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Moderating Executive Functions in the Relationship Between Anxiety and Depression Symptoms and Response to Drug Therapy

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ABSTRACT

Background: Poor executive functions are potentially risky for psychopathology and can reduce response to treatment. This study aimed to investigate the moderating role of executive functions in the relationship between anxiety and depression symptoms and response to drug therapy.

Methods: The correlation method was used in this study. The statistical population was adult outpatients with anxiety disorders and depression who referred to psychiatric clinics of Bojnourd city. One hundred and sixty-four participants completed the Outcome Questionnaire, Brief Symptom Inventory, and Behavior Rating Inventory of Executive Function.

Results: The findings showed that problems of executive functions and anxiety and depression symptoms predicted weak response to treatment (P<0.0001). The results of moderating regression analysis showed that problems of executive functions significantly moderate the relationship of anxiety symptoms and response to treatment (P<0.0001), while they do not significantly moderate the relationship between depression symptoms and response to treatment (P>0.05). The results further showed that a longer course of disease and the comorbidity of depression and anxiety reduce the response to treatment (P<0.05).

Conclusion: Poor performance in executive functions, a longer course of disease, and the comorbidity of anxiety and depression disorders can reduce the response to treatment in patients.

Introduction

Executive functions include inhibitory control, working memory, and cognitive flexibility, which enable an individual to think before acting, resist temptation and impulsive reactions, concentrate, solve problems, show flexible compatibility to needed changes, and adopt a new and different viewpoint. These skills are critical for success in various aspects of life and are sometimes more predictive of intelligence and socioeconomic status [1]. Poor executive functions are potentially risky for psychopathology [2]. The longitudinal study of risky cognitive control mechanisms for internalization disorders can help advance our understanding of their etiology and treatment. Studies have shown that internalization problems are related to problems of executive function [3].

Previous studies have confirmed that high levels of anxiety and depression are related to impaired executive functions [4-8]. The amount of impairment in executive functions is strongly related to the severity of anxiety and depression symptoms [9 , 10].

Considering the relationship between anxiety and depression with executive functions, it is important to investigate the moderating effect of executive function on response to treatment in people with anxiety and depression disorders. Studies have shown that deficits in neuropsychological functions, such as visual-perceptual

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memory and organizational strategy [11] and poor emotional control [12], predicted a weaker response to treatment. Studies have also shown that among depressed individuals who received antidepressants, executive dysfunctions were associated with poor response to treatment and increased relapse [13]. Several studies have reported a positive relationship between executive function and response to cognitive-behavioral therapy and symptom reduction in both adults with substance abuse [14] and adults with obsessive-compulsive disorder [15].

On the other hand, some studies have shown that better executive function is negatively associated with response to treatment; that is, a poor performance in cognitive flexibility has been associated with a better response to therapy [16]. Yet other studies have found that pre-treatment executive functions were not significantly associated with the response to antidepressant drug therapy [17]. Some studies have also shown that pre-treatment executive function had a weak correlation with response to treatment in adults with obsessive-compulsive disorder [18], adults with a generalized anxiety disorder [19], and adolescents with attention-deficit/hyperactivity disorder [20].

Given the contradictory findings of the role of executive functions in predicting response to treatment, it is necessary to investigate the relationship between executive functions and treatment outcome. Previous studies have not examined the moderating role of executive functions in the relationship between anxiety and depression symptoms and response to treatment. Therefore, the current study investigated the moderating role of executive function in the relationship between anxiety and depression symptoms and response to treatment among adults with depression and anxiety.

Methods

The method of this study was descriptive-correlation. The statistical population included all adult outpatients with anxiety and depression disorders who were referred to psychiatric clinics in Bojnourd city in the spring and summer of 2019.

Convenient sampling was used to select participants from among the clients of psychiatric clinics who received the diagnosis of anxiety and depression disorders and volunteered to participate in the study. The sample size was selected based on the research method. Thus, in multiple correlations, the number of predictor variables must be added to 104 ($N \geq 3+104$). To reduce the effect of sample loss and increase the power of the test, 180 subjects were considered for the study. According to Gpower3.1 software, the power of this study and alpha level was 0.99 and 0.01, respectively.

Procedure

Individuals who had been diagnosed with anxiety and depressive disorders by psychiatrists, were consuming medication for at least one month, and were inclined to participate in the study were considered as a sample. Inclusion criteria included receiving a diagnosis of an anxiety and depression disorder, aged over 18 years, and taking medication prescribed by psychiatrists for at least one month. Exclusion criteria included having psychotic disorders, substance abuse disorder, aged under 18 years, and absence from treatment.

For ethical reasons, participants completed a consent form to participate in the study and were assured that their information would remain confidential. This study was approved by the Department of Psychology at the University of Bojnourd with code 13180899 and Clinical Trials with code NCT04603170. Participants were asked to complete the outcome questionnaire, brief symptom inventory, and behavior rating inventory of executive function.

Tools

Outcome questionnaire: The outcome questionnaire was designed to assess response to treatment. This questionnaire had the dimensions of mental distress or signs of distress, interpersonal relationships, and social role. This 45-item questionnaire is answered on a 5-point Likert scale (not at all to perfectly). A high score is an indicator of a weak response to treatment. The test-retest reliability coefficients for the dimensions were in the range of 0.78 to 0.82, and the whole questionnaire was 0.84. The internal consistency coefficient for the dimensions ranged from 0.71 to 0.91, and for the whole questionnaire was 0.93 [21]. The outcome questionnaire was translated into Persian by the researchers of this study, and its reverse translation was reviewed and approved. The Cronbach's alpha coefficient in a pilot study was 0.71. The participants responded with the Persian version of the outcome questionnaires.

Brief symptom inventory: This inventory is a short version of the SCL-R-90 that measured the symptoms of psycho-somatization, obsessive-compulsive, interpersonal sensitivity, paranoid thoughts, depression, psychosis, general anxiety, hostility, and anxiety. This inventory consists of 53 items scored on a 5-point Likert scale ranging from 0 to 4 (not at all to extremely). The internal consistency reliability of the subscales was in the range of 0.71 to 0.85, and the test-retest reliability was in the range of 0.68 to 0.91 [22]. In Iran, the retest reliability of the subscales was in the range of 0.62 to 0.87, and Cronbach's coefficients were in the range of 0.62 to 0.85. Correlation coefficients between SCL-R-90 and the brief symptom inventory were reported to be in the range of 0.48 to 0.98 [23]. This study used anxiety and depression subscales.

Behavior Rating Inventory of Executive Function (BRIEF): This questionnaire is used to measure the executive functions of adults aged 18 to 90 on their daily performance in the natural environment. It has 75 items that measure factors including response inhibition, shifting, emotional control, self-monitoring, initiation, working memory, planning, material organization, and task monitoring. A high score is an indicator of weak executive functions. Cronbach's alpha coefficient was reported for the scales in the range of 0.73 to 0.90 and 0.96 for the total index. The test-retest reliability with an interval of 4 weeks was obtained for the scales in the range of 0.82 to 0.93 and for the total index, 0.94.

The reliability of the raters was reported for the scales in the range of 0.44 to 0.68 and for the total index as 0.63 [24]. This questionnaire was translated in Iran by Mani et al. [25], and its Cronbach's alpha of the subscales were reported in the range of 0.65 to 0.83.

Results

Sixteen incomplete questionnaires were removed, and the data of 164 participants was analyzed by SPSS 22V. Pearson's correlation and moderating regression analysis were used to investigate the moderating role of executive functions in the relationship between anxiety and depression symptoms and response to treatment. Given that both the independent variable and the moderator variable were of the distance scale type, Hayes regression [26] was used.

Demographic findings showed that participant age range was 18 to 53 years with a mean of 30 years and a standard deviation of 7.91. Among 164 patients, 40 were men and 124 were women. Of the participants, 17.1% (28 people) had a middle or high school education, 43.9% (72 people) had a diploma, and 39% (64 people) had a bachelor's degree or higher. Eighty-eight participants (53.7%) had anxiety disorders, 48 participants (29.3%) had depression, and 17.1% had both anxiety and depression disorders. In terms of duration of illness, 32 participants had been affected by anxiety disorders and depression for 1 to 6 months, 36 participants for 6 to 12 months, and 96 participants for more than one year.

To perform Pearson correlation and regression analysis, the data must have a normal distribution. The results of the Kolmogorov-Smirnov test showed that the distribution of variables was normal (P>0.05).

Table 1 shows that the score of anxiety and depression symptoms is significantly related to executive functions and response to treatment. In other words, with increases in the severity of anxiety and depression symptoms, the rate of executive functions becomes weaker. The results also showed that executive functions are significantly correlated with response to treatment, which means a poor response to treatment is associated with weaker executive functions.

As Table 2 shows, response to treatment (R^2=0.54) is strongly predicted by executive functions (P<0.0001). Table 2 also shows that executive functions significantly moderate the relationship between anxiety symptoms and dimensions of response to treatment (P<0.0001).

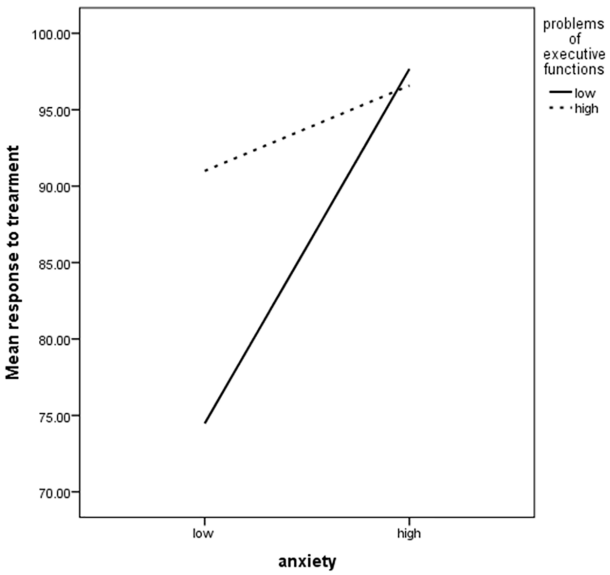

Figure 1: Moderation role of executive functions in relationship between anxiety symptoms and response to treatment

Executive functions significantly moderate response to treatment (ΔR^2=0.08). These results suggest that problems of executive function decrease the response to treatment.

To show this moderating effect, participants were divided into two groups of higher and lower based on deviation from the mean in two variables of anxiety symptoms and executive functions. Then the means of the groups in the response-to-treatment variable were calculated. Figure 1 shows how the poor performance of participants in executive functions can impair response to treatment.

Table 3 shows that executive functions and depression symptoms significantly predicted response to treatment (R^2=0.46) (P<0.0001). Table 2 also shows that although executive functions moderate the relationship between depressive symptoms and response to treatment, this moderating role is not significant (P>0.05). Figure 2 shows that problems of executive function alongside depression symptoms weaken response to treatment.

As the duration of disease was an ordinal variable, analysis of variance was used to evaluate the moderating effect of this factor. As Table 4 shows, duration of disease can significantly affect response to treatment, which means a longer course of disease decreases response to treatment.

As disorder type was an ordinal variable, analysis of variance was used to investigate its moderating effect.

Table 1: Mean and standard deviation of variables and correlations among them

Variables	Mean±SD	Anxiety symptoms	Depression symptoms	Executive functions
Anxiety symptoms	11.17±8.30	1	0.66**	0.54**
Depression symptoms	10.60±6.80	0.66**	1	0.57**
Executive functions	127.17±23.29	0.54**	0.57**	1
Response to treatment	85.95±16.06	0.55**	0.67**	0.45**

Table 2: Moderation role of executive functions in the relationship between anxiety symptoms and response to treatment

	Indexes of Hayes regression		Anxiety	Executive functions	Interaction of anxiety and executive functions
Dependent variables	R^2 (F)	R^2 change(F)	Coefficient(t)	Coefficient(t)	Coefficient(t)
Response to treatment	0.41 (37.72**)	0.08 (20.88**)	4.18 (5.61**)	0.35 (5.33**)	-0.022 (-4.57**)

**P<0.01; *P<0.05

Table 3: Moderation role of executive functions in the relationship between depression symptoms and response to treatment

	Indexes of Hayes regression		Depression	Executive functions	Interaction of depression and executive functions
Dependent variables	**R^2 (F)**	**R^2 change (F)**	**Coefficient (t)**	**Coefficient (t)**	**Coefficient (t)**
Response to treatment	0.46 (45.80**)	0.009 (2.63)	2.62 (3.48**)	0.18 (2.19*)	-0.009 (-1.62)

**P<0.01; *P<0.05

Table 4: Moderating role of disease course

Group	Mean of response to treatment	SD	F	P
1 to 6 months	80.50	14.24	3.20	0.04
6 to 12 months	84.33	16.06		
More than 1 year	88.37	16.26		

Table 5: Moderating role of disease type

Group	Mean of response to treatment	SD	F	P
Anxious individual	83.63	15.73	11.85	0.0001
Depression individual	82.83	17.42		
Individuals with both anxiety and depression	98.57	5.57		

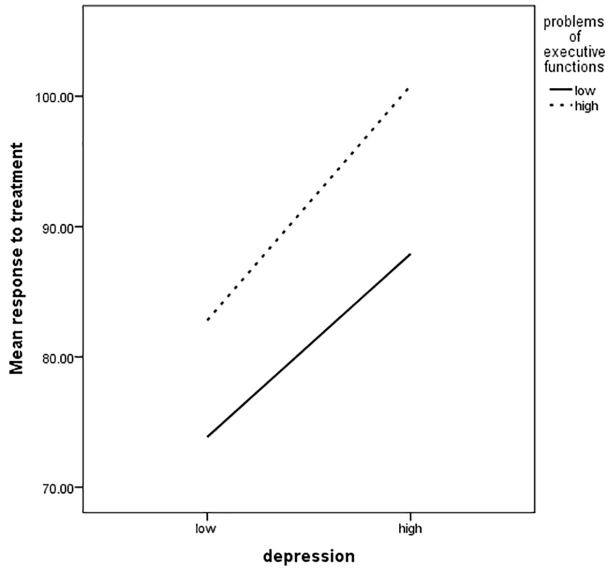

Figure 2: Moderation role of executive functions in the relationship between depression symptoms and response to treatment

As Table 5 shows, disorder type can significantly affect response to treatment, which means that the presence of both depression and anxiety disorders decreases the response to treatment.

Discussion

This study investigated the moderating role of executive functions in the relationship between the severity of anxiety and depression symptoms and response to drug treatment in depressed and anxious patients. The results showed that executive functions were significantly correlated with anxiety and depression symptoms.

This finding is consistent with those of studies reporting that people with high levels of anxiety and depression have impaired executive functions [4-8].

Because anxious individuals experience high levels of stress and threats, their executive functions can be disrupted. Studies have shown that even mild stress affects the frontal cortex by increasing dopamine [27]. The norepinephrine system in the frontal cortex when people are stressed can play a role in frontal dysfunction [28]. In response to stress, the adrenal cortex releases cortisol, which has a profound effect on the prefrontal cortex. In addition, stress disrupts the functional link between the frontal cortex and other areas of the brain [29].

Studies on executive dysfunction in depressed people have also shown that people in a sad mood have worse attention control [8], inhibition and working memory [6], and mental flexibility [30].

The current study showed that executive dysfunctions decrease the response to poor treatment. Numerous studies have shown that deficits in executive functions predict a weaker response to treatment [11, 12, 15]. People who perform poorly executive functions such as response inhibition, shifting, working memory, emotion regulation, organization, and planning also seem to have less ability to continue treatment and apply medical prescriptions and recommendations, which in turn weakens the response to treatment.

This study further showed that executive functions significantly moderated the relationship between anxiety symptoms and dimensions of response to treatment. These results suggest that problems in executive dysfunctions decrease the response to treatment. Based on the results of the current study, it can be concluded that people with strong executive functions during psychological stress can use their cognitive abilities to benefit from treatment. Studies have shown that executive dysfunction in mood disorders leads to a worse prognosis, and the presence of cognitive impairments are correlated with chronic disease [31].

The current results also revealed that executive function did not moderate relationship depression or response to treatment. Some studies have indicated that depressed individuals without psychotic symptoms have a mild performance on executive functions [32]. Explaining this finding, it can be said that because depressed people, unlike anxious people, do not have sufficient motivation for treatment and do not take the symptoms of the disease seriously, properly performing executive functions does not much help improve the response to treatment.

The results of the current study showed that the longer

the course of the disease is, the weaker the response to treatment will be. In explaining this finding, several possibilities are raised. First, patients with a long course of disease have not been able to use their cognitive capabilities to cope with their disease due to poor cognitive mechanisms. Second, these patients have regained some of their cognitive abilities due to the chronicity of the disease. Third, these patients are caught in a vicious cycle in which anxiety and depression symptoms reduce the possibility of effective use of cognitive mechanisms, and by not using these cognitive mechanisms effectively, anxiety and depression symptoms do not improve and response to treatment is weakened.

This study also showed that the comorbidity of depression and anxiety disorders weakens the response to treatment. It can be stated that the comorbidity of symptoms of depression and anxiety disorders can put additional stress on patients, thus reducing the possibility of effective use of cognitive and executive mechanisms to follow medical advice, so the response to treatment weakens.

These studies had several limitations. First, in this study, the type of medication used, the level of stress, and the demographic characteristics of the participants were not controlled. These variables can affect the results of the study. Second, the study method was correlation, and the effects of cause and effect cannot be deduced. Third, the data collection tools were questionnaires, so participants' responses could be with bias; moreover, participants' disorder diagnoses were based solely on psychiatrists' clinical judgment and interviews with participants.

Given those limitations of the study, it is recommended that in future research, the type of drug used, stress levels, and demographic characteristics of the sample be controlled, and credible interviews and tools should be used to diagnose the types of disorder.

Conclusion

This study investigated the moderating role of executive functions in the relationship between anxiety and depression symptoms and response to treatment among patients with anxiety and depression. The findings showed that poor executive function can impair the response to treatment in anxious patients. Particularly in low levels of anxiety symptoms, strong executive functions can increase response to treatment. The present study also showed that the chronicity and comorbidity of depression and anxiety disorders reduce the response to treatment.

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References

1. Diamond A, Ling DS.Conclusions about interventions, programs, and approaches for improving executive functions that appear justified and those that, despite much hype, do not. Dev Cogn Neurosci 2016; 18: 34–48. http://dx.doi.org/10.1016/j.dcn.2015.11.005
2. Abela JRZ, Hankin BL.Rumination as a vulnerability factor to depression during the transition from early to middle adolescence: a multi-wave longitudinal study. J. Abnorm. Psychol.2011; 120:259–271.doi:10.1037/a0022796
3. Han G, Helm J, Cornelia Iucha C, Zahn-Waxler C, Hastings PD, Klimes-Dougan B. are executive functioning deficits concurrently and predictively associated with depressive and anxiety symptoms in adolescents? J Clin Child Adolesc Psychol. 2016; 45(1): 44–58. doi:10.1080/15374416.2015.1041592
4. Ajilchi B, Nejati V. Executive Functions in Students with Depression, Anxiety, and Stress Symptoms. Basic Clin Neurosci, 2017; 8(3): 223-232. https://doi.org/10.18869/nirp.bcn.8.3.223
5. Visu-Petra L, Miclea M, Visu-Petra G. (2013). Individual differences in anxiety and executive functioning: A multidimensional view. Int J Psychol, 48(4), 649– 659. DOI: 10.1080/00207594.2012.656132
6. Alves M, Yamamoto T, Arias-Carrion O, Rocha N, Nardi A, Machado S, et al. Executive function impairments in patients with depression. CNS Neurol Disord Drug Targets 2014; 13(6): 1026-40. DOI: 10.2174/18715273136661406 12102321
7. Brooks BL, Iverson GL, Sherman EMS, Roberge MC. Identifying cognitive problems in children and adolescents with depression using computerized neuropsychological testing. Appl Neuropsychol 2010; 17(1): 37–43. DOI: 10.1080/09084280903526083
8. Ajilchi B, Ahadi H, Nejati V. Delavar A. Executive Functions in Depressed and non-depressed Individuals. Journal of Clinical Psychology, 2013; 5(2): 77-88. DOI: 10.22075/jcp.2017.2129
9. Bredemeier K. Attention and executive functioning deficits associated with dimensions of anxiety and depression [Ph.D. thesis]. Champaign: the University of Illinois at Urbana-Champaign. 2012
10. Holler K, Kavanaugh B, Cook NE. Executive functioning in adolescent depressive disorders. J Child Fam Stud 2013;23(8): 1315–24. DOI: 10.1007/s10826-013-9789-z
11. Flessner CA, Allgair A, Garcia A, Freeman J, Sapyta J, Franklin M E, et al. The impact of neuropsychological functioning on treatment outcome in pediatric obsessive-compulsive disorder. Depress Anxiety 2010; 27(4): 365–371. doi:10.1002/da.20626
12. McNamara JP, Reid AM, Balkhi AM, Bussing R, Storch EA, Murphy TK, et al. Self-regulation and other executive functions relationship to pediatric OCD severity and treatment outcome. J Psychopathol Behav Assess 2014; 36(3): 432-442.
13. Story TJ, Potter GG, Attix DK, Welsh-Bohmer KA, Steffens DC. Neurocognitive correlates of response to treatment in late-life depression. Am J Geriatr Psychiatry. 2008 Sep 1;16(9):752-9.
14. Blume AW, Marlatt GA. The role of executive cognitive functions in changing substance use: What we know and what we need to know. Ann Behav Med 2009; 37(2): 117–125. doi:10.1007/s12160-009-9093-8
15. D'Alcante CC, Diniz JB, Fossaluza V, Batistuzzo MC, Lopes AC, Shavitt RG, et al. Neuropsychological predictors of response to randomized treatment in obsessive-compulsive disorder. Prog Neuropsychopharmacol Biol Psychiatry 2012; 39(2):310–317. doi:10.1016/j.pnpbp.2012.07.002
16. Goodkind M, Gallagher-Thompson D, Thompson L, Kesler S, Anker L, Flournoy J, et al. The Impact of Executive Function on Response to Cognitive Behavioral Therapy in Late-Life Depression. Int J Geriatr Psychiatry 2015; 31(4): 334-339.
17. Godovich SA, Senior CJ, Degnan KA, Cummings C, Shiffrin N D, Alvord MK, Et al.The Role of Executive Functioning in Treatment Outcome for Child Anxiety. Evid Based Pract Child Adolesc Ment Health 2020; 5(1): 53-66, DOI: 10.1080/23794925.2020.1727794
18. Moritz S, Kloss M, Jacobsen D, Fricke S, Cuttler C, Brassen S, et al. Neurocognitive impairment does not predict treatment outcome in obsessive-compulsive disorder. Behav Res Ther 2005; 43(6): 811–819. doi:10.1016/j.brat.2004.06.012
19. Mohlman J. Executive skills in older adults with GAD: Relations with clinical variables and CBT outcome. J Anxiety Disord 2013;27(1): 131–139. doi:10.1016/J.JANXDIS.2012.12.001

20. Molitor SJ. Executive Functions as Moderators of Response to Behavioral Interventions for Adolescents with Attention-Deficit/ Hyperactivity Disorder. degree of Doctor of Ph.D., Virginia Commonwealth University. 2019 https://scholarscompass.vcu.edu/etd/5927
21. Limbert MJ, Burlingame GM, Umphress V, Hansen NB, Vermeersch DA, Clouse GC, et al. The reliability and validity of the outcome questionnaire. Clin Psychol Psychother 1996; 3(4): 249-258.
22. Derogatis LR. BSI Brief Symptom Inventory. Administration, Scoring, and Procedures Manual (4th Ed.). Minneapolis, MN: National Computer Systems. 1993
23. Akhavan Abiri F, Shairi M. Validity and Reliability of Symptom Checklist-90-Revised (SCL-90-R) and Brief Symptom Inventory-53 (BSI-53). Clin Psycho Person 2020; 17(2): 169-195. (Persian) http://cpap.shahed.ac.ir/article_2916.html?lang=en
24. Roth RM, Isquith PK, Gioia GA. BRIEF—A: Behavior Rating Inventory of Executive Function— Adult Version. Psychological Assessment Resources, Lutz, FL. 2005
25. Mani A, Ghelijkhani S, Haghighat R, Ahmadzadeh L, Chohedri E, et al. Validity and Reliability of the Persian Version of the Self-Report Form of Behavior Rating Inventory of Executive Function-Adult version (BRIEF-A), Shiraz E-Med J. 2018; 19(2):e14295. DOI: 10.5812/semj.14295.
26. Hayes AF. Documentation is available in Hayes (2018). www.guilford.com/p/hayes3
27. Cerqueira JJ, Mailliet F, Almeida OF, Jay TM, Sousa N. The prefrontal cortex as a key target of the maladaptive response to stress. J. Neurosci 2007; 27:2781–2787, http://dx.doi.org/10.1523/JNEUROSCI.4372-06.2007.
28. Birnbaum S, Gobeske KT, Auerbach J, Taylor JR, Arnsten AFT. A role for norepinephrine in stress-induced cognitive deficits: alpha-1-adrenoceptor mediation in the prefrontal cortex. Biol. Psychiatry 1999; 46: 1266–1274, http://dx.doi.org/10.1016/S0006-3223(99)00138-9.
29. Liston C, McEwen BS, Casey BJ. Psychosocial stress reversibly disrupts prefrontal processing and attentional control. Proc. Nat. Acad. Sci. 2009; 106: 912–917.
30. Ashby F, Isen A, Turken A. A neuropsychological theory of positive affect and its influence on cognition. Psychol. Rev 1999; 106: 529–550, http://dx.doi.org/10.1037/0033-295X.106.3.529.
31. Morphy FC, Rubinzstein J, Michel A, Rogers RD, Robbins TW, Paykel ES, et al. Decision-making Cognition in Mania and Depression. Psychol Med. 2001; (31): 679-693. 1238-1243.
32. Basso MR, Bornstein RA, Carona F, Morton R. Depression accounts for executive function deficits in obsessive-compulsive disorder. Cogn Behav Neurol 2001 Oct 1;l4(4):241-5.