Relation between the SOC model and depressive symptoms in the elderly

Summary

The theoretical model known as Baltes' Selection, Optimization and Compensation (SOC) (1990), presents strategies for loss regulation and facing normative and non-normative changes. Objective: To analyze the relation between the use of SOC strategies with the depressive symptoms of the elderly when stress events occur. Method: Non-probabilistic sample, with individuals aged 60 and over, participating in activities of groups for the elderly. Result: It was observed that the use of SOC works as an effect modifier in the relation between stressors and depression, being that the chances of the elderly with low use of SOC resources to present depressive symptoms were 2.46 times bigger than in elderly that present high use of these resources. Conclusion: These results reinforce the relevance of the insertion of these strategies in studies and interventions on the theme, since their use can help in the promotion of well-being and confrontation of diseases.

[R1] Comentário: Instruments?

[R2] Comentário: More results here to the reader.

Key words: selection; optimization; compensation; depression; elderly.

Resumo

O modelo teórico conhecido como Seleção, Otimização e Compensação (SOC), de Baltes (1990), apresenta estratégias para a regulação de perdas e enfrentamento de mudanças normativas e não normativas. Objetivo: Analisar a associação do uso das estratégias SOC com os sintomas depressivos de idosos diante da ocorrência de eventos estressores. Método: Amostra não probabilística, com indivíduos com idade a partir de 60 anos, participantes de atividades de grupos para idosos. Resultado: Foi observado que o uso de SOC funciona como modificador de efeito na relação entre estressores e depressão, sendo que as chances dos idosos com baixo uso de recursos SOC apresentarem sintomas depressivos foram 2,46 vezes maiores do que em idosos que apresentam uso elevado destes recursos. Conclusão: Esses resultados reforçam a relevância da inserção dessas estratégias em estudos e intervenções sobre a temática, já que o uso delas pode auxiliar na promoção de bem estar e enfrentamento de doenças.

Palavras chave: seleção; otimização; compensação; depressão; idosos.

Introduction

The accelerated aging of the population around the world has marked the increase of studies on the subject, which has contributed to the formulation of theories that have approached old age under new perceptions and overcame the perspectives that limited this phase to losses and declines (Neri, 2006; Santana, Garcia, & Araújo, 2017). Among these

theories, Lifespan (Baltes, 1987) stands out, which assumes development as a phenomenon that happens throughout life and considers the occurrence of adaptive changes in old age. In this conception, the variability and possibility of differentiated courses of life are explained by the influences of multiple factors such as genetic, biological and socio-cultural aspects and development occurs from the balance between gains and losses (Xavier, Bueno, Assis, Almeida, & Assis, 2017).

Throughout life, biological development occurs accompanied by several external and internal determinants to the individual, besides opportunities and socio-structural limitations. The biological and socio-cultural factors may vary from one individual to another, and it is essential in old age to maintain a balance in the distribution of personal efforts to continue to achieve the goals and to regulate the losses that intensify with increasing age (Freire, et al, 2012). Throughout life, people seek to maximize gains and minimize losses as a way to react to the biological, social and psychological determinants that limit or enhance their development (Baltes, 1997). In addition to that, this development is in constant dynamic interaction with available resources (Xavier et al., 2017). This dynamic of gains and losses is conditioned by individual and cultural factors, as well as by the moment experienced by the individual. The implications of this global view of human development are examined at levels of analysis that involve consideration of three general functions: the development function; the maintenance function, including recovery (resilience); and the loss regulation function. These three functions represent the systemic conjunction of individual development (Baltes, 1995; Baltes, 1997).

The adaptive development function concerns behaviors involved in achieving higher levels of functioning or adaptive capacity. The maintenance and recovery function (resilience) is associated with the selection of behaviors involved in maintaining operating levels when facing a new contextual challenge or loss of potential. The regulation of loss or management includes the behaviors that organize the operation at lower levels when maintenance or recovery (resilience) is no longer possible (Baltes, 1994, Freire, et al, 2012). These adaptive functions were defined through three development regulation processes: selection, optimization and compensation. The so-called SOC Selection, Optimization and Compensation model (Baltes, 1997) considers that there are different ways of allocating resources to face the normative and non-regulatory changes experienced throughout life, seeking the elaboration of a successful or adaptive development (Carpentieri, Elliott, Brett, & Deary, 2017; Freire, Resende, & Rabelo, 2012).

Selection is understood as the definition and/or reduction of alternatives or personal objectives. It is an active or passive process that helps to conserve energy and motivation, eliminating or reducing less valued goals. Optimization refers to the identification, search, refinement and acquisition of additional goals. It includes persistence, practice, skill development and resource enhancement, modeling successful behaviors, and investing in time and energy. Optimization ultimately aims to complement the behavioral strategies used to achieve the goals. Compensation is the component that concerns the adaptation to maintain the balance in the face of losses experienced, whether physical, emotional, environmental or social (Baltes, 1997; Carpentieri et al., 2017; Grove, Loeb, & Penrod, 2009).

Among the adverse outcomes associated with adaptive difficulties in old age, depression stands out for being disabling and highly prevalent in the elderly, and may lead to suicide attempts or suicide itself. By 2030, depression will be the most common disease in the world, currently with an estimated 350 million people affected by the disease (WHO, 2016). According to IBGE (2014), among the people in general who reported a diagnosis of depression, only 16.4% were receiving psychotherapy and 46.4% received medical assistance for depression in the last 12 months. A nationwide study showed a prevalence of 34.9% of depression in the elderly, 15.9% with mild to moderate depression and 19.1% with severe depression (Sousa et al., 2017).

In this scenario, studies on depressive symptoms and their associated factors can help professionals in early diagnostic evaluation and appropriate interventions in mental health of the elderly (Sousa et al., 2017). Some studies have highlighted the relevance of using SOC resources to minimize depressive symptoms in the workplace (Shang et al., 2015) and in adolescence (Gestsdottir, Urban, Bowers, Lerner, & Lerner, 2011). In contrast, no significant direct relationships were found between adaptive coping, as measured by the use of SOC resources, and the depression outcome in American elderly women (Warner et al., 2017) and stroke patients (Donnellan, Hevey, Hickey, & O'Neill, 2012). The main explanations for the lack of relationship between SOC and depression were attributed to limitation in measuring SOC resources. Thus, the findings on the relationship between SOC and depressive symptoms remain controversial, which indicates the need for further research. Thus, this study aimed to analyze the association between stress and depression in the elderly and the influence of SOC resources on this association.

Method

The data were obtained through a non-probabilistic sample, captured for convenience among individuals over 60 years of age, participating in activities of groups for the elderly,

such as gymnastics and religious groups. The collection was carried out between September 2017 and August 2018 with 200 elderly people from Belo Horizonte aged between 60 and 89 years old.

[R3] Comentário: Or 196?

[R4] Comentário: between 60 and 89 ou 60 and 87?

The instruments were self-applicable and the collection was made in groups, starting with a meeting to present the objectives of the research and scheduling, for a later moment, for the participants to respond to the research instruments. The application of the instruments was divided in two moments.

The following inclusion criteria were adopted: to be 60 years old or older, to present physical and mental state capable of answering the questionnaire, showing awareness and orientation in time and space. Exclusion criteria: elderly hospitalized, institutionalized and those who refused to sign the Term of Free and Informed Consent (TCLE).

The study was approved by the Research Ethics Committee of the Federal University of Minas Gerais (CAAE: 57343816.0.00000.5149).

Instruments

Sociodemographic questionnaire: The sociodemographic data collected were age, sex, education, family income and marital status.

Emotional state scale: The Geriatric Depression Scale (Paradela, et al, 2005), used as an aid in tracking depressive pictures in the elderly, is composed of 15 items, among which the participants must mark yes or no, according to how they felt in the last week. Each question is scored in 0 or 1 point, when corresponds the presence of depressive symptom. The total score is the sum of the 15 questions, being a score equal or superior to 5 indicative of the presence of depression.

Social Support: On this scale the person answers in each item how often they consider to have available each type of support, being able to choose between "never", "rarely", "sometimes", "almost always" or "always". The scale is composed of 19 items that represent five dimensions: material, affective, emotional, information and positive social interaction. Therefore, the higher the score, the higher the level of social support (Pais-Ribeiro & Ponte, 2009).

The Elders Life Stress Inventory: The Elders Life Stress Inventory (ELSI) (Aldwin, 1990) has been translated and adapted to Portuguese (Batistoni, Cupertino, & Neri, 2009). It is composed by 32 items and the person must mark in each item how stressful the events mentioned were, being 0 corresponding to the event in question did not happen, 1 for events not stressful at all, 2 for little stressful, 3 for events moderately stressful, 4 for very stressful

and 5 for extremely stressful. The higher the score, the higher the stress level of the individual.

SOC Questionnaire: The SOC questionnaire (Almeida et al, 2013) is an instrument composed by 48 items, being 12 items for each of the 4 sub-scales: (1) elective selection, (2) selection based on losses, (3) optimization and (4) compensation. The instrument is made of two expressions in each of the 48 items, the first being a target phrase that defines the resource of the SOC model and the second phrase a disperser, that is, a possible action, but which is not based on theory. The evaluator is asked to choose which of the statements characterizing the behavior of two fictional individuals, A and B, best describes it.

Depending on the answer chosen, the facet is scored or not, because there is a proper behavior of the evaluated strategy which receives a score, and an opposite behavior, thus, that does not fit the strategy of the SOC model and is not scored. At the end of the completion, the points for each strategy are added up to a maximum total of 12 points for each one, making a maximum total of 48 points for the instrument. High scores show more resilience and indicate that the individual is operating according to the SOC model.

General Health: This variable is composed by a question that asks about how the person perceives his/her own health in a general way. There are five answer options, which vary from very bad to excellent.

Comparative Health: It consists of a question in which the participant is asked to evaluate his or her own health in comparison with that of other people they know of the same age. As an answer, the options are better, equal or worse than most people's health.

Data Analysis

The variables SOC, depression, stress and social support were treated as dichotomous. For this purpose, the median was used as a reference for the cutoff point in the analysis. Analyses were conducted with Pearson's Chi-square test (χ^2), to test the association between depression and the variables: gender, schooling, income, general health, comparative health, stress and SOC. Mantel Haenszel's interaction test was performed to verify if the SOC variable acted as an effect modifier in the association between stress and depression. Later, logistic regression was performed, using the Stepwise selection method, to evaluate the association of the variables considered significant ($p<0.05$) with depression. In addition, social support was included due to the possibility of being a confounding due to its possible impact on depression.

The calculation of the odds ratio, and its respective 95% confidence intervals, was carried out in order to compare the probability of the elderly having depression in relation to

stress levels and the use of SOC resources. The data were analyzed using the statistical program R.

Results

The sample was composed by 200 elderly, between 60 and 87 years old, being 81.6% female, and 176 seniors were members of groups linked to public services or college extension projects, such as "Academia da Cidade" (City Gym) and "Programa Envelhecimento Ativo" (Active Aging Program), respectively. The rest of the elderly were linked to groups of private institutions. The percentage of elderly people with about 9 years of schooling was high, being 20% with a college degree, 5.5% with incomplete college degree, 44% with high school degree, 21.5% elementary school and 9% who can read and write without formal study.

[R5] Comentário: Or 196? 4 persons quit?

[R6] Comentário: Between 60 and 87 years old or 60 and 89 years old like in method?

The distribution of the population according to income was bigger between 1,1 and 2 minimum wages (25,4%) and it occurred greater homogeneity on the other income groups: 15,2% of people that received up to a minimum wage; 18,3% from 2,1 to 3 minimum wages; 20,8% received from 3,1 to 4 minimum wages; and 20,3% received more than 4 minimum wages. Before the transformation as dichotomy, the media of the variable Social Support was 82,42 and median of 86,32 points.

Regarding self-perception of health in general, 51.5% of the elderly considered their health good, 27.5% defined it as very good or excellent and 21% as reasonable or very bad. When asked to evaluate health compared to other people of the same age group, 50.2% considered their health to be equal or worse than most and 49.7% consider that their health is better than most. The average of the SOC variable in the sample was high compared to the maximum score of 48 (M = 33.28) and the median, used as a cutoff point for the analyses was 34 points. Regarding stressors, the mean was 18.77 and the median was equivalent to 13.5 points.

The prevalence of elderly people with depression in this sample corresponds to 19.5%. In Pearson's Chi-square test, the presence of depression obtained a higher percentage among elderly with income between 1.1 and 2 minimum wages; with little social support; with little use of SOC resources; with confrontation of many stressors; and with self-perceived health as reasonable/poor. However, depression was significantly associated only with SOC, Stressors, and General Health (Table 1). The use of SOC resources behaved as an effect modifier (Mantel Haenszel, $\chi^2 = 5.942$, $p=0.015$) for the association between stressors and depression.

Table 1. Distribution of sociodemographic characteristics, social support, general health, Stress and SOC by total sample and Depression.

Variable		Total sample		Depression				
				With Depressive Symptoms		Without Depression		
		n	%	N	%	n	%	p-value*
Gender	Man	36	18,4	6	16,7	30	83,3	0,591
	Woman	160	81,6	33	20,6	127	79,4	
Age	60 to 64	64	33,3	12	18,8	52	81,2	0,817
	65 to 69	58	30,2	13	22,4	45	77,6	
	70 to 74	38	19,8	6	15,8	32	84,2	
	75 or more	32	16,7	5	15,6	27	84,4	
Income	0 to 1	30	15,2	8	26,7	22	73,3	**0,047**
	1,1 to 2	50	25,4	14	28	36	72	
	2,1 to 3	36	18,3	4	11,1	32	88,9	
	3,1 to 4	41	20,8	9	22	32	78	
	More than 4	40	20,3	3	7,5	37	92,5	
Social Support	Little support	93	46,5	24	25,8	69	74,2	0,165
	Plenty support	107	53,5	15	14	92	86	
General Health	Good	103	51,5	20	19,4	83	80,6	**0,817**
	Very good/excellent	55	27,5	3	5,5	52	94,5	
	Reasonable/terrible	42	21	16	38,1	26	61,9	
Stress	Many stressors	100	50	26	26	74	74	**0,019**
	Few stressors	100	50	13	13	87	87	
SOC	Low use of SOC	92	46	24	26,1	68	73,9	**0,03**
	High use of SOC	108	54	15	13,9	93	86,1	

* Obtained with Pearson's Chi-square test (χ^2)

In logistic regression, it was observed that the variables that had statistically significant association with depression were: self-perceived health (p-value = 0.025), stress

(p-value = 0.017) and SOC (p-value = 0.014). The prerequisite of absence of multicollinearity was met, since the tolerance values are greater than 0.1 and the VIF (variance inflation factors) less than 10. Moreover, within each category of independent variables, there were a minimum of 50 cases, which allowed the analysis of Logistic Regression. The adjustment quality tests are all higher than the 0.05 significance level, which indicates that there is not enough evidence to conclude that the model does not adjust to the data.

It was observed that the chances of the elderly who faced many stressors presented depression were 2.5 times higher than the chances of those who faced few stressors (see table 2). That is, the more stressors the individual faces, the higher the chance of having depression. Regarding the use of SOC resources, the chances of the elderly who presented low use of SOC resources to present depression was 2.46 times higher than in elderly who present high use of these resources.

Table 2 - Odds Ratio in relation to Depression

Odds Ratio for Category Predictors			
Level A	Level B	Odds Ratio	CI of 95%
Stress			
Few Stressors	Many Stressors	2,4566	(1,1559; 5,2209)
SOC			
High Use of SOC	Low Use of SOC	2,4609	(1,1829; 5,1196)

Discussion

This study investigated the relation between depression and SOC resources, as well as the effect of these resources in the relation between stress and depression. The association between SOC and depression in the elderly has been confirmed. Elderly people who made greater use of SOC resources were twice less likely to experience depression as those who made little use of these resources. Some studies have provided evidence that using SOC strategies can promote greater feelings of happiness and well-being (Kelly, Fausset, Rogers, & Fisk, 2014; Teshale & Lachman, 2016; Wurm, Warner, Ziegelmann, Wolff, & Schüz, 2013), and have the potential to decrease the impact of chronic pain in the elderly (Alonso-Fernández, López-López, Losada, González, & Wetherell, 2016). These factors have a major impact on the emotional state of the elderly, which indicates the relevance of considering the

SOC model in research on emotional state and depression in the elderly population. Additionally, self-regulation through SOC can also promote greater capacity to confront diseases as shown by other studies (Carpentieri et al., 2017; Haug, Danbolt, Kvigne, & DeMarinis, 2016; Hutchinson & Nimrod, 2012; Warner et al., 2017; Yuen & Vogtle, 2016), which demarcates the relevance in facing experienced stressors and depression.

An unprecedented result obtained in this study refers to the role of SOC as an effect modifier in the relationship between stress and depression. This finding supports the Life-Span theory assumptions regarding the SOC model, which is considered to be a mechanism capable of improving the functioning, maintenance of the current performance or the attainment of what is desired by the elderly, even when facing losses experienced in old age (Baltes & Baltes, 1990). In this way, with the use of resources, such as the SOC, the elderly becomes more adapted and able to face normative stressors, such as declines or health losses (Shang et al., 2015; Kahana, Kahana, & Lee, 2012; Neri, 2006).

The level of stress faced by the individual is an important factor in triggering depression (Paulino, Prezotto, & Calixto, 2015; Sousa et al., 201710). The stressing events investigated in this study, and which were associated with depression, involved normative factors of the course of life, such as retirement and loss of parents, and non-normative factors, such as the loss of a child. The presence of life-long stressing events, associated with advanced age and low social support were considered as predictors for depression in other studies (Almeida et al., 2015; Paulino et al., 2015). Stress is recognized as one of the main reasons that predispose the elderly to depression, so that most cases are triggered by stressful situations, especially those of psychosocial origin (Almeida et al., 2015; Paulino et al., 2015).

According to the stress paradigm (Kahana, Kahana, & Lee, 2014), with increasing age, there is an accumulation of normative factors of social and health-related stress. Without these stressors, there would be no need to distinguish successful aging from successful living at any age. In light of this recognition of the inevitability of age-related stressors, most elderly face aging-related stress factors, such as declines or health losses. This reality brings the need to confront and adapt to these changes and stressors, always seeking to achieve or maintain positive results towards quality of life (Shang et al., 2015, Kahana, Kahana, & Lee, 2012). In this way, the maintenance of quality of life is possible to the extent that the elderly can resort to coping strategies.

Several studies regarding aging (Schaie, 1983; Rudinge and Thomae, 1990, Rudinger and Rietz, 2001; Schaie and Hofer, 2001; Baltes and Mayer, 1999) have shown that transition situations, experienced with different variations of stress, can prove to be an opportunity for

personal development, changing the effects on psychological well-being and health of individuals according to the interference of several variables. In other words, the life events and transitions resulting from them are important for understanding the factors involved in psychological development (Fonseca, 2007). In addition, there is the impact of non-normative events, which is enhanced by the experience of lack of control, and with the aging, the possibilities of living with negative events increase. However, the greater the sense of control over the event, the less chance there is of developing problems of adaptation, such as social isolation, somatic diseases, dependence, and depressive symptoms (Neri, 2006). Therefore, the modifying effect of SOC resources on the relationship between stress and depression in the elderly reinforces the relevance of stimulating intervention and prevention programs in mental health, and studies have shown that the insertion of these strategies can help promote well-being, decrease depressive symptoms, improve the ability to cope with diseases and self-image (Riedel, Müller, & Ebener, 2015; Rozario, Kidahashi, & DeRienzis, 2011; Schmitt, Zacher, & Frese, 2012; Unson & Richardson, 2013).

Although literature shows that having little or no contact with friends, neighbors or relatives, dissatisfaction with the social support received, spending too much time alone, feeling lonely and disagreements in personal relationships is associated with greater risk of depression, this study found no significant relationship between social support and depression (Almeida et al., 2015). This result may have occurred due to the profile of the sample, which is composed of elderly people who attended collective activities such as city gyms, recreational groups and clubs. Thus, they are more active seniors and probably with more social ties.

On the other hand, previous studies on depression and associated factors did not include the SOC in the analyses, and these resources can function as mechanisms to face adverse events on depression. Thus, we can consider this absence as a limitation of previous studies that investigated only the socio-demographic variables on depression (Almeida et al., 2015; Hajjar, Nardelli, Gaudenci, & Santos, 2018; Paulino et al., 2015; Sousa et al., 2017).

The sample size and profile imply limitations of the present study. Since this is an unprecedented study, the fact that there are no previous studies for comparison is a limitation of the present study. Therefore, further studies are necessary to broaden and strengthen understanding of the use of SOC resources in old age. In addition, sample expansion would be important to test the proposed SOC model as an effect modifier for depression. It is also necessary to include objective physical health measures, as it is recognized that pathologies are a determinant of mental health in the elderly.

Final considerations

The present study pointed out that SOC resources have a modifying effect on the relation between stress and depression. The relation between SOC and depression is still little studied, being a pioneer the research carried out in this study.

The relation between stress and depression was significant and the use of SOC resources can be understood as a way to regulate the consequences of stressors faced throughout life. Therefore, the use of resources is a way to mitigate damage, optimize what is possible and adapt to changes.

It is considered that the understanding and application of the use of SOC strategies can be of great relevance in the treatment and prevention of depression in the elderly. Thus, it is suggested that future investigations continue the study of the effects of SOC resources and their implications on the emotional state of the elderly.

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