dfdfaa664c05) . Among the subscales, Affect correlated at $r = .50$ with Beliefs and $r = .33$ with Behaviours, with the latter two also significantly correlated at $r = .45$.

Reliability

Given the factorial similarities, internal consistency and test–retest reliability were examined using the combined samples from Studies 1 and 2 (see Table 4). The overall DABBS demonstrated excellent internal consistency, and the internal consistency for each subscale ranged from good to

[1] A CFA with the final 18-item version of the DABBS was also conducted on the sample from Study 2A, to ensure acceptable model fit in the clinical sample. The results suggested adequate fit ($\chi^2(126) = 240$, RMSEA = .07, CFI = .95).

TABLE 2 Factor-item loadings for the 3-factor model from the exploratory factor analysis (study 2A) and confirmatory factor analysis (study 2B)

	Study 2A (n = 200)			Study 2B (n = 200)		
	Affect	Beliefs	Behaviours	Affect	Beliefs	Behaviours
I feel anxious about death	**.83**			**.79**		
The fact that I will die someday is terrifying	**.91**			**.81**		
My inevitable death petrifies me	.92					
I am scared of dying	**.91**			**.90**		
Death frightens me	**.93**			**.89**		
Dying is the most frightening thing I can imagine	.73					
It would be terrible to not have time to experience everything I want to		**.36**			**.42**	
It would be horrible to die alone		**.55**			**.62**	
My death will be a painful experience		**.62**			**.52**	
I could not cope with growing old without my loved ones		**.60**			**.64**	
I will lose a loved one suddenly and it will destroy me		**.70**			**.67**	
On my deathbed, I will not be able to face death as bravely as I should		**.47**			**.66**	
I would not cope if someone I care for developed a fatal illness		**.77**			**.62**	
Watching or reading media stories about dying			**.69**			**.72**
Thinking about being diagnosed with a terminal illness			**.63**			**.64**
Reading a novel with a character who is dying			**.78**			**.66**
Thinking about a loved one dying			**.58**			**.53**
Watching a film or TV show with a character who is dying			**.80**			**.64**
Thinking about myself dying	.33		**.60**			**.62**
Reading a memoir or essay by someone diagnosed with a terminal illness			**.65**			**.74**

Note: Items in bold are those retained in the final 18-item version of the DABBS.

TABLE 3 The 18-item Death Anxiety Beliefs and Behaviours Scale (DABBS)

Below is a list of statements about death that you may or may not agree with. Please indicate how much you agree with each statement from 1 ('strongly disagree') to 5 ('strongly agree').					
	Strongly disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
1. I feel anxious about death	1	2	3	4	5
2. The fact that I will die someday is terrifying	1	2	3	4	5
3. I am scared of dying	1	2	3	4	5
4. Death frightens me	1	2	3	4	5
Below is a list of death-related thoughts, beliefs and attitudes that you may experience. Please indicate how frequently you are troubled by each thought on a scale from 1 ('never have the thought') to 5 ('always have the thought')					
	Never have the thought	**Rarely have the thought**	**Sometimes have the thought**	**Often have the thought**	**Always have the thought**
5. It would be terrible to not have time to experience everything I want to	1	2	3	4	5
6. It would be horrible to die alone	1	2	3	4	5
7. My death will be a painful experience	1	2	3	4	5
8. I could not cope with growing old without my loved ones	1	2	3	4	5
9. I will lose a loved one suddenly and it will destroy me	1	2	3	4	5
10. On my deathbed, I will not be able to face death as bravely as I should	1	2	3	4	5
11. I could not cope if someone I care for developed a fatal illness	1	2	3	4	5

TABLE 3 (Continued)

Below is a list of activities that some people may avoid. Please indicate how frequently you would avoid each of these situations, on a scale from 1 ('I would never avoid') to 5 ('I would always avoid').					
	Never avoid	**Rarely avoid**	**Sometimes avoid**	**Often avoid**	**Always avoid**
12. Watching or reading media stories about dying	1	2	3	4	5
13. Thinking about being diagnosed with a terminal illness	1	2	3	4	5
14. Reading a novel with a character who is dying	1	2	3	4	5
15. Thinking about a loved one dying	1	2	3	4	5
16. Watching a film or TV show with a character who is dying	1	2	3	4	5
17. Thinking about myself dying	1	2	3	4	5
18. Reading a memoir or essay by someone diagnosed with a terminal illness	1	2	3	4	5

TABLE 4 Reliability of the DABBS and each subscale in studies 2A and 2B

			Time 1 (n = 400)		Time 2 (n = 364)		
	Items	Cronbach α	*M*	SD	*M*	SD	Test–retest
DABBS	18	.90	52.42	13.05	53.06	12.76	.86*
Affect	4	.94	12.78	4.72	12.72	4.47	.85*
Beliefs	7	.83	21.39	5.69	21.59	5.44	.78*
Behaviours	7	.87	18.25	5.97	18.75	5.91	.79*

Abbreviation: DABBS, Death Anxiety Beliefs and Behaviours Scale.

*p <.001.

excellent in this sample. The correlations between Time 1 and Time 2 scores suggested excellent test–retest reliability for the overall scale and each of the subscales across the three-week period. The total scores on the DABBS ranged from 18 to 89. Only .5% of the sample scored the lowest possible score of 18, well beneath the 15% stipulated to indicate problematic floor effects (Terwee et al., 2007), and no participants reached the highest score of 90. Thus, there did not appear to be any floor and ceiling effect issues.

Criterion and construct validity

As expected, the DABBS was positively correlated with all three existing death anxiety measures, suggesting good criterion validity (see Table 5). Specifically, each correlation was $r \geq .70$, meeting the recommended cut-off (Terwee et al., 2007). In addition, the DABBS correlated significantly, and in the expected direction, with each theoretically-relevant construct. That is, it correlated positively with BFAS and DASS-21 depression, anxiety and stress scores, and negatively with RSES and age, suggesting good construct validity as per recommended guidelines (Terwee et al., 2007). The size of these correlations (i.e. small to moderate) is further indicative of good divergent validity (i.e. the measures are not redundant). Consistent with theoretical predictions (e.g. Neimeyer, 2015), significant differences in DABBS scores were found as a function of gender, with women (M = 53.89, SD = 13.17), reporting higher scores than men (M = 47.82, SD = 11.77), $F(1,397) = 8.12$, $p < .0001$.

As predicted, significant differences were found in DABBS scores between different attachment styles, $F(1,397) = 3.29$, $p = .038$. Simple effects analyses revealed that securely attached individuals (34.8%) had significantly lower DABBS scores (M = 50.14, SD = 11.51) than individuals with an avoidant attachment style (52.5%; M = 53.57, SD = 13.75, p = .016). No significant difference in DABBS scores was found between securely attached individuals and anxious-ambivalent individuals (12.8%; M = 53.90, SD = 13.43, p = .078), or between avoidant and anxious-ambivalent individuals (p = .869).

STUDY 3

Study 3 examined the discriminant ability of the DABBS, using a subset of participants from Studies 2A and 2B.

Participants

To assess the discriminant ability of the DABBS to identify people with clinically significant levels of death anxiety and those without, it was first necessary to establish two groups of those reporting death

TABLE 5 Summary of Pearson correlations between measures in studies 2A and 2B ($N = 400$)

	DABBS	DAS	DCS	DAQ	DASS-21 depression	DASS-21 anxiety	DASS-21 stress	RSES	BFAS	Age
DABBS	-	.73**	.71**	.76**	.25**	.38**	.41**	−.26**	.35**	−.13*
DAS		-	.72**	.72**	.17**	.26**	.31**	−.29**	.37**	−.19**
DCS			-	.79**	.41**	.52**	.51**	−.46**	.51**	−.19**
DAQ				-	.34**	.46**	.46**	−.35**	.41**	−.15**
DASS-21 Depression					-	.65**	.72**	−.71**	.58**	−.09
DASS-21 Anxiety						-	.74**	−.56**	.52**	−.26**
DASS-21 Stress							-	−.57**	.65**	−.18**
RSES								-	−.63**	.14**
BFAS									-	−.18**
Age										-

Abbreviations: BFAS, Big Five Aspects Scale (Neuroticism Subscale); DABBS, Death Anxiety Beliefs and Behaviours Scale; DAQ, Death Anxiety Questionnaire; DAS, Death Anxiety Scale; DASS-21, Depression Anxiety Stress Scales; DCS, Death Concerns Scale; RSES, Rosenberg Self-Esteem Scale.

*$p < .05$; **$p < .01$.

anxiety in the clinical range versus those scoring in the normal range on existing measures. Given that cut-off scores are not available on any of the existing death anxiety measures, it was necessary to operationalize clinically significant levels of death anxiety. For this purpose, a composite death anxiety Z-score was created for each participant, by averaging the Z-scores of the existing measures of death anxiety (i.e. the DAS, DAQ and DCS). We determined that to have clinically significant death anxiety, participants would have to (a) report a high score (i.e. above the mean in our sample) on the existing measures of death anxiety, *and* (b) be experiencing clinically significant levels of distress, operationalized as reporting a mental health condition that they had sought treatment for in the past year (i.e. be part of Study 2A sample). In contrast, to be categorized as scoring in the normal range on death anxiety, we constructed a group who: (a) scored below zero on the composite death anxiety Z-score, indicating below average death anxiety, *and* (b) were not experiencing clinically significant distress, in that they neither reported a mental health condition nor had sought psychological help in the past year (i.e. be part of the Study 2B sample). This process resulted in 125 participants in the clinically significant death anxiety group, and 127 in the group who scored in the normal range for death anxiety.

RESULTS

The receiver operating characteristic (ROC) curve analysis was used to evaluate the performance of the DABBS at distinguishing between these two groups. This analysis was conducted using MedCalc version 20.008. The associated area under the curve (AUC) statistic was calculated, to evaluate how well the DABBS discriminates between those seeking treatment with clinically significant death anxiety compared to those who score in the normal range (see Figure S1). Additional performance indicators were examined, including specificity (i.e. the proportion of true negative cases) and sensitivity (i.e. the proportion of true positive cases). The AUC for the DABBS was .90 (95%CI = .85–.93; $p < .001$), suggesting excellent discriminant ability using established criteria (Hosmer et al., 2013). Three potential cut-off criteria were examined for their test performance indicators (see Table 6). Using a DABBS total cut-off score of ≥55, the measure demonstrated good specificity and sensitivity.

DISCUSSION

This study aimed to validate a new measure assessing death anxiety and related unhelpful beliefs and behaviours in both treatment-seeking and community samples. The resulting DABBS appears to be a reliable and valid tool to measure death anxiety, with a cut-off to identify those with clinically significant fears. The overall measure demonstrated excellent internal consistency and test–retest reliability, and showed neither ceiling nor floor effects. Large correlations were found between the DABBS and three existing death anxiety measures (i.e. the DAS, DCS and DAQ), supporting its criterion validity. Further, as expected, the DABBS significantly correlated with age, neuroticism, self-esteem and DASS-21 depression, anxiety and stress scores. In addition, DABBS scores differed as a function of gender and attachment style, in line with theoretical predictions. Although the difference between securely attached and anxious-ambivalent attached individuals did not reach significance, this may have been influenced by the use of a single-item measure of attachment style.

TABLE 6 Sensitivity and specificity of DABBS cut-offs

DABBS cut-off	Sensitivity (95% CI)	Specificity (95% CI)
>47	92.00 (85.8–96.1)	59.84 (50.8–68.4)
>55	75.20 (66.7–82.5)	89.76 (83.1–94.4)
>62	52.00 (42.9–61.0)	98.43 (94.4–99.8)

Abbreviations: CI, confidence interval; DABBS, Death Anxiety Beliefs and Behaviours Scale.

Further, it seems like the small sample of the anxious-ambivalent group introduced power constraints, as the means of the two non-securely attached groups were quite similar. Lastly, the DABBS significantly discriminated treatment-seeking individuals with high death anxiety from those who reported low death anxiety and no mental health disorders.

The current findings on the DABBS are promising, particularly given the evaluations of existing death anxiety measures. Of all 21 self-report measures reviewed, Zuccala et al. (2019) identified the DAS, DCS and DAQ to be the most valid and reliable measures aimed at the general community, when evaluated using the criteria of Terwee et al. (2007). However, the present findings suggest that the DABBS demonstrates equivalent (if not superior), performance on properties such as internal consistency, test–retest reliability and floor and ceiling effects, to these three measures. Second, its ability to distinguish treatment-seeking individuals with mental health conditions and high death anxiety, further suggests its relevance to clinical settings. The ability to identify a clinical cut-off for problematic death anxiety (≥ 55) that identifies a high proportion of 'cases' is a significant advantage to clinical practice. Third, the DABBS demonstrated appropriate discriminant validity from neuroticism, arguably the most likely confound for death anxiety (Menzies & Dar-Nimrod, 2017). The DABBS demonstrated the smallest correlation with neuroticism of all four included death anxiety measures (whilst still being significant as expected). Fourth, the DABBS maintains these robust psychometric properties while also being more concise than most existing scales. The measures reviewed by Zuccala et al. (2019) contained an average of 27 items (with multiple scales having more than 45 items), limiting the feasibility of measuring death anxiety in either research or clinical settings. The comparatively shorter length of the DABBS addresses this practical issue, enhancing the usability of the scale. Fifth, the items and subscales of the DABBS offer greater clinical utility compared with existing death anxiety scales. The inclusion of items assessing affective, cognitive and behavioural components of death anxiety is particularly useful in both treatment planning and assessment of treatment efficacy. The fact that this theoretical three-factor structure was empirically confirmed in both treatment-seeking and non-treatment-seeking samples adds further weight to the clinical utility of this measure.

In addition to these benefits of the DABBS itself, the strengths of the studies are notable. The use of three community samples of over 900 participants, across two countries, one of which reported mental health difficulties, is a considerably stronger methodology than that usually applied in developing death anxiety measures. The death anxiety literature has been previously criticized for its overreliance on student samples. For example, a review of 89 studies of death anxiety measures found that 60.7% of studies have solely used a student sample in validation, and only 14.6% have used a general community sample (Zuccala et al., 2019). This finding is particularly problematic given a body of evidence showing that this construct varies as a function of age (Harrawood et al., 2009; Rasmussen & Brems, 1996; Russac et al., 2007). Thus, our use of multiple community samples with diverse ages represents a significant improvement in ensuring the generalizability of the measure. Further, the size of the included samples is a strength of the current studies; to the best of our knowledge, only one community validation study of a death anxiety measure has utilized a larger sample (i.e., $N = 1415$; Nelson & Nelson, 1975). Lastly, as the DABBS is the only measure whose factor structure has been assessed and validated among both treatment-seeking and non-treatment-seeking populations, it is the only one that can serve as the basis of valid comparisons across these groups.

Despite these strengths, future research with the DABBS is recommended. First, longitudinal testing would prove invaluable to examine whether the DABBS can predict the development of psychopathology, such that it can identify individuals at risk for future mental health issues (Iverach et al., 2014). Second, further research is needed to explore whether the DABBS demonstrates responsiveness to change, such as by therapeutic intervention. A meta-analysis of randomized controlled trials revealed that CBT is most effective at reducing death anxiety (Menzies et al., 2018). Given that CBT specifically addresses maladaptive beliefs and behaviours (i.e., avoidance), the DABBS' focus on these two elements should make it particularly likely to be responsive to treatment effects.

The limitations of this study should also be noted. First, we did not use qualitative feedback from the community in developing items. While generating items from focus group discussions has become more

common (Drennan, 2003), we did not use such methods in developing the DABBS. However, we identified key fears from client files, relied on expert opinion and adapted and updated items from established measures of death anxiety. A second limitation is the potential for sampling bias. Given that the study was advertised as examining people's attitudes towards death, it is possible that the sample may have been biased towards those more comfortable with this topic. However, the use of a treatment-seeking sample with higher levels of death anxiety partially mitigates this concern. Lastly, psychological research is increasingly being criticized for its reliance on sampling from Western, educated, industrialized, rich and democratic (WEIRD) societies. This issue is particularly problematic given that such samples are relatively unusual compared to the global population (Henrich et al., 2010). Across the present studies, around 88% of the participants were White, and all resided in either Australia or the United Kingdom, which both represent WEIRD nations. Further research is needed to examine potential cultural differences in response to the DABBS. In a similar vein, the current samples had a gender skew (79.2% women) which should also be noted given the evidence that women typically score higher than men on death anxiety measures (e.g. Russac et al., 2007). Finally, one limitation inherent to self-report measures of death anxiety is the potential for individuals to underreport it, particularly given that denial and repression are common coping strategies for fears of death (e.g. Menzies & Menzies, 2021; Pashak et al., 2020). Future research may benefit from using the DABBS in conjunction with assessment methods which do not rely on self-report methodologies (e.g. psychophysiological measures in response to death-related stimuli).

CONCLUSION

Growing research suggests the importance of considering death anxiety in clinical practice (Iverach et al., 2014). Despite this, a recent review of death anxiety measures has shown psychometric and/or clinical-relevance shortfalls in all existing measures (Zuccala et al., 2019). The present studies suggest that a new measure, the DABBS, is a valid and reliable measure of death anxiety in both the general community and among those who report seeking treatment for mental health conditions. It is the first measure of its kind to distinctly assess unhelpful beliefs about death and death-related avoidance behaviours. Compared to many other measures of death anxiety, the DABBS is publicly available and relatively brief, offering high usability. Further, the factor structure appears similar in both a treatment-seeking and non-treatment-seeking sample facilitating valuable comparisons for future research. The DABBS also successfully discriminates individuals who report mental health conditions and clinically significant levels of death anxiety from those who do not have current mental health difficulties or pronounced death anxiety, with a clinical cut-off which can be invaluable in clinical practice.

AUTHOR CONTRIBUTIONS

Rachel Elizabeth Menzies: Conceptualization; formal analysis; investigation; methodology; writing – original draft. **Louise Sharpe:** Conceptualization; methodology; supervision; writing – review and editing. **Ilan Dar-Nimrod:** Conceptualization; methodology; supervision; writing – review and editing.

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CONFLICT OF INTEREST

All other authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data set is available from the corresponding author by request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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