DEVELOPMENT OF A NEW RUMINATION SCALE

Stanislava Stoyanova
South-West University "Neofit Rilski", Bulgaria
E-mail: avka@abv.bg

Abstract

A new Brief Rumination Scale was constructed to measure rumination as repetitive thoughts about negative past events and regrets. Its good psychometric properties were established in a heterogeneous Bulgarian sample of 1274 healthy individuals – one-factor structure, high enough internal consistency, proven convergent, discriminant and intentional validity. It was found that rumination decreased with past positive time orientation and present hedonistic time orientation. Rumination increased with past negative time orientation and proneness to dysfunctional impulsivity. Regarding social differences in rumination, it was found that the participants whose income was above the medium (but not the highest one) and who were living in cities with more than 50,000 inhabitants were more prone to moderate rumination than expected – they emphasized on unfavorable events in their past and expressed regret about more omitted opportunities in their life. A brief, valid and reliable measure of rumination would shorten the process of conducting a study and would make it more probable the subjects to agree to participate in the study in this way enriching the scientific knowledge.
Keywords: *dysfunctional impulsivity, rumination measurement, scale development, time orientation*

Introduction

Rumination means rethinking again over a negative memory (Block & Kremen, 1996). Mental rumination is a disease, according to International Classification of Diseases – 11ᵗʰ edition (World Health Organization, 2020), coded as MB24.E Mental rumination and it represents mental preoccupation with negative events, negative personal characteristics, or failures. Mental rumination means sinking into thoughts over and over a problem, thinking over and over about a stressful event, a stressful situation (Emmett et al., 2019; Gassling et al., 2012; Heim, 1995), presence of intrusive thoughts (Hörlesberger, 2016), obsessive thoughts on what has happened (Emmett et al., 2019; Harzer & Ruch, 2015), constant rethinking of the problem without reaching a clear conclusion and solution, aimless thinking about the problem (Heim, 1995; Heim et al., 1991), excessive persistence (Balcar et al., 2011; Holubova et al., 2018) and perseveration in thoughts, rethinking repeatedly a stressful event (Balcar et al., 2011; Gassling et al., 2012; Holubova et al., 2018), constant thinking about the situation so that the person cannot be distracted from it (Emmett et al., 2019; Harzer &

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Ruch, 2015), the person finds it difficult to think of something else (Götz, 2003). Rumination is expressed as repetitive negative thoughts about own negative emotional experiences, and reflections on their causes, consequences, and symptoms (Dzhambov et al., 2019).

It is important to study rumination, because it is related to well-being, life satisfaction and mental resilience in stress situations. Thinking about negative emotions with recurring negative thoughts is often accompanied with attention deficits, difficulties in regulation of emotions, and mental health diseases (Dzhambov et al., 2019). Problem-focused negative repeated thoughts (ruminative thoughts) are related to depression, anxiety, maladaptation, and low resilience (Dzhambov et al., 2019). People who experience subjective well-being do not experience negative events in their memories repeatedly (Diener & Ryan, 2009). Perseveration worsens the satisfaction with the quality of life in the field of experiences, feelings, free time (Holubova et al., 2018). Mental rumination is a passive coping strategy with unfavorable outcome, inappropriate, ineffective (Heim, 1995), maladaptive (Balcar et al., 2011; Holubova et al., 2018). Repetitive negative thoughts (rumination) are maladaptive cognitive responses to stressful events, social interactions, and failure (Dzhambov et al., 2019). Fixation in thinking about what is happening is negative coping - instead of overcoming stress, you can increase it (Emmett et al., 2019; Harzer & Ruch, 2015). Thinking repeatedly about an unpleasant event leads to longer activation of cortisol that is related to a delay in recovery from a psychosocial stressor (Gassling et al., 2012).

A brief, valid and reliable measure of rumination shortens the process of study, makes it more probable the subjects to agree to participate in the study and enriches the scientific knowledge. The new Brief Rumination Scale was constructed to measure the repetitive thoughts regarding past negative events. An existing measure of rumination in scientific literature has been used as a model for constructing the new Brief Rumination Scale. Ruminative Thought Style Questionnaire (RTSQ) measures thoughts regarding negative emotions and it consists of 15 items distributed in 4 sub-scales – 5 items in the sub-scale of problem-focused thoughts, 4 items in the sub-scale of counterfactual thinking, 4 items in the sub-scale of repetitive thoughts and 2 items in the sub-scale of anticipatory thoughts (Brinker, & Dozois, 2009; Dzhambov et al., 2019). Counterfactual thinking in the form of wishes is related to high mental resilience (Dzhambov et al., 2019). Anticipatory thoughts are repetitive thoughts regarding future exciting events (Dzhambov et al., 2019). The answers on Ruminative Thought Style Questionnaire (RTSQ) are given on a 7-point Likert scale and higher scores mean greater tendency to reflect on own negative experiences (Brinker, & Dozois, 2009; Dzhambov et al., 2019). Cronbach's alpha of Ruminative Thought Style Questionnaire is .79, and it varies between .8 and .86 for its sub-scales in a Bulgarian sample of medical students (Dzhambov et al., 2019). Ruminative Thought Style Questionnaire has good psychometric properties among Bulgarian medical students (Dzhambov et al., 2019), but, according to our concept, rumination is related to the repetitive thoughts regarding past, not to the anticipatory thoughts regarding future, neither the nature of rumination includes thoughts regarding any imaginary scenarios of happening of an event in the form of wishes in counterfactual thinking, so a new Brief Rumination Scale was constructed to be better focused on the essence of rumination and to be a shorter instrument for measuring rumination.

The aim of the research was to construct a brief, concise measure of rumination (to predispose the subjects to fill in it) that would study rumination as thinking over and over past negative events, according to the definition of rumination by World Health Organization (2020).

Research Methodology

General Background

A study was conducted from 2015 to 2020 both online and face-to-face. The criterion for participating in the study was to be a major Bulgarian citizen (at least 18 years old). All subjects participated voluntarily, anonymously, and were given informed consent. Each subject was studied once. The research type was cross-sectional, quantitative, descriptive, correlational. The study focused on examining the psychometric properties of the new Brief Rumination Scale.

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Participants

The participants in the study were 1274 healthy individuals. The sample size was enough for performing factor analysis, because it was above the required minimum of 200 participants (Brown, 2014; Salama-Younes, 2011) or 300 participants (Guadagnoli & Velicer, 1988; Yong & Pearce, 2013). The male participants were 435 (34.1%) and the female participants were 839 (65.9%). Their age varied between 18 and 55 years old with mean age 31.6 years old, standard deviation 1.9 years. They lived in villages ($N = 22$; 1.7%), towns with up to 50,000 inhabitants ($N = 357$; 28.0%), cities with more than 50,000 inhabitants ($N = 693$; 54.4%), and in Bulgarian capital ($N = 202$; 15.9%). Their specialties are presented in Table 1 and their annual family income is described in Table 2. Almost half of the sample consisted of specialists in social sciences, economic and administrative specialists with medium income.

Table 1

Frequencies of Different Specialties

Specialties	N	%
Specialists in natural and technical sciences	38	3.0
Medical specialists	61	4.8
Teachers, lecturers	38	3.0
Economic and administrative specialists	196	15.4
IT specialists	37	2.9
Lawmakers and superior representatives	55	4.3
Lawyers	135	10.6
Specialists in social sciences	566	44.4
Writers, journalists, and language specialists	55	4.3
Creators and performers	53	4.2
Athletes, workers in sport area	40	3.1

Table 2

Frequencies of Annual Family Income

Annual family income	N	%
Low	290	22.8
Medium	505	39.6
High	401	31.5
Very high	78	6.1

Instruments

A brief rumination scale was created based on the sub-scales Problem-focused thoughts and Repetitive thoughts from Ruminative Thought Style Questionnaire (RTSQ) (Brinker, & Dozois, 2009), as well as on Past Negative Time Orientation scale of Zimbardo Time Perspective Inventory (Zimbardo & Boyd, 1999). See Appendix 1 for Bulgarian version of Brief Rumination Scale and Appendix 2 for English version of Brief Rumination Scale. The answers were given on a 5-point

scale from 1 – very uncharacteristic for me to 5 – very characteristic for me, following the model of Past Negative Time Orientation scale of Zimbardo Time Orientation Inventory (Zimbardo & Boyd, 1999). The score on Brief Rumination Scale varied between 5 and 25. A cutoff score of 15 was accepted as a threshold between low and high rumination scores. The scores between 5 and 10 mean minimal rumination. The scores between 11 and 15 mean mild rumination. The scores between 16 and 20 mean moderate rumination. The scores between 21 and 25 mean strong rumination. The scoring procedure was similar to this one of the questionnaire General Anxiety Disorder – GAD7 (Spitzer et al., 2006).

Its construct validity was verified by means of Radoslavova and Velichkov's (2005) questionnaire measuring sensation seeking, functional impulsivity and dysfunctional impulsivity, as well as through the scales Past positive time orientation, Past negative time orientation, and Present hedonistic time orientation from Zimbardo Time Perspective Inventory (Zimbardo & Boyd, 1999) adapted in Bulgarian by Slavchov and Virmozelova (2007). Their psychometric properties were good enough to be used in Bulgarian samples (Radoslavova & Velichkov, 2005; Slavchov & Virmozelova, 2007). Past negative time orientation reveals a generally negative view of the past, negative attitudes towards the past because of unpleasant events, negative interpretation of past events and regret (Zimbardo & Boyd, 1999). Present hedonistic time orientation reflects an attitude towards life directed at achieving pleasure with little concern for its consequences (Zimbardo & Boyd, 1999). Past positive time orientation means a favourable attitude towards the past because of pleasant memories (Zimbardo & Boyd, 1999). Dysfunctional impulsivity concerns taking quick ineffective decisions (Pitts & Leventhal, 2012, Zadravec et al., 2005), while functional impulsivity is characterized with quick and effective acting (Dickman, 1990). Sensation seeking is a search for novel, intense experiences (Cross et al., 2013), and ecstatic emotions (Dodonov, 1978).

Data Analysis

Exploratory and confirmatory factor analyses were applied, as well as reliability analysis, regression analysis, independent samples *t*-test, paired sample *t*-test, and multinomial test. Descriptive statistics were used to describe average tendencies. Data were statistically processed by means of JASP 0.14 (JASP Team, 2020).

Research Results

Exploratory factor analysis with ordinary least squares method (because the answers were given on a 5-point Likert scale) and rotation method equamax extracted only one factor. Kaiser-Meyer-Olkin measure of sampling adequacy was .783, i.e., the results from factor analysis deserved being interpreted (Yong & Pearce, 2013). Individual measures of sampling adequacy for the five items in the scale varied from 0.761 to 0.827. The value of Bartlett's test of sphericity was 994.150, $df = 10$, $p < .001$ so the relationships between the variables followed a specific model (Yong & Pearce, 2013). The indexes for adequacy of factor model revealed high enough adequacy – $\chi^2_{(5)} = 9.923$, $p = .077$, i.e. the factor model did not differ significantly from the empirical data (Salama-Younes, 2011); root mean square error of approximation (RMSEA) = 0.028 and RMSEA values within 90% confidence interval were between 0 and 0.05, i.e. appropriate factor model, because these RMSEA values were below 0.05 (Brown, 2014; Schermelleh-Engel et al., 2003); Tucker-Lewis Index (TLI) was 0.990 that was above the required minimum value 0.9 of the model fit (Brown, 2014). Scree test also revealed that only one factor should be interpreted whose eigenvalue was above 1 – see Figure 1.

The extracted factor explained 33.2% of the variance of the variables in the factor model. Factor loadings of the items in Brief Rumination Scale resulting from Exploratory factor analysis are presented in Table 3. They were high enough being above 0.32 (Yong & Pearce, 2013), as well as being above 0.4 (Balcar et al., 2011; Salama-Younes, 2011).

Table 3

Factor Loadings of the Items in Brief Rumination Scale Resulting from Exploratory Factor Analysis

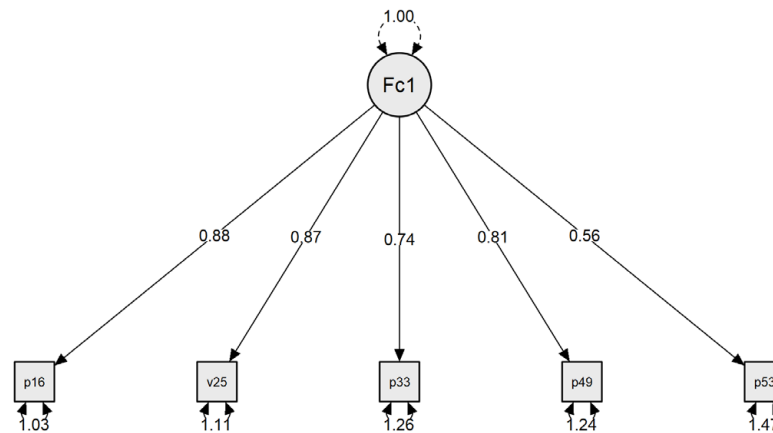| Items	Factor loading
It is hard for me to forget unpleasant memories of my childhood	.551
I think about the bad things that have happened to me in the past	.588
I have many unpleasant memories in my past that I think about	.638
Painful experiences from my past are constantly repeated in my mind	.654
I often think about the good things that I have missed in my life	.418

Figure 1

Scree Plot of Factor Solution from Exploratory Factor Analysis of Brief Rumination Scale
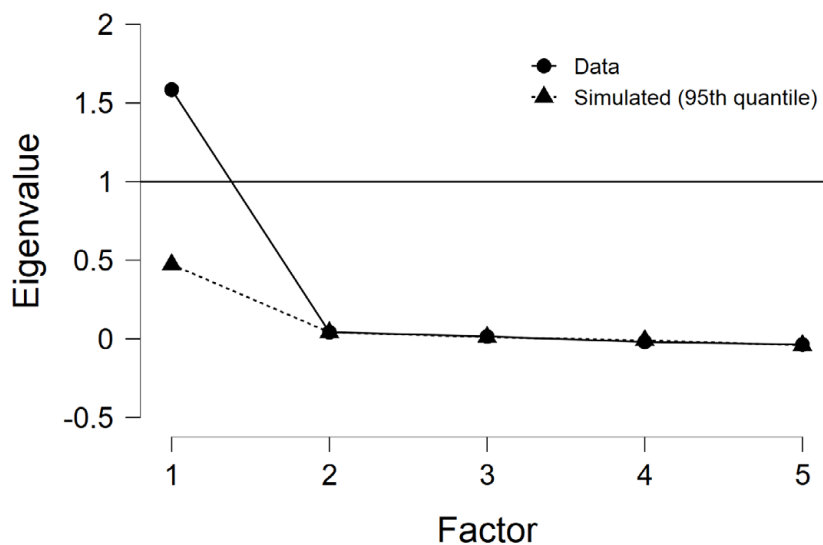
Confirmatory factor analysis with diagonally weighted least squares (DWLS) method supported one-factor solution. DWLS method was appropriate for variables on ordinal level of measurement and it did not require normal distribution of the source variables (Li, 2016). The indexes of model fit revealed high enough model adequacy to the empirical data – $\chi^2_{(5)} = 4.205$, p = .520, i.e. the factor model did not differ significantly from the empirical data (Salama-Younes, 2011); RMSEA = 0.000 and RMSEA values within 90% confidence interval were between 0 and 0.036, i.e. appropriate factor model, because these RMSEA values were below 0.05 (Brown, 2014; Schermelleh-Engel et al., 2003); Comparative Fit Index (CFI) = 1.000 that was above the required minimum value 0.9 of the model fit (Hooper, Coughlan, Mullen, 2008; Vittersø, Røysamb, & Diener, 2002); Bentler-Bonett Normed Fit Index (NFI) was 0.998 that was above the required minimum value 0.9 of the model fit (Hooper et al., 2008); Bollen's Relative Fit Index (RFI) was 0.993 that was close to 1 indicating a good model fit (Shadfar & Malekmohammadi, 2013). Factor model of rumination is presented in Figure 2.

Figure 2

Confirmatory Factor Model of Rumination

Note: Fc1 means Factor 1, i.e., rumination; p33 means the item It is hard for me to forget unpleasant memories of my childhood; p49 means the item I often think about the bad things that have happened to me in the past; v25 means the item I have many unpleasant memories in my past that I think about; p16 means the item Painful experiences from my past are constantly repeated in my mind; p53 means the item I often think about the good things that I have missed in my life. Factor loadings estimates are presented on the lines relating each item to the factor. Residual variances estimates are presented below the abbreviations of the items' names.

Reliability coefficients of Brief Rumination scale was Cronbach's α = .705 (between 0.678 and 0.732 within 95% confidence interval), i.e., acceptable internal consistency (Glen, 2014), and this coefficient would not become higher if any item of the scale dropped out. Average interitem correlation was 0.323 and it was above the minimum acceptable average interitem correlation of 0.3 (Cristobal et al., 2007) that meant high internal homogeneity. Average interitem correlation was between 0.2 and 0.4 as recommended Piedmont (2014) in order the items to be representative for the measured construct and fully cover it. Average interitem correlation was between 0.15 and 0.50 as recommended Clark and Watson (1995) for both specific and general constructs.

The mean value on Brief Rumination Scale was 13.71, standard deviation was 4.58. About 1/3ʳᵈ of the participants was prone to moderate or strong rumination – see Table 4.

Table 4

Frequency Distribution of Levels of Rumination

Levels of rumination	N	%
Minimal rumination	319	25.039
Mild rumination	508	39.874
Moderate rumination	344	27.002
Strong rumination	103	8.085

There were not any significant gender differences in rumination ($t_{(991.252)}$ = 0.839, p = .402; Levene's test of Equality of Variances F = 10.159, df = 1, p = .001). The male participants were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 120.191, $p < .001$, expected count = 109, observed count for minimal rumination = 104, observed count for mild rumination = 184, observed count for moderate rumination = 123, observed count for strong rumination = 24). The female participants also were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 144.471, $p < .001$, expected count = 210, observed count for minimal rumination = 215, observed count for mild rumination = 324, observed count for moderate rumination = 221, observed count for strong rumination = 79).

The participants with low income were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 65.559, $p < .001$, expected count = 72, observed count for minimal rumination = 78, observed count for mild rumination = 118, observed count for moderate rumination = 73, observed count for strong rumination = 21). The participants with medium income were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 125.503, $p < .001$, expected count = 126, observed count for minimal rumination = 126, observed count for mild rumination = 216, observed count for moderate rumination = 125, observed count for strong rumination = 38). The participants with high income were more prone to mild or moderate rumination than expected (Multinomial $\chi^2_{(3)}$ = 80.526, $p < .001$, expected count = 100, observed count for minimal rumination = 93, observed count for mild rumination = 154, observed count for moderate rumination = 122, observed count for strong rumination = 32). The participants with very high income (Multinomial $\chi^2_{(3)}$ = 4.256, $p = .235$) did not differ statistically significantly in their levels of rumination.

The participants living in villages were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 10.727, $p = .013$, expected count = 6, observed count for minimal rumination = 4, observed count for mild rumination = 12, observed count for moderate rumination = 2, observed count for strong rumination = 4). The participants living in towns with up to 50,000 inhabitants were more prone to minimal or mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 81.510, $p < .001$, expected count = 89, observed count for minimal rumination = 102, observed count for mild rumination = 140, observed count for moderate rumination = 93, observed count for strong rumination = 22). The participants living in cities with more than 50,000 inhabitants were more prone to mild or moderate rumination than expected (Multinomial $\chi^2_{(3)}$ = 138.440, $p < .001$, expected count = 173, observed count for minimal rumination = 171, observed count for mild rumination = 274, observed count for moderate rumination = 191, observed count for strong rumination = 57). The participants living in the capital were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 40.614, $p < .001$, expected count = 50, observed count for minimal rumination = 42, observed count for mild rumination = 82, observed count for moderate rumination = 58, observed count for strong rumination = 20).

The studied specialists in natural and technical sciences (Multinomial $\chi^2_{(3)}$ = 2.000, $p = .572$), teachers and lecturers (Multinomial $\chi^2_{(3)}$ = 5.895, $p = .052$), IT specialists (Multinomial $\chi^2_{(2)}$ = 2.000, $p = .368$, there were not any studied IT specialists with strong rumination), lawmakers and senior representatives (Multinomial $\chi^2_{(2)}$ = 3.527, $p = .171$, there were not any studied lawmakers and senior representatives with strong rumination), writers, journalists, and language specialists (Multinomial $\chi^2_{(3)}$ = 5.000, $p = .172$) did not differ statistically significantly in their levels of rumination. Medical specialists were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 17.492, $p < .001$, expected count = 15, observed count for minimal rumination = 12, observed count for mild rumination = 26, observed count for moderate rumination = 19, observed count for strong rumination = 4). Economic and administrative specialists were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 24.367, $p < .001$, expected count = 49, observed count for minimal rumination = 58, observed count for mild rumination = 72, observed count for moderate rumination = 39, observed count for strong rumination = 27). Lawyers were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 50.156, $p < .001$, expected count = 34, observed count for minimal rumination = 31, observed count for mild rumination = 64, observed count for moderate rumination = 34, observed count for strong rumination = 6). Specialists in social sciences were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 105.746, $p < .001$, expected count = 142, observed count for minimal rumination = 142, observed count for mild rumination = 222, observed count for moderate rumination = 152, observed count for strong rumination = 50). Creators and performers were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 28.585, $p < .001$, expected count = 13, observed count for minimal rumination = 10, observed count for mild rumination = 28, observed count for moderate rumination = 14, observed count for strong rumination = 1). Athletes and workers in sport area were more prone to mild rumination than expected (Multinomial $\chi^2_{(3)}$ = 32.800, $p < .001$, expected count = 10, observed count for minimal rumination = 2, observed count for mild rumination = 24, observed count for moderate rumination = 12, observed count for strong rumination = 2).

The scores on Rumination were approximately normally distributed – skewness was 0.204 and

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kurtosis was -0.389. The scores on Past positive time orientation, Present hedonistic time orientation, Past negative time orientation, Sensation seeking, Functional impulsivity and Dysfunctional impulsivity also were approximately normally distributed, because their coefficients of skewness varied between -0.274 and 0.204, as well as their coefficients of kurtosis varied between -0.690 and 0.139, i.e., they were within the range of -1 and 1 (Hair et al., 2016).

Concerning validity of Brief rumination scale, Linear regression analysis, Method Enter, indicated that Rumination was predicted by past positive time orientation, past negative time orientation, present hedonistic time orientation, and dysfunctional impulsivity ($R = 0.820$, $R^2 = 0.672$, RMSE = 2.634; $F_{(7, 1266)} = 369.869$, $p < .001$; see Table 5). Rumination decreased with past positive time orientation and present hedonistic time orientation. Rumination increased with past negative time orientation and proneness to dysfunctional impulsivity, i.e., taking quick ineffective decisions.

Table 5

Results from Linear Regression Analysis for Predicting Rumination

Model	b unstandardized	β standartized	t	p	Collinearity Statistics VIF
Intercept	-2.474		-2.272	.023	
Past positive time orientation	-0.408	-0.056	-3.287	.001	1.113
Past negative time orientation	5.767	0.822	49.380	<.001	1.067
Present hedonistic time orientation	-0.348	-0.043	-2.545	.011	1.108
Sensation seeking	0.704	0.029	1.559	.119	1.346
Functional impulsivity	-0.047	-0.002	-0.119	.905	1.151
Dysfunctional impulsivity	0.828	0.039	2.148	.032	1.252
Age	0.054	0.022	1.368	.172	1.030

Regarding intentional validity, it was considered important to distinguish rumination from past negative time orientation. To check for intentional validity, rumination score was averaged (divided into the number of the items in Brief Rumination Scale) and it was compared with the averaged score on Past negative time orientation scale. Rumination ($M = 2.741$, $SD = 0.917$) differed statistically significantly ($t_{(1273)} = 10.804$, $p < .001$, Cohen's $d = 0.303$, i.e., medium effect size, according to Cohen, 1988) from past negative time orientation ($M = 2.905$, $SD = 0.653$) and the latter was more typical for this sample than rumination.

Discussion

This study had some limitations concerning social desirability that could influence on scale scores, as well as not applying any existing rumination scale to check validity of the new questionnaire, neither checking its validity in a sample of diagnosed individuals. Another limitation was the age range of the sample in this study that excluded elderly people. However, the received data permitted to reveal that the new Brief Rumination Scale had good psychometric properties to be used for measuring rumination – it was found to be a unitary construct, it had high enough reliability, and proven convergent and discriminant validity as sub-types of construct validity. Concerning convergent validity of Brief Rumination Scale, it was established that rumination decreased with past positive time orientation (a favorable attitude towards the past because of pleasant memories, according to Zimbardo & Boyd, 1999) and present hedonistic time orientation (an attitude towards life directed at achieving pleasure, according to Zimbardo & Boyd, 1999), besides rumination in-

creased with past negative time orientation (negative attitudes towards the past because of unpleasant events, negative interpretation of past events and regret, according to Zimbardo & Boyd, 1999) and proneness to dysfunctional impulsivity (i.e., taking quick ineffective decisions, according to Pitts & Leventhal, 2012; Zadravec et al., 2005), so rumination despite being a process of thinking over and over own past difficulties and failures, should be a kind of cognitive bias related to ineffective processing of information instead of reflective self-assessment leading to self-improvement.

Rumination measured with Brief Rumination Scale was successfully distinguished from the similar construct of past negative time orientation that indicated intentional validity of Brief Rumination Scale.

Concerning discriminant validity of Brief Rumination Scale, it was established that rumination was not predicted by sensation seeking (search for novel and intense experiences, according to Cross et al., 2013, as well as for ecstatic emotions, according to Dodonov, 1978), neither by functional impulsivity (quick and effective decision taking, according to Dickman, 1990). These findings prove the maladaptive character of rumination that does not enrich personal experience, neither contributes to personal growth achieved with self-control and mastery.

Some other proofs for validity of Brief Rumination Scale were the findings that there were not any significant gender differences in rumination (both male and female participants were more prone to mild rumination than expected), and the lack of gender differences in rumination also found during Bulgarian adaptation of Ruminative Thought Style Questionnaire among medical students (Dzhambov et al., 2019). Another study has specified that women with high IQ are prone to self-monitoring, anxiety, self-blame, and rumination (Block & Kremen, 1996), but our study did not use any IQ measure as a means for establishing validity of Brief Rumination Scale that may be also considered as a limitation of the current study. However, the studied subjects were healthy individuals that performed successfully in their life as they did not address to any specialists for improvement in regard of their mental health, well-being, or resilience at the moment of their participation in the study that may be considered as an indicator of sufficient cognitive abilities.

During Bulgarian adaptation of Ruminative Thought Style Questionnaire, it was found that low-income medical students were more prone to rumination (Dzhambov et al., 2019), but our findings revealed that the participants with high (but not the highest) income and living in cities with more than 50,000 inhabitants were more prone to moderate rumination than expected, so further investigation of the relationships between income and rumination is required. Our study also revealed proneness to mild rumination among medical specialists, economic and administrative specialists, lawyers, specialists in social sciences, creators and performers, athletes and workers in sport area, but mild rumination is in fact a low level of rumination and there were not found any specialties more susceptible to stronger degree of rumination, as the study conducted by Dzhambov et al. (2019) revealed regarding the lack of significant differences in rumination among the different areas of medical specialization.

Conclusions

A new Rumination scale was developed that consisted of five items, so it was a brief, concise measure of rumination to predispose the subjects to fill in it. A brief, valid and reliable measure of rumination would shorten the process of conducting a study and would make it more probable the subjects to agree to participate in the study in this way enriching the scientific knowledge. The new scale measured rumination as thinking over and over past negative events, according to most definitions of rumination. Any additional constructs were not included in the structure of the scale. This was the first study to present the development of a new Brief rumination scale in a heterogeneous population. Its good psychometric properties were established that permitted using the scale for its purpose, i.e., measuring rumination. Further studies may specify test-retest reliability of Brief rumination scale, as well as might compare rumination proneness cross-culturally and establish if some personal qualities like emotional stability/neuroticism or striving to perfectionism may be related to rumination vulnerability.

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Appendix 1. Bulgarian version of Brief Rumination Scale

Представяме Ви анонимен въпросник, съдържащ в себе си твърдения, които отразяват начина, по който преживявате случилото се в миналото. Моля, отбележете до каква степен всяко едно от твърденията се отнася до вас, като изберете отговор от 1 до 5 (като 1 означава, че въобще не се отнася за Вас, а 5, че изцяло се отнася за Вас). Моля, избирайте отговор „3-не мога да преценя", колкото се може по-рядко. Няма правилни и неправилни отговори, не се замисляйте дълго върху всяко твърдение.

Предварително Ви благодарим за съдействието!

1. Трудно ми е да забравя неприятните моменти от моето детство.

1	2	3	4	5
Въобще не се отнася за мен	В голяма степен не се отнася за мен	Не мога да преценя доколко се отнася за мен	В голяма степен се отнася за мен	Напълно се отнася за мен

2. Често мисля за лошите неща, които са ми се случили в миналото.

1	2	3	4	5
Въобще не се отнася за мен	В голяма степен не се отнася за мен	Не мога да преценя доколко се отнася за мен	В голяма степен се отнася за мен	Напълно се отнася за мен

3. В миналото ми има много неприятни спомени, за които мисля.

1	2	3	4	5
Въобще не се отнася за мен	В голяма степен не се отнася за мен	Не мога да преценя доколко се отнася за мен	В голяма степен се отнася за мен	Напълно се отнася за мен

4. В съзнанието ми постоянно се повтарят болезнени преживявания от миналото.

1	2	3	4	5
Въобще не се отнася за мен	В голяма степен не се отнася за мен	Не мога да преценя доколко се отнася за мен	В голяма степен се отнася за мен	Напълно се отнася за мен

5. Често мисля за хубавите неща, които съм пропуснал/а в живота.

1	2	3	4	5
Въобще не се отнася за мен	В голяма степен не се отнася за мен	Не мога да преценя доколко се отнася за мен	В голяма степен се отнася за мен	Напълно се отнася за мен

Appendix 2. English version of Brief Rumination Scale

This is an anonymous questionnaire containing statements that reflect the way you experience what happened in the past. Please indicate to what extent each of the statements applies to you by choosing an answer from 1 to 5 (1 means that it does not apply to you at all, and 5 that it applies to you entirely). Please, choose the answer "3 - I am not sure" as rarely as possible. There are no right or wrong answers, do not think long about every statement.

Thank you in advance for your cooperation!

1. It is hard for me to forget unpleasant memories of my childhood.

1	2	3	4	5
Very uncharacteristic for me	Uncharacteristic for me	I am not sure how much it applies to me	Characteristic for me	Very characteristic for me

2. I often think about the bad things that have happened to me in the past.

1	2	3	4	5
Very uncharacteristic for me	Uncharacteristic for me	I am not sure how much it applies to me	Characteristic for me	Very characteristic for me

3. I have many unpleasant memories in my past that I think about.

1	2	3	4	5
Very uncharacteristic for me	Uncharacteristic for me	I am not sure how much it applies to me	Characteristic for me	Very characteristic for me

4. Painful experiences from my past are constantly repeated in my mind.

1	2	3	4	5
Very uncharacteristic for me	Uncharacteristic for me	I am not sure how much it applies to me	Characteristic for me	Very characteristic for me

5. I often think about the good things that I have missed in my life.

1	2	3	4	5
Very uncharacteristic for me	Uncharacteristic for me	I am not sure how much it applies to me	Characteristic for me	Very characteristic for me

Stanislava Stoyanova   PhD, Professor, South-West University "Neofit Rilski", Blagoevgrad, Bulgaria.
E-mail: avka@abv.bg
ORCID: https://orcid.org/0000-0002-8873-9285