



Psychometric properties of the Death Reflection Scale - Indian version ☆☆☆

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ABSTRACT

Contemplation of mortality often helps people to become more mindful of their living, cherishing relationships, experiences and opportunities. Therefore, the present study aims to evaluate the validity of the Death Reflection Scale within the Indians. A non-clinical sample of 381 participants age ranges from 19 to 90 years participated in this study. The Death Reflection Scale is a widely recognized tool to gauge positive aspects on reflecting about mortality. The scale's validity and reliability throughout the German population was demonstrated to be appropriate and relevant. Given the shared cultural similarities among diverse Eastern ethnicities, this validation offers the potential for application across various countries. However, it is crucial to research its validity and reliability using confirmatory factor analysis (CFA) in the Indian population. The validity of the scale was confirmed using Confirmatory Factor Analysis (CFA), yielding a CFI of 0.951. The Goodness Fit Index of 0.929 and RMSEA of 0.07 indicating a reasonably good fit. The scale's discriminant, convergent, and factorial validity were all proven by the results, which also showed its reliability ($\alpha = 0.92$). These results imply that the Death Reflection Scale's Indian validation satisfies the fundamental requirements for psychological evaluations, proving its appropriateness for use in scholarly research.

- Quantitative method used in validating the questionnaire.
- Cultural validation has been done to ensure cultural relevance and appropriateness.
- Reliability and consistency have been established.

Specification table

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Background

Leo Tolstoy in his narrative “The Death of Ivan Ilych” portrayed death as black sack that a human being fights with. He addressed the challenges and difficulties faced in acknowledging the finitude of life and to elucidate the inescapable nature of death [1]. On the other end contemporary psychology and research in the field of death and dying asserts that in the hands of profound existential pursuit through life’s struggles and questions lies the real meaning of living [2–6]. Existential struggle acts as a catalyst in elevating humanity and overall pro-social behaviour [7,8]. People who have had near death experiences later reported that such experiences has enhanced their appreciation for life [9,10]. It often sets as a reminder of life’s fragility thus enhancing gratitude and the desire to maximise time [11–13]. Providing an immersive experience to navigate death and its aftermath contributes to fostering death positivity and serves as a novel avenue for exploring and normalizing discussions around mortality [14–16]. Hence the primary objective of this study was to assess the psychometric properties of the Death Reflection Scale (DRS), a reliable instrument designed to accurately measure the positive impact of reflections and attitudes toward mortality [17] in the Indian population. Validating the Death Reflection Scale across Indian populations is crucial to ensure it is culturally attuned and captures the distinctive nuances of contemplating death within this particular cultural context [18–23]. This study advances our understanding of the scale’s cross-cultural applicability and its utility in various cultural context.

In light of the preceding information, the following hypotheses were formulated:

H0: The factor structure observed in the Death Reflection Scale, as established in the original population, does not align with or hold when administered to the Indian population.

H1: The Death Reflection Scale does not fit the model.

Method details

Methodology

The data for this study were collected using the snowball sampling method. This approach was chosen because of the sensitive nature of the topic. This makes it advantageous to introduce the questionnaire through trusted contacts. Individual characteristics were examined using descriptive statistics, while the factor structure of the Death Reflection Scale (Indian version) was assessed through confirmatory factor analysis (CFA). This method ensures a comprehensive evaluation of the scale’s effectiveness and relevance within the specific cultural context.

Participants

To be eligible for participation, individuals were required to meet specific inclusion criteria, including (1) an age of 19 years or older, (2) willingness to actively engage in the study, (3) comfortable in discussing subjects related to death and dying, (4) absence of any terminal or mental illness, and (5) proficiency in the English language sufficient to complete the survey. To understand the different perspectives across broad spectrum of age, participants from 19 to 90 were recruited. Since the questionnaire pertaining to capture mortality contemplation participants with illness either physical or mental were limited as it can be triggering. Alongside demographic inquiries, the questionnaire covered five topics pertaining to death contemplation. Initially, a total of 395 individuals completed the survey. After applying the exclusion criterion of incomplete survey responses, the final sample comprised 381 individuals. To ensure participant privacy, all responses were provided anonymously, with only sociodemographic data being collected and analysed.

Instruments

For the data analysis, versions 24 and 27 of AMOS and SPSS were used. Descriptive statistics were utilized to explore individual characteristics, and the confirmatory factor analysis (CFA) method was applied to assess the factor structure of the Death Reflection Scale (Indian version). This comprehensive approach ensures a robust examination of the scale’s applicability and performance within the given cultural context.

Death reflection scale

The Death Reflection Scale consists of 15 items designed by Yuan et al. [19] to capture how people think about life in light of its finiteness. Participants indicate their level of (dis)agreement with each statement using a five-point rating scale. Each dimension has a potential maximum score of 15 and a minimum of 3. For the entire questionnaire, the highest achievable score was 75, while the lowest attainable score was 15. The scale is divided into five unique dimensions.

1. Motivation to Help (MOH): This dimension examines acts of kindness and prosocial behaviour, revealing a strong desire to support others, particularly when contemplating mortality. (e.g., “When I consider death, I feel a compelling urge to support other people”).
2. Motivation to Live (MOL): This dimension gauges the inclination to set life goals and engage in new endeavours as a response to thoughts about mortality. (e.g., “When I think about death, I make plans for my life”).

Table 1
Descriptive statistics, skewness, and kurtosis of the DRS items ($n = 381$).

	M	SD	Factor loading	skewness	Kurtosis	α -Value
MOH	2.472	1.025	0.452	.455	-0.506	.797
MOL	2.614	0.977	0.501	.391	-0.299	.734
PLP	3.007	1.093	1.233	.142	-0.834	.854
LEGACY	2.831	1.135	0.838	.688	1.713	.806
CTO	2.354	1.136	1.385	.635	-0.625	.846

Table 2
Correlation properties of the Death Reflection Scale.

	MOH	MOL	PLP	LEGACY
MOH				
MOL	0.511**			
PLP	0.509**	0.447**		
LEGACY	0.480**	0.513**	0.471**	
CTO	0.592**	0.532**	0.498**	0.596**

Note. **Correlation is significant at the 0.01 level (2-tailed).

3. Putting Life in Perspective (PLP): When confronted with thoughts of death, this dimension assesses the ability to adopt a more relaxed attitude when dealing with minor or stressful concerns. (e.g., “When I reflect on death, I can easily let go of insignificant issues”).
4. Leaving a Personal Legacy (LEGACY): This dimension delves into the contemplation of one’s legacy within the context of thoughts about mortality. (e.g., “When I think about death, I ponder how I will be remembered”).
5. Connection to Others (CTO): In response to thoughts about mortality, this dimension assesses the desire to prioritize quality time spent with loved ones and openly express feelings toward them, reflecting an enhanced emphasis on meaningful connections (e.g., “When I think about death, I wish to spend more time with those dearing to me”).

Method validation

Descriptives analysis

Table 1 shows the descriptive statistic properties of the death reflection scale, indicating that all the dimensions’ characteristics are within the acceptable range.

The Death Reflection Scale (DRS) exhibits robust internal consistency, as evidenced by a Cronbach’s alpha of 0.914, indicating a strong correlation among its items. This signifies a cohesive underlying construct, as values surpassing 0.7 are deemed acceptable [20]. The internal consistency (α -value) across dimensions ranges from 0.734 to 0.854, indicating moderate to good consistency within the factors, with higher values indicating greater reliability. With a total of 15 items, the scale proves to be a reliable instrument for assessing the intended construct. The mean and standard deviation for each dimension falls within the ranges of 2.354 (1.14) to 3.007 (1.09). The factor loadings ranged from 1.38 (factor 5) to 0.45 (factor 1). These findings collectively affirm the scale’s reliability and its effectiveness in measuring the targeted construct.

Table 2 presents correlation coefficients reflecting associations between different variables, with each cell denoting the strength and direction of these relationships.

1. **Motivation to Live and Putting Life in Perspective:** A moderately strong and positive correlation ($r = 0.511$, $p < 0.01$) is observed between an individual’s motivation to live and his or her perspective on life.
2. **Motivation to Live and Legacy:** There is a significant positive correlation of moderate strength ($r = 0.513$, $p < 0.01$) between individuals’ motivation to live and their perception of legacy.
3. **Putting Life in Perspective and Legacy:** A fairly significant positive correlation ($r = 0.471$, $p < 0.01$) exists between an individual’s perspective on life and his or her sense of legacy.
4. **Connection to Others and Motivation, Perspective, Legacy:** Strong positive correlations are observed between an individual’s sense of connection to others and their motivation to live ($r = 0.592$, $p < 0.01$), putting life in perspective ($r = 0.532$, $p < 0.01$), and their sense of legacy ($r = 0.596$, $p < 0.01$).

In summary, these correlations underscore significant associations among motivation, life perspective, legacy considerations, and the sense of connection to others. These findings suggest an interrelated nature of these psychological aspects, emphasizing their potential relevance to an individual’s well-being and overall life outlook [19].

Table 3 Convergent and discriminant validity in the study were evaluated using the average variance extracted (AVE) and composite reliability (CR) values. The results indicated that the CR values surpassed the commonly accepted threshold of 0.70 proposed by Fornell [24], signifying a high level of internal consistency in the measurement model. Additionally, strong correlations ($p < 0.01$)

Table 3
Convergent and discriminant values of the Death Reflection Scale.

	CR	AVE	LEGACY	MOH	MOL	PLP	CTO
MOH	.813	.594	.771				
MOL	.796	.571	.627	.755			
PLP	.946	.513	.701	.698	.696		
LEGACY	.854	.661	.613	.629	.584	.813	
CTO	.849	.654	.741	.736	.692	.591	.809

Table 4
Model fit of the Death Reflection Scale.

Psychometric Testing	Values
Comparative Fit Index (CFI)	0.95
Tucker Lewis Index (TLI)	0.93
Normed Fit Index (NFI)	0.93
Parsimony Normed Fit Index (PNFI)	0.71
Root Mean Square Error of Approximation (RMSEA)	0.07
Goodness Fit Index (GFI)	0.93
Root Mean Square Residual (RMR)	0.07

were observed among various dimensions of the Death Reflection Scale (DRS), indicating meaningful associations between these characteristics. These inter-factor correlations, detailed in [Table 3](#) of the study, substantiate both the discriminant and convergent validity.

Consequently, rejecting the null hypothesis provides compelling evidence supporting the assertion that the factor structure of the Death Reflection Scale, initially developed in a different population, retains validity and alignment when applied to the Indian community. This rejection substantiates an alternative hypothesis, affirming the consistency and validity of the observed framework within the scale when extended or applied within the Indian context.

In [Table 4](#) the confirmatory factor analysis of the Death Reflection Scale demonstrated a commendable fit, with a comparative fit index (CFI) of 0.951 and a Tucker-Lewis index (TLI) of 0.935, indicating a robust fit. Additionally, the normed fit index (NFI) of 0.926 suggests a reasonably excellent fit. A root-mean square error of approximation (RMSEA) of 0.07 and a goodness fit index (GFI) of 0.929 both indicate a reasonably good fit, with a root mean square residual (RMR) of 0.068 also indicating a reasonably good match. The combined assessment of CFI, TLI, and NFI values underscores a strong alignment between the proposed model and the empirical data. While the parsimonious normed fit index (PNFI) suggests an acceptable fit, there is potential for enhancing the model's simplicity. Both the RMSEA and RMR values affirm a reasonably good fit, indicating that the model's adept approximation of the observed data. These results collectively substantiate a robust model fit.

The application of Confirmatory Factor Analysis (CFA) and rigorous validation techniques consistently upholds the presence of analogous factors and dimensions within the Indian context. These findings affirm that the factor structure of the scale retains coherence and relevance within the Indian population. Consequently, the rejection of the H1 hypothesis, asserting that the Death Reflection Scale would not fit the model, is supported by empirical evidence, highlighting the suitability and alignment of the scale within the Indian cultural framework.

This study draws comparisons with two other studies: the original scale development study by Yuan, et al., [17], which suggested cross-cultural validity, and a 2022 study by Ramsenthaler et al., [25], which reported a Cronbach's alpha of 0.87 for the German version. The findings substantiate that the factors evaluated by the DRS effectively capture the intended construct, drawing support from a 2018 study by Yuan, et al., [17]. The current findings affirm that the psychometric properties of the Indian version are consistent with or slightly better than those of the German version [25]. In summary, this study rigorously evaluated the psychometric characteristics of the Indian validation of the Death Reflection Scale, establishing its validity and reliability in assessing thoughts on mortality and associated attitudes. Recognizing and understanding the Indian perspective on death is crucial for fostering a universal comprehension of this profound human experience. By delving into the Indian cultural framework surrounding death, we gain valuable insights that enrich our understanding of death's multifaceted nature across different societies. This understanding promotes empathy, tolerance, and appreciation for diverse beliefs and rituals related to death, fostering a more inclusive and respectful global dialogue on this universal aspect of the human condition.

Limitations

Although the results of our study support the usefulness of the Death Reflection Scale for evaluating attitudes, thoughts, and reflections related to death, it is critical to recognize the inherent limitations of our study design. The validated questionnaire for this study is available only in English, which is a limitation. Given the variety of regional languages spoken in India, language adaptation is advised for a more thorough evaluation across an array of demographics. This approach would provide more comprehensive and nuanced knowledge of attitudes and perspectives toward mortality in the Indian context.

Ethics statements

Informed consent was obtained from participants and the participants' data has been fully anonymized.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRedit authorship contribution statement

Sri Varthini: Conceptualization, Methodology, Software, Data curation, Writing – original draft. **Maya Rathnasabapathy:** Conceptualization, Supervision, Writing – review & editing.

Data availability

Data will be made available on request.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.mex.2024.102970](https://doi.org/10.1016/j.mex.2024.102970).

References

- [1] Tolstoy, L. The death of Ivan Ilyich and other stories; 2015. [doi:10.1093/owc/9780199669882.001.0001](https://doi.org/10.1093/owc/9780199669882.001.0001).
- [2] P.T.P. Wong, Existential positive psychology and integrative meaning therapy, *Int. Rev. Psychiatry* 32 (7–8) (2020) 565–578, [doi:10.1080/09540261.2020.1814703](https://doi.org/10.1080/09540261.2020.1814703).
- [3] M. Sekowski, Attitude toward death from the perspective of Erik Erikson's theory of psychosocial ego development: an unused potential, *OMEGA* 84 (3) (2020) 935–957, [doi:10.1177/0030222820921604](https://doi.org/10.1177/0030222820921604).
- [4] P.J. Cozzolino, Death contemplation, growth, and defense: converging evidence of dual-existential systems? *Psychol. Inq.* 17 (4) (2006) 278–287, [doi:10.1080/10478400701366944](https://doi.org/10.1080/10478400701366944).
- [5] Vail, K.E.; Juhl, J.; Arndt, J.; Vess, M.; Routledge, C.; Rutjens, B.T. When death is good for life. *personality and social psychology review* 2012, 16 (4), 303–329. [doi:10.1177/1088868312440046](https://doi.org/10.1177/1088868312440046).
- [6] Poe, M.; Bingham, P.; Souza, J.P.B. and Souza, J., “Death from a distance and the birth of a humane universe.” New Books Network 2010.
- [7] A. Frias, P.C. Watkins, A.C. Webber, J.J. Froh, Death and gratitude: death reflection enhances gratitude, *J. Posit. Psychol.* 6 (2) (2011) 154–162, [doi:10.1080/17439760.2011.558848](https://doi.org/10.1080/17439760.2011.558848).
- [8] E. Jonas, J. Schimel, J. Greenberg, T. Pyszczynski, The scrooge effect: evidence that mortality salience increases prosocial attitudes and behavior, *Person. Soc. Psychol. Bull.* 28 (10) (2002) 1342–1353, [doi:10.1177/014616702236834](https://doi.org/10.1177/014616702236834).
- [9] J. Metcalfe, W. Mischel, A hot/cool-system analysis of delay of gratification: dynamics of willpower, *Psychol. Rev.* 106 (1) (1999) 3–19, [doi:10.1037/0033-295x.106.1.3](https://doi.org/10.1037/0033-295x.106.1.3).
- [10] L.A. King, J.A. Hicks, J. Abdelkhalik, Death, life, scarcity, and value: an alternative perspective on the meaning of death, *Psychol. Sci.* 20 (12) (2009) 1459–1462, [doi:10.1111/j.1467-9280.2009.02466.x](https://doi.org/10.1111/j.1467-9280.2009.02466.x).
- [11] L.L. Carstensen, D.M. Isaacowitz, S.T. Charles, Taking time seriously: a theory of socioemotional selectivity, *Am. Psychol.* 54 (3) (1999) 165–181, [doi:10.1037/0003-066x.54.3.165](https://doi.org/10.1037/0003-066x.54.3.165).
- [12] J.A. Hicks, C. Routledge, *The Experience of Meaning in Life*, Springer eBooks, 2013, [doi:10.1007/978-94-007-6527-6](https://doi.org/10.1007/978-94-007-6527-6).
- [13] B. Greyson, Persistence of attitude changes after near-death experiences, *J. Nerv. Ment. Dis.* 210 (9) (2022) 692–696, [doi:10.1097/nmd.0000000000001521](https://doi.org/10.1097/nmd.0000000000001521).
- [14] G.S. Khoo, From terror to transcendence: death reflection promotes preferences for human drama, *Media Psychol.* 21 (4) (2017) 719–749, [doi:10.1080/15213269.2017.1338965](https://doi.org/10.1080/15213269.2017.1338965).
- [15] V. Nicolucci, A death-positive video game for death education of adolescents, *J. Educ. Technol.* 27 (2) (2019) 186–197, [doi:10.17471/2499-4324/1071](https://doi.org/10.17471/2499-4324/1071).
- [16] T. Trivate, A. Dennis, S. Sholl, T.A. Wilkinson, Learning and coping through reflection: exploring patient death experiences of medical students, *BMC Med. Educ.* 19 (1) (2019), [doi:10.1186/s12909-019-1871-9](https://doi.org/10.1186/s12909-019-1871-9).
- [17] Z. Yuan, L.E. Baranik, R.R. Sinclair, M.T. Sliter, K.L. Rand, M.P. Salyers, Memento Mori: the development and validation of the Death Reflection Scale, *J. Organ. Behav.* 40 (4) (2018) 417–433, [doi:10.1002/job.2339](https://doi.org/10.1002/job.2339).
- [18] S. Özgüç, E.K. Serin, D. Tanriverdi, Death anxiety associated with coronavirus (COVID-19) disease: a systematic review and meta-analysis, *OMEGA* 88 (3) (2021) 823–856, [doi:10.1177/00302228211050503](https://doi.org/10.1177/00302228211050503).
- [19] J. Hockey, Closing in on death? Reflections on research and researchers in the field of death and dying, *Health Sociol. Rev.* 16 (5) (2007) 436–446, [doi:10.5172/hesr.2007.16.5.436](https://doi.org/10.5172/hesr.2007.16.5.436).
- [20] I. Arpacı, K. Karatas, M. Baloglu, A. Haktanir, COVID-19 phobia in the United States: validation of the COVID-19 Phobia Scale (C19P-SE), *Death Stud.* 46 (3) (2021) 553–559, [doi:10.1080/07481187.2020.1848945](https://doi.org/10.1080/07481187.2020.1848945).
- [21] P. Bilimoria, Hindu response to dying and death in the time of COVID-19, *Front. Psychol.* 12 (2021), [doi:10.3389/fpsyg.2021.636384](https://doi.org/10.3389/fpsyg.2021.636384).
- [22] S.E. Thrane, Hindu end of life, *J. Hospice Palliat. Nurs.* 12 (6) (2010) 337–342, [doi:10.1097/njh.0b013e3181f2ff11](https://doi.org/10.1097/njh.0b013e3181f2ff11).
- [23] Correa, S. (2020, August 30). An Indian perspective on death. Retrieved from <https://www.linkedin.com/pulse/indian-perspective-death-steve-correa>.
- [24] C. Fornell, D.F. Larcker, Evaluating structural equation models with unobservable variables and measurement error, *J. Mark. Res.* 18 (1) (1981) 39, [doi:10.2307/3151312](https://doi.org/10.2307/3151312).
- [25] C. Ramsenthaler, K. Baumann, A. Büssing, G. Becker, Cross-cultural validity of the Death Reflection Scale during the COVID-19 pandemic, *Front. Psychol.* 13 (2022), [doi:10.3389/fpsyg.2022.957177](https://doi.org/10.3389/fpsyg.2022.957177).