Boredom Proneness and Exercise Behavior: The Mediating Effect of Expression Suppression

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Abstract: The aims of this study were to assess the influence of boredom proneness on exercise behavior and verify the mediating effect of expression suppression between both of the above. Multidimensional state boredom scale (MSBS), expression suppression scale (ESS) and physical activity rating scale (PARS-3) was used as measure tools to investigate 2052 college students. Boredom proneness were ubiquitous among them. Expression suppression in emotion regulation strategies was seldom stimulated to cope with stress events. The exercise behaviors' characteristics mainly demonstrated “medium & short duration”, “low intensity”, “small frequency”, et al.. The gender differences were significant in exercise intensity and frequency (males' were significantly higher than females'). Regressions of boredom proneness and the expression suppression to each index of exercise behaviors were significantly negative influence respectively (p<0.001); Expression suppression acted on partial mediating effect between boredom proneness and each index of exercise behaviors. And, gender was significant difference in the chain of the boredom proneness's influences on exercise intensity and frequency. It may be an effective strategy to improve the exercise behaviors by improving the subjective cognition of exercise and alleviating the regulation strategy of expression suppression.

1 Introduction

Boredom is an individual negative psychological state that is lack of interest and motivation [1-2]. In initial period of psychology, it is regarded as one dimension of burnout; With the development of psychology, boredom, as an independent concept, generally is defined to be composite state as affective characterized by indifference, helplessness, loneliness, depression and unpleasant feelings when individuals in low stimulation of inside or outside [3].

Previous studies also found that expression suppression strategy plays a mediating effect role in the influence chain of boredom proneness and social behaviors. It is a negative regulation strategy for people to suppress the emotional expression that is about to happen or is happening [4]. The researches show that boredom leads to a lack of interest and motivation in behavioral activities and tends to regulate emotional response by suppressing emotional expression [5-6]. The use rate of emotion regulation strategy can reflect the cognition and behavior of exercise. When individuals face exercise stress events, compared with cognitive reappraisal strategies, expression suppression often leads to self-suppression, social withdrawal and other negative effects and restricts exercise participation behaviors [7].

It is true that the researches about psychological mechanism of exercise behaviors seldom focus on the negative psychological characteristics. Although it has been confirmed that there are gender differences in exercise behaviors [8], it has not been proved whether there is the same characteristic in the influence chain of boredom proneness, expression suppression and exercise behavior. Based on this, this study reveals the influence of boredom proneness and expression suppression on exercise behavior of college students through empirical research.

2 Methods

2.1 Participants and Procedure

A total of 2052 students (961 males, 1091 females, M_{age}=20.64 years, SD_{age}=2.255 years) from twelve colleges in Shanghai, Jiangsu and Zhejiang province China took part in the questionnaire survey in the spring of 2019. Five cities were sampled from the two provinces above; Two colleges were sampled from each city (five cities and Shanghai).

According to the principles of stratified cluster sampling and convenient sampling, data was collected from each class at the same time and place. The paper questionnaire took participant about 5 minutes to complete and were withdrawn immediately after finished it on the spot. All participants gave informed consent and received an oral explanation about questionnaire before proceeding to data collection.

2.2 Measures

Multidimensional state boredom scale (MSBS). The MSBS [9] is a 24-item questionnaire, with responses ranging from 1 = “Extremely disagree” to 7 = “Extremely agree”, measuring levels of boredom. Responses were summed to form a total score. Confirmatory factor analysis demonstrated: x^2/df=2.341, *GFI*=0.918, *NFI*=0.902, *NNFI*=0.917, *RMSEA*=0.051. Cronbach's alpha coefficient is 0.936; Split-half reliability coefficient in the study is 0.885.

Expression suppression scale (ESS). The 4-item ESS [6] inquired about one's frequency of using expression suppression, with response options from 1 = “Never” to 7 = “Very often”. Responses were summed to form a total score. Cronbach's alpha coefficient is 0.899; Split-half reliability coefficient is 0.875.

physical activity rating scale (PARS-3). The PARS-3 [10] consists of 3 aspects (intensity, duration and frequency) measuring one's amount of exercise as assessment indexes of physical exercise. The amount of exercise equals the product of exercise intensity, duration and frequency. The indexes of exercise intensity and frequency range from 1 to 5 and duration from 0 to 4. Cronbach's alpha coefficient is 0.909; Split-half reliability coefficient is 0.918.

2.3 Analysis Strategy

Data analysis was performed by IBM SPSS (IBM Corp) 24 and IBM AMOS (IBM Corp) 24 software. The former was used to analyze correlation and regression; The latter was used to construct and verify model.

3 Results

3.1 Descriptive Statistics and T-test

Descriptive data (table 1) presents that: the mean score (98.93) of boredom proneness was higher than its theoretical one; The mean score (10.02) of expression suppression was lower than its theoretical one; The mean score (3.03) of exercise duration of male was higher than its theoretical one; The mean scores of exercise intensity and frequency were lower than its theoretical one. Multiple comparisons results show gender was significant difference in exercise intensity and frequency (P<0.05).

Table 1. Means, standard deviations and t-test for gender

Variable	Male		Female		Total		Levene-test		*T*-test		
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	*P*	*T*	*df*	*P*
BP	96.84	49.891	101.91	44.669	98.93	47.115	2.533	.119	-1.291	2050	.197

ES	10.02	2.460	10.30	2.465	10.17	2.464	.447	.504	-1.050	2050	.294
Intensity	2.79	2.104	2.23	1.964	2.39	2.020	.670	.403	2.557	2050	.011*
Duration	3.03	1.025	2.68	1.010	2.79	1.018	.636	.426	1.594	2050	.112
Frequency	2.57	1.065	1.97	1.987	2.15	1.626	.613	.434	2.706	2050	.007**

Note. BP=boredom proneness; ES=expression suppression.
** $p<0.01$, * $p<0.05$.

3.2 Correlations

Correlation analysis demonstrates in table 2: both of boredom proneness and expression suppression were significantly negatively correlated with each index of exercise behavior ($p<0.01$). Gender was only significantly negatively related with exercise intensity ($r=-0.127$) and frequency ($r=-0.134$). boredom proneness ($r=-0.674$) and expression ($r=-0.412$) were highly negatively associated with exercise frequency.

Table 2. Correlations for BP, ES and exercise behavior

Variable	BP	ES	Intensity	Duration	Frequency	Gender
BP	1					
ES	.505**	1				
Intensity	-.552**	-.366**	1			
Duration	-.541**	-.392**	.727**	1		
Frequency	-.674**	-.412**	.790**	.787**	1	
Gender	.065	.052	-.127*	-.080	-.134**	1

Note. BP= boredom proneness; ES=expression suppression.
** $p<0.01$, * $p<0.05$ (two-tailed).

3.3 The Mediating Effect

Through one-dimensional linear regressions analysis, with boredom proneness, expression suppression, gender as independent variables and three indexes of exercise behavior as dependent variables, as shown in table 3, Boredom proneness ($\beta=-0.552$) and expression suppression ($\beta=-0.366$) were significant for exercise intensity ($p<0.001$); Boredom proneness ($\beta=-0.541$) and expression suppression ($\beta=-0.392$) were significant for exercise duration ($p<0.001$); Boredom proneness ($\beta=-0.674$) and expression suppression ($\beta=-412$) were significant for exercise frequency ($p<0.001$). In addition, gender was significant for both exercise intensity ($\beta=-0.127$，$p<0.05$) and frequency ($\beta=-0.134$，$p<0.01$) but not for exercise duration ($\beta=-0.080$，$p=0.112$).

Table 3. Regression results for BP, and ES on each index of exercise behavior separately

Variable	Intensity				Duration				Frequency			
	B	*SE*	*β*	R^2	B	*SE*	*β*	R^2	B	*SE*	*β*	R^2
BP	-.082	.006	-.552***	.303	-.080	.006	-.541***	.291	-.100	.006	-.674***	.452
ES	-.300	.038	-.366***	.132	-.321	.038	-.392***	.151	-.339	.038	-.412***	.168
Gender	-.562	.220	-.127*	.014	-.352	.221	-.080	.006	-.596	.220	-.134**	.016

Note. BP=boredom proneness; ES=expression suppression.
*** $p<0.001$

Through hierarchical regressions analysis, with boredom proneness, expression suppression as independent variables, gender as control variable and three indexes of exercise behaviors as dependent variables, as shown in table 4. Step 1: boredom proneness was significant for exercise intensity, duration and frequency; Step2: boredom proneness - expression suppression was significant for exercise intensity ($F=91.459$), duration ($F=90.249$) and frequency ($F=170.027$) due

to intervention of expression suppression; Step 3: boredom proneness - expression suppression - gender was significant for exercise intensity (F=63.090) and frequency (F=116.729) due to intervention of gender. From step 1 to 3, it was concluded that the regression coefficients of boredom proneness to three indexes of exercise behavior decreased and were still significant but not equal to zero; Three ΔR^2s were 0.008, 0.018 and 0.006 respectively. It can be proved that expression suppression acted on partial mediating effect between boredom proneness and each index of exercise behaviors. And that, there was gender difference in the chain of the boredom proneness's influences on exercise intensity and frequency.

Table 4. Hierarchical regression results for BP, and ES on each index of exercise behavior

Variable	Intensity								
	Step1			Step2			Step3		
	B	*SE*	*β*	B	*SE*	*β*	B	*SE*	*β*
BP	-.082	.006	-.552***	-.073	.007	-.492***	-.072	.007	-.488***
ES				-.097	.039	-.118*	-.095	.039	-.115*
Gender							-.396	.183	-.089*
F			174.710			91.459			63.090
R^2			.303			.311			.318
ΔR^2						.008			.007
Variable	Duration								
	Step1			Step2			Step3		
	B	*SE*	*β*	B	*SE*	*β*	B	*SE*	*β*
BP	-.080	.006	-.541***	-.068	.007	-.461***	-.068	.007	-.459***
ES				-.130	.039	-.159***	-.129	.039	-.158***
Gender							-.184	.184	-.042
F			165.472			90.249			60.499
R^2			.291			.309			.309
ΔR^2						.018			.000
Variable	Frequency								
	Step1			Step2					
	B	*SE*	*β*	B	*SE*	*β*	B	*SE*	*β*
BP	-.100	.006	-.674***	-.093	.006	-.625***	-.092	.006	-.620***
ES				-.080	.035	-.097*	-.078	.035	-.094*
Gender							-.396	.163	-.089*
F			331.457			170.027			116.729
R^2			.452			.458			.465
ΔR^2						.006			.007

Note. BP=boredom proneness; ES=expression suppression.
*** p<0.001, * p<0.05.

4 Discussion

Boredom proneness were ubiquitous and became chronic life stressors among college students. When an individual often faces the same exercise situation, it will lead to tedious and down due to the mismatch between the novelty of the situation and his own needs, or even cause inexplicable loss and depression due to the unpleasant exercise memories or external information in the past [11]. As we all know, boredom is also closely related to the subjective cognition of individuals. If the subjective thinks that the exercise environment or exercise activities are simple, repetitive and boring, then individuals will still lead to boredom proneness.

Expression suppression in emotion regulation strategies was seldom stimulated to cope with stress events. Under the influence of emotional state, social adaptation, memory cognitive and social support system, college students are less likely to adopt the “response-focused emotion regulation strategy” of expression suppression when facing emotional stimulation, and more likely to choose the “antecedent-focused emotion regulation strategy” to avoid negative emotions and maintain social interpersonal relations [12].

The more serious boredom proneness of college students is, the worse the exercise behavior will be. Boredom is a negative emotional experience [13]. If individual is full of “boredom elements”, it will form negative emotional memory, which will destroy the cognitive system of physical exercise, resulting in individual psychological imbalance, sedentary behaviors, and etc.. People with serious boredom proneness to be inactive and procrastinate, which often causes them to get into interpersonal troubles and hinders from social behaviors [14].

The higher use rate of expression suppression strategy, the worse the exercise behavior will be. People with high use rate of expression suppression strategy tend to hide real emotional response and deal with exercise activities in a negative way. As explained by the theory of resource conservation, individual who is accustomed to adopting the strategy of expression suppression are more likely to expend their emotional resources, resulting in the psychological appearance of procrastination and burnout and increasing the possibility of behavior withdrawal [15].

Expression suppression acted on partial mediating effect between boredom proneness and each index of exercise behaviors. Boredom proneness reflects the cognition bias in social behaviors of college students, which interferes with behavior decision-making. It is more likely to suppress emotional expression and limit the utilizability of cognitive resources after the emergence of emotions, which will affect the enthusiasm of participating in physical exercise [16].

Conclusions

Expression suppression in emotion regulation strategies was seldom stimulated to cope with stress events. The gender differences were significant in exercise intensity and frequency (males' were significantly higher than females'). Expression suppression acted on partial mediating effect between boredom proneness and each index of exercise behaviors. It may be an effective strategy to improve the exercise behaviors by improving the subjective cognition of exercise and alleviating the regulation strategy of expression suppression.

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