The Death Rumination Questionnaire 13 (DRQ-13): Factor Structure and Psychometric Properties in a Sample of Cancer Patient Population

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Abstract
Background: *Rumination can impair thinking and problem-solving, and can drive away critical social support. Rumination is an extended process with inflexible cognitive style and negative thinking. The aim of this study was to evaluate the factor structure and psychometric properties of the DRQ-13 in a sample of cancer patients in Iran using exploratory and confirmatory factor analytic procedures.*
Method: *The DRQ-13 was used to measure the conscious derivatives of 3 death rumination styles - death_concentration, death_critical, and death_exhaust in a sample of 200 cancer patients.*
Result: *Cronbach's coefficient alpha for death_concentration (ex = 0.71),death_critical (ex = 0.7) were deemed fair. the alpha of death_exhaust (ex = 0.66) was found to be low in terms of potential clinical significance.*
Conclusion: *Our results were consistent with the previous research on the DRQ indicating that the psychometric features need to be improved before the wider use of the scale. Further, DRQ-13 is a suitable tool to assess cancer patients' thinking and mood about death and that may be used for psychological interventions to improve the care of these patients.*

Key words: *rumination, death rumination, DRQ-13, exploratory and confirmatory analysis, death rumination questionnaire*

I. INTRODUCTION

The word "ruminate" derives from the Latin for chewing cud, a less than gentle process in which cattle grind up, swallow, then regurgitate and re-chew their feed (American Psychological Association (2017). Similarly, human ruminators have intrusive thoughts and this can lead to impairment in thinking and problem-solving and also drive away critical social support. Rumination is an extended process with inflexible cognitive style (Davis and Nolen-Hoeksema, 2000).

II. REVIEW OF LITERATURE

Literature suggest rumination as a dysfunctional mode of cognitive processing, leading to depression-linked dysfunctional thought content pathways of the cortisol stress response in vulnerable individuals (Kuehner et al, 2008). Rumination might also be important in the cognitive expression of neuroticism that could lead to persistent dysphoria (Roberts et al, 1998).The synergistic effect of rumination and negative emotion may sometimes progress to impulsive behaviors (Selby et al, 2014). Rumination may occur in stress, major depressive disorder, and generalized anxiety disorder (Ruscio et al, 2014). Association of rumination with the the depressive episode may be classified as a distinct clinical subtype (Kasch et al, 2001). Teasdaleand Green (2004) believe that rumination is related to temperament of self-focus, and therefore, it is closely linked to neuroticism. The negative self-related thinking in social judgments and recall post-event processing contribute negative self-related information of memory bias in social anxiety (Mellings and Alden, 2000). Gavric, Moscovitch , Rowa and McCabe (2017) declare cognitive and metacognitive models of Social Anxiety Disorderand enhance our understanding of the cognitive processes which may function to initiate and maintain negative thinking patterns in Social Anxiety Disorder.Self-reflection was more adaptive in nature and it correlated with neural and genetic state. Further, self-reflection is an effective intervention against rumination feeling (Nolen-Hoeksema et al, 2008).Self-reflection might sometimes revoke maladaptive effect of self-rumination due to reflectors ruminate synchronically(Takano and Tanno, 2009). Disease conditions induce repetitive thinking about disease and death. that is.Furthermore, McEvoy, Mahoney and Moulds (2010) reported the repetitive negative thinking

(RNT) questionnaire with high internal reliability and it was associated with anxiety, depression, anger, shame, and general distress. Moreover, although, the RNT scale's constructs that are theoretically related to engagement in RNT, including positive and negative metacognitions, cognitive avoidance, thought suppression, and thought control strategies, the Absence of Repetitive Thinking (ART) scale was of little predictive utility in the theoretical and clinical implications of disease and death rumination.Further, rumination with depression was a strong index for diagnosis depression in high rumination individuals (Roelofs et al, 2006).

III. OBJECTIVES OF THE STUDY

We undertook this study with the main aim of evaluating the factor structure and psychometric properties of the death rumination questionnaire (DRQ-13) in a sample of cancer patients in Iran, using exploratory and confirmatory factor analytic procedures.

IV. MATERIALS AND METHODS

A. Sample

Participants (n=200) were recruited from a local cancer population in Iran. We obtained informed consent from all participants and we administered the DRQ-13 and a socio-demographics questionnaire. Each patient took approximately 15-20 minutes to complete the questionnaires. The study started on 12th April 2014 and ended on 20th March 2015.

B. The DRQ-13

The DRQ-13 is derived from previous versions of the instrument and underwent a test of face validity with four psycho dynamically trained professionals. The DRQ-13 is aimed to measure the conscious derivatives of 3 death rumination styles. These included death concentration, death critical, and death exhaust. Participants answered each of the 13 items on a 5 point Likert scale with anchors of one (not at all applicable to me) and five (completely applicable to me). Scores for two factors were calculated by taking the mean of the three items and scores for one factor calculated by taking the mean of four items, representing the death rumination. Scores were derived by taking the mean of the items belonging to each factor scale.

C. Statistical Analysis

The Statistical Package for Social Sciences (SPSS) version21.0 was used for the estimation, we used the maximum likelihood method in factor analysis and used method goodness of fit index (GFI) Therefore, we used wieght regression We assessed the internal consistency of DRQ-13 scales using the traditional Cronbach's coefficient alpha index.

V. RESULTS

A. Exploratory Factor Analysis

The sample included 82 men (41%) and 118 women (59%) and the mean age of participants was 44.74 years (SD=16.95). Principal components analysis with varimax rotation was conducted on the whole sample (n = 200) using the mean scores for each death rumination. Orthogonal rotation was employed as we sought to unearth factors, which were relatively independent of one another (Hinkin, 1998). The goal was to see how the 13 individual component of death rumination loaded onto 3 factors, commonly referred to as death rumination. Three components had eigenvalues greater than one and together accounted for 46.35% of the variance. Plausible two factor solutions were revealed.

Examination of the scree plot, scree elbow curves, and eigen values above two indicated that three factor solution was the most parsimonious. The three rotated components accounted for 77.52%, 14.33% and 8.1% of the variance (total 100%). Table 2 displays the rotated factor loadings and side loadings.

Eigen values and variance estimates for the rotated solution are provided in Table 3. As a general rule, eigen values loading .30-.40, all factor loadings should be reported to ensure sufficient information for a full evaluation of the results and variance estimates above 50% are consequential (Floyd and Widaman, 1995).

Examination of the three factors revealed that some components needed to be deleted; some failed to make theoretical sense in their groupings, while others loaded poorly, or had high side loadings. Confirmatory factor analysis was conducted to further determine the strongest items of the scale and make recommendations for refinement (Floyd and Widaman, 1995).

B. Confirmatory Factor Analysis

The goodness of fit index (GFI) statistics for three factors is provided in Table 4. As with the exploratory analysis, the mean score for each component was used. In model one, death rumination component with factor loadings less than .4 in the exploratory analysis was dropped (n = 3 – component 6, component 2 and component 7). In factor one, eight components (components 3, 5, 9, 12, 6, 7, 8, and 13) were dropped due to their standardized regression weights (.00, .00, and .00, respectively). The components1, 2, 4, 10 and 11 were dropped from factor

two for theoretical reasons. Components 1, 2, 4, 10, 11, 3, 5, 9 and 12 were dropped due to its regression weight in factor three. The model proved to be the best fitting for a combination of empirical and theoretical reasons(x2/df= 3.04; GFI= 128.05). Table 5 contains the factor loadings and Table 6 contains intercorrelations of the factors. In the final model, the first factor was best described as the death concentration and is comprised of component 1, 2, 10 and 11. Factor two as death critical contained the component 3, 5, 9 and 12. The third factor death exhaust contained component 6, 7, 8, 13 and 4.

C) Re1iability

Internal consistency reliability of the three styles was assessed in sample using Cronbach's coefficient alpha (see Table 7). In the sample (n = 200), the alpha for death_concentration (ex = 0.71) anddeath_critical (ex = 0.7) were deemed fair. The alpha of death_exhaust (ex = 0.66) was found to be low in terms of potential clinical significance.

VI. DISCUSSION

Stressful life events leading responses to distress, specifically employing in rumination, highlighting potentially useful targets for interventions aimed at preventing the onset of depression and anxiety (Michlet al, 2006). There is not any pathway of rumination as mindfulness meditation alternatively; negative mood and dysphoric mood significantly decrease (Broderick, 2005). Nolen-Hoeksema's Response Styles Theory in 1987 about simultaneous rumination with more depressive meanwhile maintain gender difference in depression, distinct between the reflective pondering component of rumination and the brooding component in rumination explore(Treynoret al, 2003). Soo, Sherman and Kangas (2014) in Their studies indicated Multidimensional Rumination in Illness Scale (MRIS) was suit target represent psychometric traits meanwhile this scale widespread assessing the cognitive style of rumination in the background of physical illness. Disease condition lead to thinking more and more about death then patients with serious diagnosis like cancer employ death rumination. In fact death rumination questionnaire was essential to assists patients mood by validate and reliable questionnaire.

In this study exploratory factor analysis revealed a three factor solution, yet not all items loaded satisfactorily. Confirmatory factor analysis was used to find the best empirically and theoretically cogent groupings. Death rumination considered three levels of death mood the first factor fit well into the conceptualization of component1, 2, 10 and 11 then second factor in that the four component are primarily of an death critical. It is possible that this death rumination was revealed due to our 3 use of exploratory and confirmatory analysis, and in-depth consideration of theory.

There are numerous other similarities between our findings and those of other authors. Further, defenses which perform well in factor analysis do not always reliably cluster together within styles. Internal consistency for all components was acceptable (.84).the styles are highly correlated it is possible that despite rigorous back translation procedures, the French and English versions may have contained different meanings (which may explain, in part, different alpha levels between the groups). There are various limitations to our results. Despite theoretical congruency amongst the derived death rumination, some psychometrie properties are questionable.

Internal consistency reliabilities are generally poor and the factors are highly correlated. It is possible that despite rigorous back translation procedures, the Persian and English versions may have contained different meanings (which may explain, in part, different alpha levels between the groups). Erdur-Baker and Bugay (2010) shows Confirmatory Factor Analysis (CFA), Internal Consistency Coefficient (Cronbach Alpha), and Convergent validity with cultural equivalence of this feature instrument, the Ruminative Response Scale appears in suitable validity and reliability in Turkish samples. Smart, Peters and Baer (2015) in their study about development and validation of a measure of self-critical rumination, they declare final 10-items of the Self-Critical from Rumination were in high internal consistency, a clear single-factor structure of self- critical congruent with constructs, increasingly validity over other measures of self-criticism could predicting both general distress and traits of borderline personality disorder. Watkins and Baracaia (2000) about why people ruminate in dysphoric moods, they suggested higher levels of self-reported rumination significantly more strongly reasons for ruminating than the other persons with lower levels of self-reported rumination, self-reported scale was in sufficient validity and reliability. Lee and Kim (2014) declare Ruminative Response Scale Revised (RRS-R) free of item with BDI therefore this scale more reliable and valid than the original RRS in Korean patients with depression, in particular 'Brooding' is highly related with depressive symptoms that RRS-R may be a useful instrument to research the implication of 'Brooding' in depression.

The strengths of the study lie in the use of both exploratory and confirmatory factor analysis in patient's samples. Every effort has been made to make our analytic approach explicit and replicable while

detailed reporting has been used to illuminate our rationale for retaining specified components on 3 factors of death rumination. Empirical and theoretical criteria were used for the factor analyses, and special attention was given to examination of the factor loadings, side loadings, eigen values, and seree plot.

Multiple paths appear fruitful for future research. First and foremost, the results of both the exploratory and confirmatory factor analyses suggest that a number of components need to be revised; an iterative approach should be taken to revise the poorly performing components of death rumination to conduct pilot testing on new items. It is crucial that all components perform weIl on the scale given the importance of making the DRQ.

Others could improve ecological validity by using non patient populations. Roger, Scremin, Borril and Forbes (2011) indicated new scale of emotional assessing was validated in different samples, this scale systematically related to two independent of health status. Death rumination loadings and factors may vary in a non patients sample given the low base rates of certain components. As the recommended sample size of 200 for confirmatory factor analyses was narrowly met, new studies could employ larger, more diverse samples (including equal numbers of men and women). As factors of death rumination are elicited by adversity, current levels of life stress that lead to death thinking should be measured for covariance purposes. Finally, further work should be conducted in the areas of predictive, test-retest reliabilities, and concurrent and discriminant validity, with particular focus on other selfreportmeasures of rumination.

The present study indicates that the DRQ-13 is a promising new instrument. Our results were consistent with the previous research on the DRQ indicating that the psychometric features need to be improved before the wider use of the scale. Further, DRQ-13 is a suitable tool to assess cancer patients' thinking and mood and that may be used for psychological interventions to improve the care of these patients.

VII.DECLARATIONS

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Conflict of interest: none declared.
Ethical approval: the study was approval by the Institutional Ethics Committee.

REFERENCES

[1] Probing the depression-rumination cycle: American Psychological Association. (2017, January 30).Retrieved from http://www.apa.org/monitor/nov05/cycle.aspx

[2] Broderick. P. C. (2005). Mindfulness and coping with dysphoric mood: contrasts with rumination and distraction. Cognitive Therapy and Research, 29(5), 501-510. Doi:10.1007/s10608-005-3888-0.

[3] Davis. R. N., & Nolen-Hoeksema. S. (2000). Cognitive inflexibility among ruminators and nonruminators. Cognitive Therapy and Research, 24(6), 699-711. Doi: 10.1023/A:1005591412406.

[4] Erdur-Baker. Ö., & Bugay. A. (2010). The short version of ruminative response scale: reliability, validity and its relation to psychological symptoms. Procedia - Social and Behavioral Sciences, 5, 2178–2181. Doi:10.1016/j.sbspro.2010.07.433.

[5] Floyd, F. J., & Widaman, K. F. (1995).Factor analysis in the development and refinement of clinical assessment instruments. Psychological Assessment, 7(3),286-299.Doi: 10.1037/1040-3590.7.3.286.

[6] Gavric D, Moscovitch, D. A., Rowa K, McCabe, R. E. (2017). Post-event processing in social anxiety disorder: Examining the mediating roles of positive metacognitive beliefs and perceptions of performance. Behav Res Ther, 4(91): 1-12. Doi: 10.1016/j.brat.2017.01.002.

[7] Kasch. K. L., Klein. D. N., & Lara. M. E. (2001). Construct validation study of the Response Styles Questionnaire Rumination scale in participants with a recent-onset major depressive episode. Psychological Assessment, 13(3), 375-383. Doi: 10.1037/1040-3590.13.3.375

[8] Kuehner. C., Huffziger. S., & Liebsch. K. (2009). Rumination, distraction and mindful self-focus: effects on mood, dysfunctional attitudes and cortisol stress response. Psychol Med, 39(2), 219-28. Doi: 10.1017/S0033291708003553.

[9] Lee S., & Kim W. (2014). Cross-Cultural Adaptation, Reliability, and Validity of the Revised Korean Version of Ruminative Response Scale. Psychiatry Investig, 11(1), 59-64. Doi: 10.4306/pi.2014.11.1.59.

[10] McEvoy. P. M., Mahoney. A. E., & Moulds. M. L. (2010). Are worry, rumination, and post-event processing one and the same?: Development of the repetitive thinking questionnaire. J Anxiety Disord, 24(5), 509-19. Doi: 10.1016/j.janxdis.2010.03.008.

[11] Mellings. T. M. B., & Alden. L. E. (2000).Cognitive processes in social anxiety: the effects of self-focus, rumination and anticipatory processing. Behaviour Research and Therapy, 38(3), 243–257. Doi: 10.1016/S0005-7967(99)00040-6.

[12] Michl. L. C., McLaughlin. K. A., Shepherd. K., Nolen-Hoeksema. S. (2006). Rumination as a mechanism linking stressful life events to symptoms of depression and anxiety: longitudinal evidence in early adolescents and adults. J Abnorm Psychol, 122(2), 339-52. Doi: 10.1037/a0031994.

[13] Nolen-Hoeksema. S., Wisco. B. E., & Lyubomirsky. S. (2008). Rethinking rumination. Perspect Psychol Sci, 3(5), 400-24. Doi: 10.1111/j.1745-6924.2008.00088.x.

[14] Roberts. J. E., Gilboa. E., & Gotlib. I. H. (1998). Ruminative response style and vulnerability to episodes of dysphoria: gender, neuroticism, and episode duration. Cognitive Therapy and Research, 22(4), 401-423. Doi: 10.1016/j.sbspro.2010.07.433.

[15] Roelofs. J., Muris. P., Huibers. M., Peeters. F., & Arntz. A. (2006). On the measurement of rumination: A psychometric evaluation of the ruminative response scale and the rumination on sadness scale in undergraduates. J Behav Ther Exp Psychiatry, 37(4), 299-313. Doi:10.1016/j.jbtep.2006.03.002.

[16] Roger. D., Scremin. L., Borril. J., & Forbes. A. (2011). Rumination, inhibition and stress: the construction of a new scale for assessing emotional style. Current psychology, 30(3), 234-244. Doi: 10.1007/s12144-011-9117-y.

[17] Ruscio. A. M., Gentes. E. L., Jones. J. D., Hallion. L. S., Coleman. E. S., & Swendsen. J. (2014). Rumination predicts heightened responding to stressful life events in major depressive disorder and generalized anxiety disorder. J Abnorm Psychol, 124(1), 17-26. Doi: 10.1037/abn0000025.

[18] Selby. E. A., Kranzler. A., Panza. E., & Fehling. K. B. (2014). Bidirectional-compounding effects of rumination and negative emotion in predicting impulsive behavior: implications for emotional cascades. J Pers. Doi: 10.1111/jopy.12147.
[19] Smart. L. M., Peters. J. R., & Baer. R. A. (2015). Development and Validation of a Measure of Self-Critical Rumination. Assessment. Doi: 10.1177/1073191115573300
[20] Soo. H., Sherman. K. A., & Kangas. M. (2014). Assessing rumination in response to illness: the development and validation of the Multidimensional Rumination in Illness Scale (MRIS). Journal of Behavioral Medicine, 37(4), 793-805. Doi: 10.1007/s10865-013-9531-8.
[21] Takano. K., & Tanno. Y. (2004). Self-rumination, self-reflection, and depression: Self-rumination counteracts the adaptive effect of self-reflection. Behaviour Research and Therapy, 47(3), 260–264. Doi: 10.1016/j.brat.2008.12.008.
[22] Teasdale. J. D., & Green. H. A. C. (2004). Ruminative self-focus and autobiographical memory. Personality and Individual Differences, 36(8), 1933–1943. Doi: 10.1016/j.paid.2003.08.022.
[23] Treynor. W., Gonzalez. R., & Nolen-Hoeksema. S. (2003). Rumination reconsidered: a psychometric analysis. Cognitive Therapy and Research, 27(3), 247-259. Doi: 10.1023/A:1023910315561.
[24] Watkins. E. d., & Baracaia. S. (2000). Why do people ruminate in dysphoric moods?. Personality and Individual Differences, 30(5), 723–734. Doi: 10.1016/S0191-8869(00)00053-2.

Tables

Table 1. Demographic Characteristics (n = 200)

Demographic Variable	N	Mean (SD)	%
Female	118		59
Male	82		41
Age	200	44.74(16.94)	

Table 2. Exploratory Factor Analysis (n = 200)

Components (n=13)	Factor l	Factor II	Factor III
Component1	.47	.41	.33
Component2	.38	.35	.31
Component3	.34	.3	.38
Component4	1	-.00	.00
Component5	.53	.36	.33
Component6	.4	.33	-.35
Component7	.13	.35	.00
Component8	.53	.16	-.03
Component9	.42	.54	-.25
Component10	.43	.55	-.06
Component11	.28	.58	-.18
Component12	.4	.6	.02
Component13	.62	.29	-.25

Table 3. Rotated Variance and Eigen Values (n = 200) sample

	Factor l	Factor II	Factor III	Total
Eigenvalue	2.32	.43	.24	3
Variance (%)	77.52	14.33	8.1	100

Table 4:Goodness of Fit Indices Model Cancer Patients (n = 200) Sample

x^2/ df[a]	GFI [b]	Sig
3.04	128.05	.000

[A]Chi-square adjusted for degrees of freedom, [b]Goodness-of-fit index

Table 5. Standardized Regression Weights in the Cancer Patients (n = 200) Sample

	Factor 1	factor 2	factor 3
Component1	.26		
Component2	.27		
Component4	.44		
Component10	.22		
Component11	.2		

Component3	.40	
Component5	.44	
Component9	.28	
Component12	.24	
Component6		.21
Component7		.3
Component8		.64
Component13		.33

Note. Each column contains standardized regression weights in the cancer patients samples respectively

Table 6. Cronbach's Coefficient Alpha Values for the Death Rumination

Factor l death_concentration	Factor II death_critical	Factor III death_exhaust
.71	.7	.66

Table 7. Correlations of Death Rumination in the Sample (n = 200)

death_concentration	death_critical	death_exhaust	
death_concentration	.73**	.68**	
death_critical	.73**		.57**
death_exhaust	.68**	.57**	

**p<.OO1, *p<.005