

Interrelations between Personality Traits and Aggression in Young Men

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Abstract

Aggression is significant problem of modern society. Its development mechanisms are not clear to date. We studied relationship between aggression index and extraversion, neuroticism and anxiety levels. The study involved 121 young men aged 18 to 22 years. Aggression index, anxiety, extraversion and neuroticism levels were estimated using Buss-Durkee Hostility Inventory, Spielberger State-Trait Anxiety Inventory, Eysenck Personality Inventory. In total group of participants the positive correlations between neuroticism and both aggression index and physical aggression were found. In total group negative correlation between extraversion and anxiety and positive correlation between anxiety and neuroticism were revealed. The highest aggression index was found in extraverts and in individuals with high level of neuroticism. No differences in aggression indexes were found between extraverts and persons with middle extraversion, between men with high and middle neuroticism levels. No differences between aggression indexes were shown in men with different levels of anxiety, but aggression index in men with low anxiety was similar to aggression index in extraverts and men with high neuroticism. Analysis of correlation coefficients between temperamental characteristics showed the positive correlation between neuroticism and anxiety in extraverts and men with middle extraversion. A positive correlation between aggression index and neuroticism in extraverts, and positive correlation between aggression index and extraversion in persons with high neuroticism were revealed. Men with high anxiety had positive significant correlation between aggression index and anxiety. Taking into account all the above mentioned tendencies, we suggest, that extraverts with high neuroticism and anxiety levels are prone to impulsive aggression. The individuals with high anxiety, high neuroticism and middle extraversion may be also predisposed to excessive impulsive aggression, due to high positive correlation between anxiety and aggression index in men with high anxiety, strong positive correlation between anxiety and neuroticism and moderate negative correlation between neuroticism and extraversion in persons with middle extraversion. In individuals with low anxiety a negative almost statistically significant ($p=0.052$) correlation between anxiety and neuroticism, and a positive significant correlation between neuroticism and aggression index were observed. The existence of these correlations together with positive correlations between aggression index and neuroticism in extraverts, between aggression index and extraversion in men with high neuroticism provide the possibility to suggest, that extraverts with low anxiety and high neuroticism may be predisposed to excessive controlled aggression. Extraverts with low anxiety and middle neuroticism can also manifest high aggression due to negative correlation between extraversion and anxiety.

Key words: Aggression, extraversion, anxiety, neuroticism, men.

Introduction

Aggression is characteristic for both animals and human. It is the reaction on threat to vital interests of individual and in normal ranges it is necessary for providing survival of individual. But excessive aggression is harmful and dangerous for both individuals and society.

Two main forms of human excessive aggression are described: impulsive and controlled [1]. The research of aggression formation mechanisms is very important to understand the excessive aggression manifestations.

Investigation of the mechanisms of aggressiveness development was mainly carried out on animals. It was shown that the formation of aggressive behavior is provided by male sex hormones, which in the perinatal period are involved in the formation of neural networks [2]. Neurotransmitter systems involved in mammalian aggression include serotonin [3], dopamine [4], norepinephrine [5], GABA, and neuropeptides such as vasopressin and oxytocin [6]. Monoaminergic brain systems have a great influence on the emotions and behavior in humans and animals [7]. Serotonin and noradrenalin exert a significant influence on early brain development through the regulation of neurogenesis, migration, differentiation, plasticity and other key morphogenetic processes [8]. The research in human's brain is impossible, but features of neuromediator status are manifested by temperamental and behavioral characteristics. Therefore the aim of our work was the study of relationships between aggressiveness index and extraversion, neuroticism and anxiety levels.

Methods

The study involved 121 young men aged 18 to 22 years. Aggression index, anxiety, extraversion and neuroticism levels were estimated using Buss-Durkee Hostility Inventory, Spielberger State-Trait Anxiety Inventory, Eysenck Personality Inventory. Buss-Durkee Hostility Inventory is used to study aggression. Eysenck Personality Inventory provides the estimation of extraversion-introversion and emotional stability-instability (neuroticism). The levels of extraversion, anxiety and neuroticism were assessed in points. The aggression index was estimated in a percentage of the maximum level. Eysenck Personality Inventory provides to estimate the sincerity of answers. If the answers have not been sincere, they were not taken into account.

Statistical analysis of the results was carried out by methods of nonparametric statistics using the package "Statistica 6.0". Nonparametric analogues of dispersion analysis - Kruskal-Wallis and median tests – were used to reveal the dependence of parameters on group. Mann-Whitney test was used to compare groups in pairs. Correlation analysis according to Spearman was used to reveal the relationship between different variables of the same group.

Results

After processing the answers to Eysenck Personality Inventory, we determined the level of extraversion and neuroticism in each participant in the study. According to the results obtained, we divided the general group into three subgroups depending on the extraversion level (extraverts - greater than 15 points, individuals with a middle level of extraversion - 10-14 points, introverts - less than 9 points), as well as 3 subgroups depending on the neuroticism level (low level of neuroticism - less than 7 points, middle level of neuroticism - 8-13 points, high level of neuroticism- more than 14 points).

After processing the answers to Spielberger State-Trait Anxiety Inventory, we determined the anxiety level in each participant in the study. According to the results obtained, we divided the general group into three subgroups depending on the anxiety level: low anxiety – to 30 points; moderate anxiety – 31-45 points; high anxiety – 46 and more points.

To reveal the dependence of the aggression index on extraversion, neuroticism or anxiety levels we used nonparametric analogue of dispersion analysis - Kruskal-Wallis test.

The aggression index was revealed to depend on extraversion and neuroticism levels ($H=6.786$, $p=0.0336$; $H=17.812$, $p=0.0001$, respectively). It didn't depend on anxiety level ($H=0.782$, $p=0.6763$).

As the dependence of aggression index on extraversion level and neuroticism level was revealed, we used Mann-Whitney test to compare groups in pairs. The aggression index was lower in introverts as compared with extraverts (Figure 1). No differences between aggression index in persons with middle level of extraversion and extraverts or introverts were revealed.

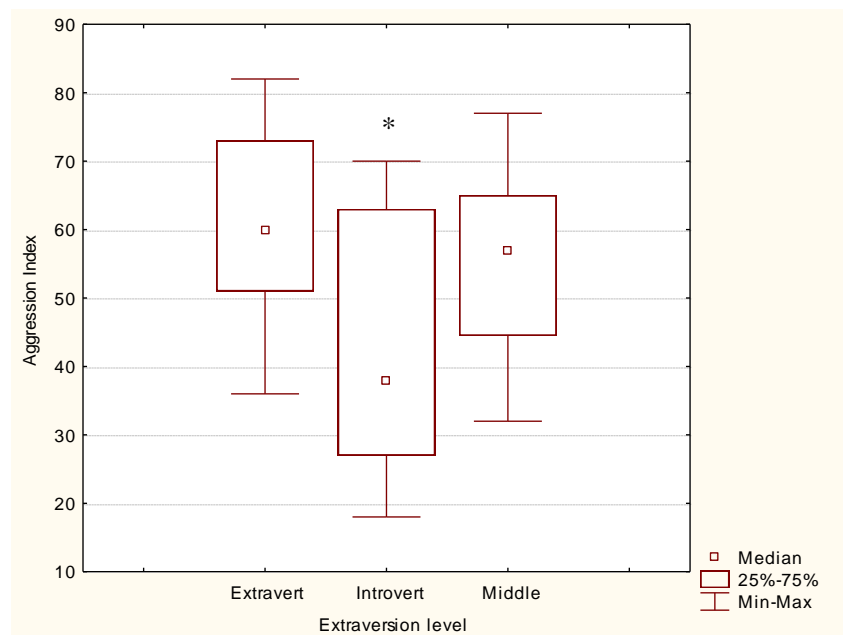


Figure 1 Aggressiveness index in men with different levels of extraversion (Me [25%; 75%], min and max; $*-p<0.05$ versus extraverts).

The aggression index was lower in persons with low level of neuroticism as compared with persons with both middle and high levels of neuroticism (Figure 2). No differences between aggression index in individuals with high and middle neuroticism were found.

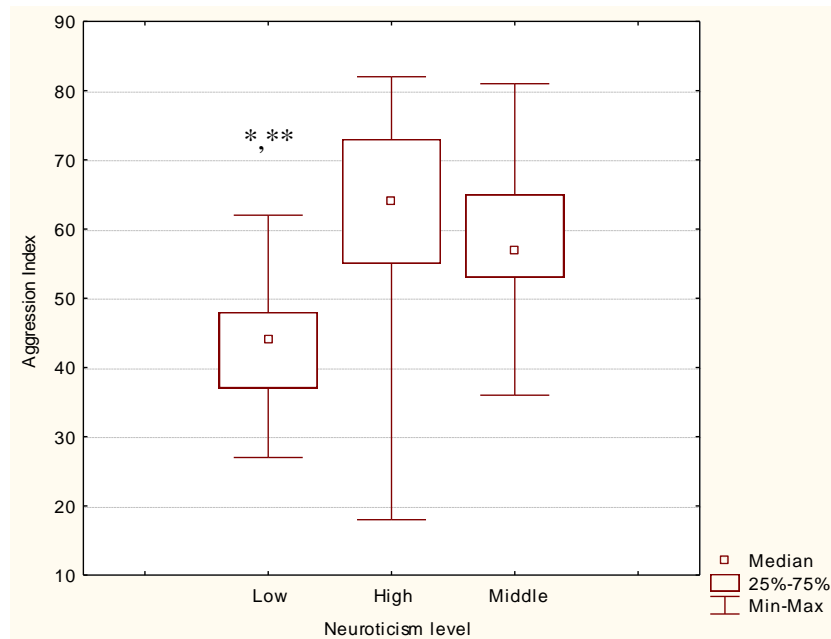


Figure 2 Aggressiveness index in men with different levels of neuroticism (Me [25%; 75%], min and max). *- $p < 0.05$ versus persons with middle level of neuroticism; **- $p < 0.05$ versus persons with high level of neuroticism.

To identify the relationship between aggression index and extraversion, neuroticism or anxiety we performed correlation analysis according to Spearman. Correlation analysis was conducted between variables within each individual group.

In total group of participants the middle significant positive correlations between neuroticism and both aggression index ($r = +0.37$, $p = 0.001$) and physical aggression ($r = +0.40$, $p = 0.0003$) were found. In total group a significant negative correlation between extraversion and anxiety ($r = -0.34$, $p = 0.002$), and significant positive correlation between anxiety and neuroticism ($r = +0.54$, $p = 0.000$) were revealed.

Positive statistically significant correlations between aggression index and extraversion were observed in men with high and men low neuroticism (Table 1).

Positive significant correlations between aggression index and neuroticism were revealed in extraverts, in men with moderate and low anxiety (Table 1).

Positive significant correlation between aggression index and anxiety was found in men with high anxiety. Negative correlation between aggression index and anxiety was shown in men with low anxiety, but it was statistically insignificant (Table 1).

Strong positive correlations between aggression index and physical aggression were found in all subgroups except men with low neuroticism (Table1).

Table 1: Correlation coefficients between aggression index and temperamental characteristics, physical aggression in different subgroups of young men

Subgroups	Correlation coefficients			
	Aggression index/Extraversion	Aggression index/Neuroticism	Aggression index/Anxiety	Aggression index/Physical aggression
Extraverts	+0.04	+0.58*	+0.11	+0.77*
Men with middle extraversion	-0.28	+0.33	+0.11	+0.75*
Introverts	+0.74 p=0.056	-0.06	-0.52	+0.94*
Men with high neuroticism	+0.45*	-0.02	-0.23	+0.76*
Men with middle neuroticism	-0.08	-0.02	+0.34	+0.86*
Men with low neuroticism	+0.87*	-0.17	+0.02	+0.31
Men with high anxiety	+0.46	+0.18	+0.60*	+0.85*
Men with moderate anxiety	-0,05	+0.35*	+0.04	+0.81*
Men with low anxiety	+0.11	+0.67*	-0.38	+0.74*

* - Correlation coefficient is statistically significant, $p < 0.05$

A significant negative correlation between extraversion and anxiety was observed in men with middle neuroticism. A significant negative correlation between extraversion and neuroticism was found in men with middle extraversion (Table 2).

Strong positive correlations between neuroticism and anxiety were observed in extraverts, men with middle extraversion, introverts and in men with moderate anxiety. A negative correlation between neuroticism and anxiety was found in men with low anxiety (Table 2). It was almost statistically significant ($p=0.052$).

Table 2: Correlation coefficients between temperamental characteristics in different subgroups of young men

Subgroups	Correlation coefficients		
	Extraversion/ Anxiety	Extraversion/Neuroticism	Neuroticism/Anxiety
Extraverts	-0.19	+0.10	+0.43*
Men with middle extraversion	-0.15	-0.38*	+0.61*
Introverts	-0.60	-0.33	+0.87*
Men with high neuroticism	-0.25	+0.17	+0.33
Men with middle neuroticism	-0.39*	-0.25	+0.32
Men with low neuroticism	-0.04	+0.32	-0.07
Men with high anxiety	+0.09	-0.25	+0.13
Men with moderate anxiety	-0.05	+0.05	+0.35*
Men with low anxiety	-0.05	+0,37	-0.60 p=0.52

* - Correlation coefficient is statistically significant, $p < 0.05$

Discussion

Two major forms of human excessive aggression are described: impulsive and controlled (premeditated) [1, 9]. Brain regions involved in the control of aggression include cortex, amygdala, septum, hypothalamus, periaqueductal grey and the locus coeruleus [10]. The lateral hypothalamus and central amygdala are tightly involved in predatory aggression [11].

Individual temperamental characteristics of the organism are based on the activity of four motivational emotogenic brain structures (frontal cortex, hippocampus, amygdala and hypothalamus). Lateral hypothalamus is positive emotogenic structure [12, 13] and medial hypothalamus [12], tegmentum of the midbrain [13] belong to emotionally negative brain structures. The hippocampus is often associated with fear conditioning, extinction and memory [14]. Functional decoding analysis of the hippocampus in association with the amygdala shows its involvement in fear and memory processing [15].

The literature data on the relationship between the personality traits and impulsive and controlled aggression are contradictory. According to some literature data, high impulsive aggression is associated with high neuroticism, but high premeditated aggression is associated with low agreeableness and high extraversion [16]. According to other results, impulsive aggression is related to high neuroticism, while premeditated aggression is related to high psychoticism and neuroticism, but to low extraversion [17].

An excessive aggression and violence are often observed in anxiety- and depression-related disorders [18]. An impulsive aggression is manifested in depressive patients [19]. Frequent detection of excessive aggression and violence in anxiety and depression indicates partial overlapping between neural pathways and neurochemical systems that regulate aggression and anxiety [1]. According to other literature data, male rats with both low anxiety-related behavior and with high anxiety-related behavior show a high form of aggression [20].

Major contributors for both aggression and anxiety are hormones of hypothalamic pituitary adrenal axis and biogenic amines. Impulsive aggression is characterized by hypothalamic pituitary adrenal axis hyperactivity. Controlled aggression is characterized by low emotional activity [21, 22].

A rapid activation of hypothalamic pituitary adrenal axis hypothalamic pituitary adrenal axis in response to stress is directed by hypothalamic corticotropin-releasing hormone. Abnormalities in the regulation by corticotropin-releasing hormone play the important role in the depression and anxiety development of [23]. Glucocorticoids influence the neurobehavioral functions in different brain areas [24]. Chronic corticosterone treatment causes dendrites to retract in CA3 hippocampus [25], which plays an integrative role in the regulation of neuroendocrine response to stress [26]. The reduced hippocampus volume in depressed patients is shown by brain imaging studies [27].

The brain monoaminergic system is involved in the development of both anxiety and aggression [1, 5, 28]. The psycho-emotional state of the organism may be modified by changing the activity of noradrenergic and serotonergic systems by chemicals [9].

Not only monoamines, gamma-amino-butyric acid and glutamate, but also many other modulators, including adenosine, cannabinoids, numerous neuropeptides, hormones, neurotrophins, cytokines and several cellular mediators, are involved in the induction and inhibition of anxious states [29] and aggression [6]. The imbalance between the above mentioned mediator systems can provide a predisposition of persons to different types of aggression.

In our study in total group of participants we found the middle significant positive correlation between neuroticism and both aggression index and physical aggression. In total group we revealed a significant negative correlation between extraversion and anxiety, significant positive correlation between anxiety and neuroticism.

But we believe that each personality trait is a reflection of a complex interaction of many neurotransmitters (and hormones). The same mediator can be involved in the formation of different personality traits, and this overlapping may results in unique combination of expression degree of personality traits (degree of extraversion expression, degree of neuroticism expression, degree of anxiety expression). For example, extravert with moderate anxiety level can have low, middle or high level of neuroticism etc, so we divided the participants into subgroups according to the levels of extraversion, neuroticism and anxiety, and examined the correlations within these subgroups.

According to our results, the lowest aggression index was found in introverts and in men with low neuroticism.

It should be noted, that introverts constituted only 7% of all participants. A positive and almost statistically significant ($p=0.056$) correlation between aggression index and extraversion degree was revealed in them, but introverts had low extraversion level (less than 9 points) and so low aggression index.

Men with low neuroticism constituted about 17% of participants. A positive significant correlation between aggression index and extraversion was revealed in men with low neuroticism, but only in this group no correlation between aggression index and physical aggression was observed, and namely physical aggression provides the excessive aggression manifestation.

Due to these tendencies we removed the above mentioned two groups from potential candidates for excessive aggression manifestation.

Taking into account the literature data about high form of aggression in male rats with both low anxiety-related behavior and with high anxiety-related behavior [20], we focused our attention on subgroups of participants with low and high anxiety.

In our study, men with high level of anxiety constituted 19.5% of participants. All of them, except one person, had high neuroticism level. Analysis of correlation coefficients between temperamental characteristics showed the significant positive correlation between neuroticism and anxiety in extraverts and men with middle extraversion (that is, the higher anxiety, the higher neuroticism). A positive significant correlation between aggression index and neuroticism in extraverts (that is, the higher neuroticism, the higher aggression index), and positive significant correlation between aggression index and

extraversion in persons with high neuroticism were revealed. Men with high anxiety had a high positive significant correlation between aggression index and anxiety degree (that is, the higher anxiety, the higher aggression index).

Taking into account all the above mentioned tendencies and literature data about impulsive aggression manifestation in anxiety- and depression-related disorders [18, 19], we suggest, that extraverts with high neuroticism and anxiety levels are prone to impulsive aggression.

The individuals with high anxiety, high neuroticism and middle extraversion may be also predisposed to excessive impulsive aggression, due to high positive correlation between anxiety and aggression index in men with high anxiety (that is, the higher anxiety, the higher aggression index), strong positive correlation between anxiety and neuroticism (that is, the higher anxiety, the higher neuroticism) and moderate negative correlation between neuroticism and extraversion in persons with middle extraversion (that is, the higher neuroticism, the lower extraversion, but within the middle extraversion).

Men with low anxiety constituted about 14% of all participants. Most of them were extraverts. In subgroup with low anxiety the introverts were absent. Only two men with middle extraversion were in this subgroup. In individuals with low anxiety a negative almost statistically significant ($p=0.052$) correlation between anxiety and neuroticism (that is, the lower anxiety, the higher neuroticism), and a positive significant correlation between neuroticism and aggression index (that is, the higher neuroticism, the higher aggression index) were observed. The existence of these correlations together with positive correlations between aggression index and neuroticism in extraverts, between aggression index and extraversion in men with high neuroticism provide the possibility to suggest, that extraverts with low anxiety and high neuroticism may be predisposed to excessive controlled aggression. Extraverts with low anxiety and middle neuroticism can also manifest high aggression due to negative correlation between extraversion and anxiety.

Conclusions

1. The positive correlations between neuroticism and both aggression index and physical aggression were found in total group of participants.
2. The negative correlation between extraversion and anxiety, and positive correlation between anxiety and neuroticism were revealed in total group of participants.
3. The aggression index was lower in introverts as compared with extraverts.
4. The aggression index was lower in persons with low level of neuroticism as compared with persons with both middle and high levels of neuroticism.
5. No differences between aggression indexes were shown in men with different levels of anxiety, but aggression index in men with low anxiety was similar to aggression index in extraverts and men with high neuroticism.
6. Analysis of correlations between temperamental characteristics, between temperamental characteristics and aggressiveness index makes it possible to assume that combination of low anxiety with high extraversion level and middle or high levels of neuroticism indicates predisposition of person to controlled aggression, and combination of high anxiety with high or middle extraversion and high neuroticism indicates predisposition of person to impulsive aggression.

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