Ilkogretim Online - Elementary Education Online, 2021; Vol 20 (Issue 5): pp. 7275-7284
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2021.05.822

Development and validation of rumination scale for traumatic amputees (RSTA)

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Abstract. The present research was undertaken to construct a standardized measure of rumination among traumatic amputees. The objectives of the present study were achieved in four phases. In the first phase an item pool of 70 descriptors was acquired. In second phase, EFA followed by Varimax rotation was conducted on a sample of 200 (90% men) traumatic amputees (Mage = 31, SDage = 1.8). The EFA resulted in a three-factor solution (instrumentality, brooding, and intrusion), which also yielded high reliability estimates. Phase three established the factorial validity of RSTA through Confirmatory Factor Analysis (CFA). The indices met the acceptable requirements for a good fit for the model. In last phase, convergent and discriminant validity of RSTA and its sub-dimensions were established. Overall, the findings suggest that RSTA is an internally consistent and valid scale of rumination in traumatic amputees.

Keywords: Rumination, Traumatic Amputation, Depression, Scale Construction

I. INTRODUCTION

Traumatic or accidental amputation poses multilevel challenges for the individual and the family. A sudden loss of a whole or partial upper and/or lower limb produces overwhelming feelings of loss of control, helplessness, and stress resulting into depression, suicidal ideation, and other psychiatric morbidities (Durmus, Safaz, Adiguzel, Uran, Sairoy, Goktepe et al., 2015; Sahu, Gupta, Sagar, Kumar, & Sagar, 2017). However, the effects might be deterred if underlying psychological factors are systematically addressed. Recently, the construct of rumination has received attention in understanding of the beginning and continuation of depression and anxiety in illness trajectories (Nolen-Hoeksema, 2000; Roelofs, Huibers, Peeters, Arntz, & Os, 2009; Watkins & Moulds, 2005). Furthermore, it has been observed that early assessment of ruminative thoughts may assist in reducing the probability of risk for psychological and emotional vulnerabilities and may improve the quality of life of physically disabled individuals (Sansone & Sansone, 2012). Evidence indicates that rumination play an important role in adjustment to physical disabilities (Brosschot, Gerin, & Thayer, 2006).

Rumination is conceptualized in terms of thought process and thought content (e.g., overthinking & self-defeating) (Sansone & Sansone, 2012) and may be measured as a trait or a state. The conventional definitions of rumination view it as a maladaptive obsessive thinking style (Brinker, Chin, & Wilkinson, 2014). According to Nolen_Hoksema, Wisko, and Lyubomirsky (2008), rumination involves a repetitive and passive response to distressing events and its causes and outcomes while Ito, Takenaka, Tomita, and Agari (2006) defined rumination as an inclination for harmful and hopeless thoughts. Contemporary models describe rumination as a multidimensional concept involving both negative and positive content (Watkins, 2009). Similarly, Marroqun, Fontes, Scilletta, and Miranda (2010) referred to a two-dimensional operationalization of rumination comprising of 'passive brooding' and 'active self-reflection.' Though most of the measures of rumination focus only on the general tendency to preservative thinking about an event (Siegle, Moore, & Thase, 2004), researchers have highlighted the value of investigating ruminative tendencies in the context of physical illness (Luminet, Papageorgiou, & Wells, 2004; Siegle, Moore, & Thase, 2004). H. L. Fritz (1999) applied the traditional conceptualization of rumination to the field of health psychology and related behaviors. His multi-dimensional model of rumination comprises of three distinctive styles of recursive thinking that emerge in response to physical illness and trauma labeled as 'instrumentality' (thinking about the everyday effects of an event), 'emotion-focused' (dwelling on negative emotions linked with an incident), and 'searching for meaning' (thinking of reasons behind an occurrence). Fritz developed a scale to measure the three thinking styles, which however, lacks psychometric estimation (Smith & Alloy, 2010). In similar fashion, Shoo, Sherman, and Kangas (2014) reviewed the existing measures and constructed Multidimensional Rumination in Illness Scale (MRIS) as a measure of 'repetitive thinking styles' in instance of physical illness. Using psychometric techniques such as EFA and CFA, their study came up with three types of illness rumination. According to the model, the first-dimension brooding

refers to a gloomy focus on symptoms, outcomes and problems that result after receiving diagnosis of illness while the second dimension, instrumentality, explains "thinking about practical implications of an event as well as positive meta-cognitions about rumination that may explain the initiation and maintenance of the rumination process." Lastly, the model describes intrusion as the third type of thinking style, which integrates "the intensity of ruminations with negative metacognitions about interpersonal consequences of rumination accompanied by intrusive distressful thinking." Shoo et al. (2014) reported strong correlation of brooding and intrusion subscales and weak relation of instrumentality subscale with depression, neuroticism, anxiety, stress, and negative affect in individuals with physical health problems, which provided support to earlier observations also.

The Motivational and Structural Model of Rumination (Martin & Tesser, 1989) explained the different psychological reasons and adjustment to physical illness grounded in differential role of rumination. Martin and Tesser (1989) asserted that trauma and illness pushes one to re-evaluate the goals of life resulting in congruence between the ideal-healthy self and ill-real self. Ruminating about this discrepancy with an intention to make sense and resolve the conflict leads to variable consequences (Watkins, 2008); individuals who ruminate in order to generate solutions to overcome incongruence (reflective rumination) between ideal-real self (Watkins & Teasdale, 2001) experience better adjustment (Tedeschi & Calhoun, 2004) and positive changes in life style (Calhoun, Cann, Tedeschi, & McMillan, 2000) whereas, individuals who tend to focus only on the reasons, symptoms, and outcomes of illness (brooding rumination) may become vulnerable to psychopathology and distress (Michael, Halligan, Clark, &. Ehlers, 2007).

Literature review indicated a only study with the precise intention of understanding the dual effect of ruminative tendencies in adults who had recently acquired loss of limb. Phelps, Williams, Raiche, Turner, and Ehde (2008) investigated the impact of negative and positive cognitive processing in adjusting to the experience of limb loss after 6 and 12 months of amputation. Their study showed that individuals with positive ruminations reported better adaptability to changes in life circumstances relative to individuals with negative ruminations who developed depressive and PTSD symptoms. Like the Motivational and Structural Model of Rumination (Martin &Tesser, 1989), the results of the study concluded that sense of illness or disability influences the emotional consequences and coping behaviors for the amputees.

Present Study

Epidemiological studies on traumatic amputees in Pakistan have presented a unique profile of the cases. According to an estimate, there are approximately 1 million amputees in Pakistan mostly from low-resource, rural areas of Punjab (Ayaz, Ikram, Matee, & Fahim, 2015) and have a mean age of 38 years (+ 17.38) (Soomro, Bibi, Ahmed, Kamran, Minhas, & Siddiqui, 2013). Majority of the traumatic amputations occur because of bomb blasts, road accidents, and occupational accidents, thus, males befall more to it as compared to females with a ratio of 7:1, respectively (Soomro et al., 2013).

Traumatic amputation is a devastating experience; once it transpires a plethora of challenges surface every day for the individual and family. Economic and financial constraints, unemployment, physical dependency, inexplicable pain, family disintegration, social isolation and stigma (Eiser, Darlington, Stride, &Grimer, 2001) all add to the onset and intensity of grief, depression, anxiety etc. (Iqbal, Ayaz, & Khalid, 2017; Mckechnie& John, 2014). Studies also suggest that older people are more at a risk for psychological distress than young people because of traumatic amputation (Briggs, 2006). How one interprets and thinks about physical trauma and disability substantially affect one's response and adjustment to the changing circumstances (Sinha & Van Den Heuvel, 2011). An amputee may experience thoughts of restricted mobility and becoming a physical burden on family and others or preoccupied by excessive worrying about joblessness because of physical impairment. In fact, researchers have equated loss of a limb through trauma with perceived loss of wholeness, demise of a spouse, death, or metaphoric castration (Sahu et al., 2017). On the other hand, Gallagher and Maclachan (2000) explored the thought contents of traumatic amputees in a qualitative investigation. Their results indicated that 48% of the participants positively looked at the situation; they reported improved coping abilities, financial advantages, and healthier changes in attitudes. Thus, considering the role of rumination in adaptation to physical impairment and the emotional and psychological sequelae a standardized measurement tool of ruminating tendencies of traumatic amputees would support the clinicians and mental health workers to screen out potential candidates for psychotherapy and counseling. Secondly, the tool can also be used to differentiate amputees with positive and negative ruminative tendencies and tailor psychosocial rehabilitation programs according to their needs. Lastly, the tool could be used for further research on ruminative tendencies of traumatic amputees and personality and social outcomes. The present research work was, therefore, undertaken to develop and validate an indigenous scale in Urdu language labeled as 'Rumination Scale for Traumatic Amputees' as a measure of rumination tendencies of traumatic amputees. Specifically, the study aimed at:

1. To develop a scale for the measurement of rumination among traumatic amputees in Urdu language.

2. To establish factorial validity and reliability indices of the proposed scale.
3. To establish convergent and discriminant validity of the proposed Scale.

II. METHODS

In order to accomplish the objectives stated above, this study was carried out in three phases.

Phase1: Generation of item pool for Rumination Scale for Traumatic Amputees (RSTA)

Domain Identification

The development of Rumination Scale for Traumatic Amputees (RSTA) was guided by the theoretical framework of Multidimensional Rumination in Illness Scale (MRIS) given by Shoo et al. (2014). Shoo et al. (2014) defined rumination as 'repetitive styles of thinking' comprising of instrumental, intrusion, and brooding styles. According to the model, instrumental rumination was operationalized as "positive beliefs underlying the initiation and maintenance of rumination e.g. thinking about illness as it can help understanding its cause" whereas, intrusion rumination referred to as "negative dimension including duration and lack of controllability e.g. cannot seem to control thinking about illness"; brooding rumination was described as "a content regarding the experience and consequences of illness e.g. thinking how little to improve in illness or situation."

Item Generation

The items for the Rumination Scale for Traumatic Amputees (RSTA) were generated through deductive as well as inductive approach. The existing literature and assessment tools on rumination, illness rumination, and amputation was reviewed and provided baseline for item generation. Consecutively, three focus group sessions were conducted with a total of 30 individuals with traumatic amputation to obtain original descriptors qualitatively. Each session lasted for approximately 40 minutes, that is, till response saturation was achieved. The participants were furnished with the Urdu-translated definitions of rumination and its three dimensions and were instructed to share their thoughts and note down descriptors for each dimension. After removing overlapping and redundant items, this exercise resulted in an item pool of 70 descriptors.

Content Validity

The list of 70 items acquired in the last step was presented to seven expert judges, who had dealt with the psychological or physiological problems of the traumatic amputees (except the expert in Urdu language). They comprised of four Ph.D. Doctors of Psychology, one consultant in Physical Medicine and Rehabilitation, the researcher himself, and one member with the degree of Masters in Urdu Language. A proforma was prepared for the committee members, which enlisted the items obtained through deductive as well as inductive approach along with the Urdu-translations of the dimensions of rumination and additional literature on illness rumination. The expert judges were required to evaluate each item and provide observation concerning the relevance of the content of items to theoretical construct of rumination and its dimensions, and determine the face validity and comprehensibility of the statements. The experts were particularly directed to assess the content representativeness of the items keeping in view the literature provided. Later, the responses of the members were accumulated and the Content Validity Ratio (CVR) was calculated to measure proportional agreement. Using a CVR of ≥ 0.99 as the criterion for item inclusion, a list of 62 representative items was formulated for Rumination Scale for Traumatic Amputees (RSTA). The committee decided the response format of RSTA to be Likert type 5-point scale. The response options ranged from *Always* to *Never* (Always = 5, Often = 4, Sometimes = 3, Rarely= 2, Never = 1). By the end of item development steps, sub-scale of instrumentality comprised of 18 items, intrusion comprised of 23 items, and 21 items were in the subscale of brooding.

Cognitive Interviewing

In order to determine the comprehensibility of items and obtain feedback from the target-population, 3 rounds of cognitive interviews were conducted with 15 traumatic amputees. The literature pertinent to social sciences suggests that it is appropriate to use a sample of 5-15 participants to eliminate ambiguous and poorly worded items (Beatty & Wills, 2007). The sample comprised of seven women and eight men capturing the same range of demographics as the target population for the study. Fourteen items, which lacked clarity were dropped, while 2 items were reworded to increase their comprehensibility based on the suggestions of the participants. This exercise resulted in 48 items.

Phase 2: Factorial Validity and Reliability Estimates for Rumination Scale for Traumatic Amputees (RSTA)

In this phase, the factorial validity of proposed RSTA was evaluated. The main objectives of this phase were to:

1. Derive items for final questionnaire
2. Identify underlying dimensions of rumination, and
3. Determine the internal consistency of the scale

Sample and Procedure

At the onset of this phase, various rehabilitation centers of Rawalpindi and Islamabad including NIRM, Islamabad, AFIRM, Rawalpindi, Max Rehab and Physical Therapy Center Islamabad, Walk AID Prosthetics and Orthotics Rawalpindi, Department of Physiotherapy, Ahmed Medical Complex Rawalpindi, and Department of Physiotherapy, Al Sayed Hospital, G.T road, Rawalpindi were contacted. The administration was presented with the aims and objectives of the study and after their approval, participants were approached individually and consent was obtained from them for participation in the study. Before data collection, approval from the ethical review committees of Preston University-Kohat, Islamabad Campus was also acquired. The study was initiated on 1 Feb 2018 and completed on 24 December 2019. The inclusion criteria for the participants included: a) traumatic amputees only, b) both men and women, and lastly c) amputees with an age-range of 19-34 years who were currently actively involved in rehabilitation. This age range was selected because the developmental psychologists believe that there are minor differences in human psychology within this age-range of young adults. The amputees who were unwilling to follow the instructions or had cognitive problems were excluded. Thus, a total of 200 participants comprised the sample of present study among which 180 were men and 20 were women.

The average age of participants was 31 years, with 12 years of education and time lapse of traumatic amputation was at least 1 year. The sample comprised mainly below knee amputees which amounted up to 46% (N=93) of the total sample. Others included 24% (N=48) above knee amputees and 8% (N=16) elbow amputations. Participants largely hailed from urban background constituting 67.5% and were having married marital status i.e. 80% (N=160).

III. RESULTS

In order to ascertain the factor structure of the scale, Exploratory Factor Analysis (EFA) with Varimax orthogonal rotation method was applied on the data. The KMO Measure value of 0.66 and the Bartlett's Test of Sphericity ($p < 0.001$) indicated the fitness of the collected data for factor analysis. To explore the factor structure of RSTA, Direct Oblimin Method of PCA was applied. EFA resulted in a three-factor solution and Scree plot (Figure-1) assisted in extraction of three factors. All three emerged factors had Eigen value > 3. The variance explained by these factors is presented in Table1.

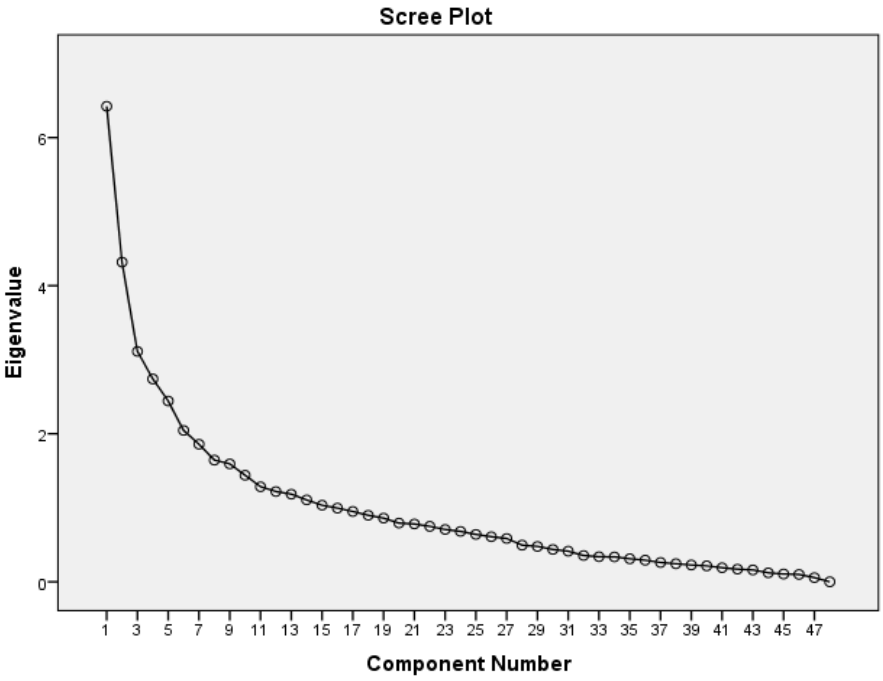

FIGURE 1. *Scree plot showing the Eigen values for each extracted factor*

Table 1. *Eigenvalues and Percentages of Variance Explained by Three Factor Solution Obtained through Principal Components Analysis (N=200)*

Factors	Eigenvalues	% of Variance	Cumulative%
1	6.3	13.3	13.3
2	4.2	8.9	22.3
3	3.1	6.4	28.8

The Eigen values showed that the first three factors accounted for almost 29% of the total variance (Table 1). The Eigen values of these factors ranged from 6.32 to 3.11. This resulted in an 18-item Rumination Scale.

Table 2. *Factor Loadings, Item-Total Correlation Coefficients, Mean, and Standard Deviation Values for 18-item of rumination scale (N = 200)*

S. No	Sub-dimension &Item No. in Scale	Factor Loading	*r*	*M*	*SD*
	Instrumentality (n=6)				
1	9	.79	.40**	3.55	1.38
2	20	.72	.45**	1.62	1.39
3	48	.70	.31*	1.47	1.49
4	50	.69	.36**	2.98	1.43
5	56	.73	.44**	1.98	1.36
6	60	.61	.41**	1.86	1.58
	Intrusion (n=6)				
7	21	.71	.47**	2.33	1.44
8	26	.77	.51*	3.11	1.81
9	28	.61	.51*	2.61	1.17
10	40	.61	.44**	1.12	1.32
11	57	.69	.53**	1.71	1.32
12	58	.63	.62**	1.52	1.30
	Brooding (n=6)				
13	11	.64	.54**	1.75	1.38
14	13	.78	.55**	2.21	1.59
15	38	.70	.54**	1.52	1.30
16	39	.61	.44**	2.15	1.44
17	41	.61	.64**	1.42	1.48
18	62	.62	.54**	1.45	1.33

Note: ***p<.01, *p<.05.*

Item-Total Correlation

To further provide statistical support to obtained factorial structure, item-total and inter-item were computed. All items achieved item-total correlation greater than .30 and inter-item correlation ranging from .15 to .50, which met the standards for validity of 18 items of RSTA (Nunnally & Bernstein, 1994).

Reliability Estimates and Descriptive Statistics

The reliability of RSTA and its subdimensions i.e. Instrumentality, Intrusion and Brooding was established through computing Cronbach Alpha indices (Field, 2009) on a sample of 200 participants. Cronbach's Alpha reliability coefficient of Rumination Scale for Traumatic Amputees (RSTA) comprising 18 items appeared as .90. And for Instrumentality α= .92, Intrusion α= .90 and for Brooding α= .91. Indices of reliability are satisfactory and indicates that scale and subscales are internally consistent.

Table 3. *Internal Consistency and Descriptive Statistics for 18-item RSTA (N = 200)*

		No. of Items	**α**	***M (SD)***	***Skewness***	***Kurtosis***	**II**	**III**	**IV**
I	RSTA	18	.90	36.37 (18.3)	1.78	1.81	.97**	.95**	.97**
II	*Instrumentality*	6	.92	13.45 (6.24)	1.70	1.90	-	.89**	.92**.

III	*Intrusion*	6	.90	12.42 (5.97)	1.29	.76	-	.89**
IV	*Brooding*	6	.91	10.50 (6.79)	1.62	1.41		-

*Note: *RSTA = Rumination Scale for Traumatic Amputees; ***p<.001*

Phase 3: Test of Dimensionality of Rumination Scale for Traumatic Amputees (RSTA)

RSTA was intended to have three subscales i.e. instrumentality, intrusion, and brooding rumination. Confirmatory Factor Analysis is considered a strong statistical method to confirm dimensionality of a newly developed scale. In this phase, CFA was conducted employing the Analysis of Moment Structure (AMOS 20) statistical package. All factors of the scale were derived as latent variables and their respective items were considered to be observed variables in the model.

Sample and Procedure

For this step, 200 amputees i.e. 190 men (95%) and 10 women (5%) were recruited for Confirmatory Factor Analysis (CFA). The age range of participants was from 19 to 34, who belonged to different cities of Pakistan including Rawalpindi, Islamabad, Lahore, Sargodha, Mirpur, and Peshawar. Moreover, data was gathered from different hospitals to obtain wide backgrounds and representations.

Results

For the assessment of model fit, several statistical estimates were used with lower and higher limits of the 90% confidence interval. Hu and Bentler (1999) suggested that CFI and TLI values of >0.90 and RMSEA <0.06 represent an acceptable fit. Figure 2 depicts CFA model. RSTA emerged as a three-dimensional scale and range of their factor loadings was from λ= .46 to λ= .97. All items had factor loadings > 0.30 and were in the acceptable range. The model fit indices of RSTA were computed through CFA. Moreover, CFA results depicted that chi-square had a value of 194.56 and relative chi square had a value of 1.92 in the default model (acceptable range: 1-3). The exhibited values of RMR and GFI were 0.05 and 0.88 respectively in the default model that were also in the* acceptable range (Awang, Afthanorhan, Mohamad, & Asri, 2015; Hu & Bentler, 1999). The relative fit indices including NFI, IFI, CFI, TLI, and RMSEA had values of 0.92, 0.96. 0.94, 0.96, and 0.06 respectively in the default model. The values for NFI, IFI, TLI and CFI were in the acceptable range (Awang et al., 2015; Hu & Bentler, 1999), which means satisfactory fit for the model.

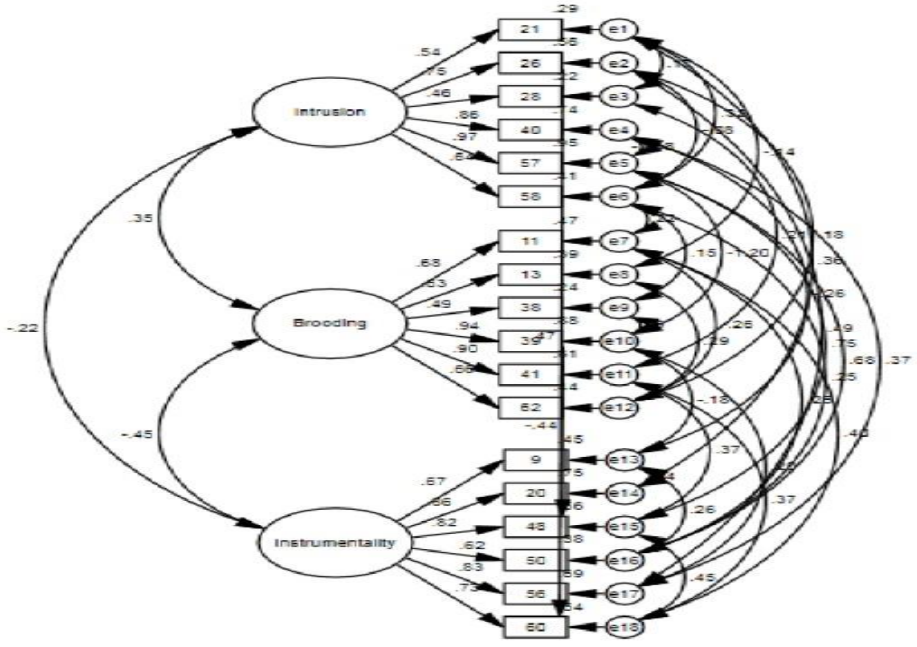

FIGURE 2. *Multi-dimensional Model for Rumination Scale (N = 200)*

Phase 4: Construct Validity of Rumination Scale for Traumatic Amputees (RSTA)

The last phase of the investigation was designed to assess the convergent and discriminant validity of Rumination Scale for Traumatic Amputees (RSTA) by correlating it with Depression Inventory for

Amputees (DIA) and Multidimensional Rumination in Illness Scale (MRIS). Specifically, a positive correlation was hypothesized between brooding and intrusion ruminating styles and depression while a negative relationship was proposed between instrumentality and depression in traumatic amputees. Whereas, a positive correlation was expected between MRIS and RSTA and their respective sub-dimensions.

Participants and Procedure

The construct validity of Rumination Scale for Traumatic Amputees (RSTA) was determined on a sample of 60 amputees approached in different hospitals of Rawalpindi and Islamabad through convenient sampling. Among the total, 30 were men and 30 were women with an age range of 18 to 34. The inclusion criteria for the sample of phase 4 was same as the one used in previous phases. After scrutinizing for missing data, the responses were entered into SPSS for statistical analysis.

Instruments

In this phase, Rumination Scale for Traumatic Amputees (RSTA), Multidimensional Rumination in Illness Scale (MRIS), and Depression Inventory for Amputees (DIA) were administered on the sample. MRIS, developed by Shoo et al. (2013), is a 32-item inventory and is comprised of three factors namely instrumentality, intrusion, and brooding. The response range is from *not at all* (1) to *almost always* (5). DIA is an indigenously developed instrument in Urdu language particularly constructed for the measurement of depression in traumatic amputees (Iqbal & Khalid, 2012). It consists of 30 items, each anchored on a five-pint rating scale. DIA is an internally consistent and valid instrument. For the present study, a Cronbach Alpha of 0.82 for DIA was obtained.

Results

In order to verify the hypotheses of phase 4 of the present study, Pearson correlation was computed between the variables (Table 4). The results are presented in Table 4. As anticipated, correlation coefficients yielded a positive and significant relationship between and MRIS and its sub-dimensions *intrusion* and *brooding*, while a weak significant negative correlation with *instrumentality* (RSTA) was observed. Similarly, results yielded a positive correlation between RSTA and its sub-dimensions while a weak correlation between *instrumentality* and depression provides support for the discriminant validity of the scale.

Table 4. *Pearson Correlation Coefficients for RSTA with MRIS and Depression (N = 60)*

Variable	Rumination Scale for Traumatic Amputees (RSTA)			
	Instrumentality	Brooding	Intrusion	Total
MRIS[1]	-.04	.22**	.14*	.45**
Instrumentality	.35**	.24**	.06	-.19**
Intrusion	-.02	.41**	.34**	.13*
Brooding	-.18**	.51**	.32**	.25**
Depression	-.13*	.18*	.37**	.23**

*Note:[1]MRIS = Multidimensional Rumination of Illness Scale; ***p<.001; **p<.01; *p<.05*

IV. DISCUSSION AND CONCLUSIONS

The present study has several contributions to make to the literature of rumination tendencies specifically among traumatic amputees. The major strength of the present study is the development of an indigenous and standardized instrument to measure rumination tendencies among traumatic amputees. Currently no scale was available to assess repetitive thinking styles of traumatic amputees. Rumination Scale for Traumatic Amputees (RSTA) is, therefore, first scale ever constructed for this purpose in Pakistan.

The research was carried out in four phases. The first phase aimed at indigenously acquiring items guided by the Shoo et al. (2014) model of illness rumination from individuals with a history of traumatic amputation. According to Fritz (1999) and Shoo et al. (2014), rumination has various subtypes and not all rumination is counterproductive. They proposed a three-dimensional model, comprising of positive

rumination style labeled as instrumentality, which results in positive belief and thoughts and are helpful in coping up and finding a new meaning to life; and two negative rumination styles including intrusion which is referred to as uncontrollable negative thoughts and lastly, brooding which results in negative experiences and perceiving consequences of illness (Fritz, 1999). Accordingly, three sets of descriptors were collected for the development of RSTA. In the second phase, EFA was applied for the identification of factor structure of RSTA on a sample of 200 traumatic amputees, mainly men with below knee amputation. In the light of EFA, six items for each factor i.e., instrumentality, intrusion and brooding were selected. The factor loadings for these factors ranged from 0.79 to 0.61 collectively explaining approximately 29% of variance. In addition, the second phase also established the reliability of the scale and its sub-dimensions, which were found to be ranging from .92 to .90. The results revealed that RSTA and its sub-dimensions are highly reliable measure of rumination tendencies in traumatic amputees. In the third phase, CFA was carried out on sample of 200 participants with similar demographic characteristics as in Phase 2. Results of CFA demonstrated that the three-dimension model provided a satisfactory representation of the data, which reflects a good fit. All 18 items distributed as 6 items for each factor i.e., instrumentality, intrusion, and brooding had factor loadings >0.45, which is well above the acceptable range (Arifin & Yusoff, 2016). In addition, our results showed a value of 1.92 for the relative chi-square which is also indicative of an adequate model fit (Coughlan, 2016).

According to Steiger, 1990, RMR should be < 0.08 and ideally <0.05. RMR in present study was found to be 0.05 which was strictly in compliance with the proposed standards. The GFI for present study was 0.88, while according to the guidelines value > 0.80 suggests a good fit (Awang et al., 2015). A 0.96 CFI value, which remained > 0.90 indicated an acceptable fit to the data (Tavakol, Dennick, & Tavakol, 2011). The values of NFI and CFI were also >0.90, which too indicated a good fit to the data (Awang et al., 2015). The value of RMSEA shows sensitivity to degree of freedom and complexity of the proposed model. RMSEA determined the fit between the hypothesized model with 18 items and the data. The expected value for a good model data fit is possible when RMSEA index value is <0.08 (Coughlan, 2016). CFA in present study revealed 0.06 as value for RMSEA which indicated good fit. It is apparent from the goodness-of-fit indices that this three-factor model of RSTA provided the appropriate fit to the observed data.

Phase 4 of this study was carried out to establish evidence of construct validity for Rumination Scale for Traumatic Amputees (RSTA). For this purpose, Pearson correlation was computed between RSTA and Multi-dimensional Rumination in Illness Scale (MRIS) and depression. MRIS (Shoo et al., 2014) measures rumination particularly in the context of illness. As anticipated, a significant correlation was observed between RSTA and MRIS and their respective sub-dimensions providing evidence for the convergent validity of RSTA. Moderate correlation coefficients between the scales and their sub-dimensions also indicate that though both scales measure features of physical illness, RSTA specifically assess the content of rumination experienced by traumatic amputees.

Theorists have exhibited their increased empirical interest in rumination in past 15 years and similarly researchers conducted and established relationship between rumination and depression (Sarvestani & Azam,2013). Rumination contributes towards hopelessness which theorist believe is the key to acquire depression (Hoeksema, 2000). Rumination is also linked with negative affect like low mood, negative thoughts and behaviors which consistently divert individual's attention on negative feelings and emotions (Mor & Winquist, 2002), thus leading to depressive moods. Results in present study are consistent with already quoted findings and statistics have confirmed that in people with traumatic amputation, rumination is positively related to depression. A statistically significant correlation of .23 appeared between rumination and depression. Moreover, significant positive correlation between brooding and intrusion and depression provided verification for the construct validity for RSTA, while a significant but weak negative correlation between instrumentality and depression suggested evidence for discriminant validity for RSTA.

This study was also unique as it has utilized approximately 460 participants with traumatic amputation. Since the data was acquired from major rehabilitation centers of Islamabad and Rawalpindi, Pakistan, which receives patients from all over the country, RSTA has been validated on a diverse population with age range from 19 to 34.

The overall findings of the present study suggest that Rumination Scale for Traumatic Amputees (RSTA) is a standardized scale for the assessment of rumination among traumatic amputees.

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