

Features of Relationships between Temperamental Characteristics in Male and Female Adolescents

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Abstract

Aggression, including aggression of adolescents, is a major problem in modern society, but the mechanisms of its development are not clear up today. Researches of mechanisms of aggression development in women are virtually absent. We studied the relationships between temperamental characteristics in male and female adolescents. Aggressiveness index, physical, verbal aggressions, irritability, anxiety, extraversion and neuroticism levels were estimated using Buss-Durkee Hostility Inventory, Spielberger State-Trait Anxiety Inventory, Eysenck Personality Inventory. Higher neuroticism, anxiety levels and irritability were found in female adolescents compared with male adolescents, that perhaps due to a greater activity of the hypothalamic pituitary adrenal axis in women. Significant positive correlations between neuroticism and anxiety, and high negative correlations between anxiety and verbal aggression were revealed in male adolescents. Significant positive correlations between neuroticism and physical aggression, neuroticism and irritability, irritability and verbal aggression, verbal aggression and extraversion were revealed in female adolescents. Significant positive correlations between neuroticism and physical aggression, neuroticism and irritability, irritability and verbal aggression in female adolescents make it possible to suggest that female adolescents are more prone to impulsive aggression than male adolescents.

Keywords: *Aggression; Extraversion; Anxiety; Neuroticism; Male and Female Adolescents*

Introduction

Aggression, including aggression of adolescents, is a major problem in modern society, but the mechanisms of its development are not clear up today. Researches of mechanisms of aggression development in women are virtually absent. Aggression is more pronounced in men than in women, so the study of mechanisms of aggression development, mainly conducted on men and male animals. Researches on human confined to conducting psychological tests, blood tests and Magnetic Resonance Imaging of brain. Most studies were performed on males of different animals. It is shown that male sex hormones facilitate the manifestation of aggressive behavior in adults [1]. In the embryonic period, they are involved in the formation of neural networks [2]. Testosterone, which is synthesized by fetal gonads, diffuses to the brain of males, where it is locally aromatized in estradiol and then initiates a process of masculinization [3]. In puberty, it triggers a second period of structural reorganization and plasticity in the brain [4]. In adults, testosterone is involved in the modulation of neural networks that regulate aggression [5]. Many mediators are involved in aggression development [6-10]. Specific neurotransmitter systems involved in mammalian aggression include serotonin, dopamine, norepinephrine, GABA, and neuropeptides such as vasopressin and oxytocin [11]. Their investigation on human's brain is impossible, but temperamental characteristics reflect the features of neuromediator status of person. The study of relationships between temperamental characteristics in males and females of different age groups is important for elucidation of aggression mechanisms development.

The aim of our work was the study of relationships between temperamental characteristics in male and female adolescents.

Methods

The study involved 34 adolescents within the age range 15 - 16 years (17 males and 17 females). The work was done in accordance with order № 319 of the Ministry of Education and Science of Ukraine of 18.03.2015 and carried out with the ethical standards.

Aggressiveness index, physical, verbal aggressions, irritability, 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 and neuroticism were assessed in points. Aggressiveness index, physical, verbal aggressions, irritability were 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”, Mann-Whitney test and correlation analysis according to Spearman.

Results

To identify gender-specific relationships between temperamental characteristics we investigated temperamental characteristics in male and female adolescents.

According to the results, they did not differ in the levels of extraversion, physical and verbal aggressions, and aggression index.

But higher levels of neuroticism, anxiety and irritability were found in female adolescents compared with male adolescents (Figure 1-3).

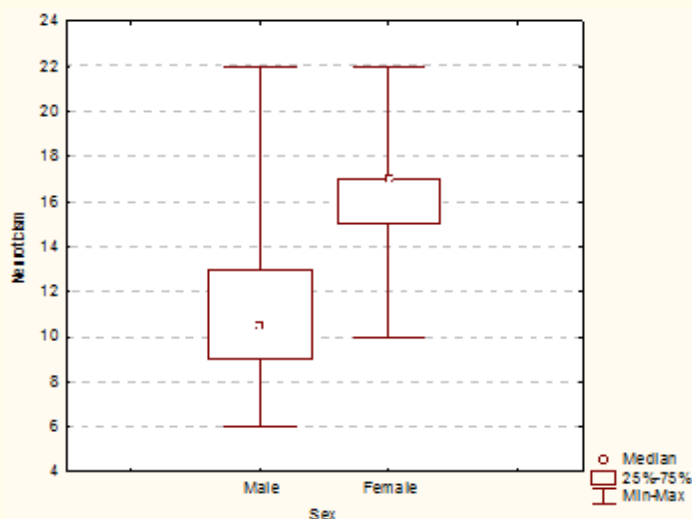


Figure 1: Neuroticism level in male and female adolescents (in points) (Me, [25%; 75%], minimum and maximum values; $p=0.00225$).

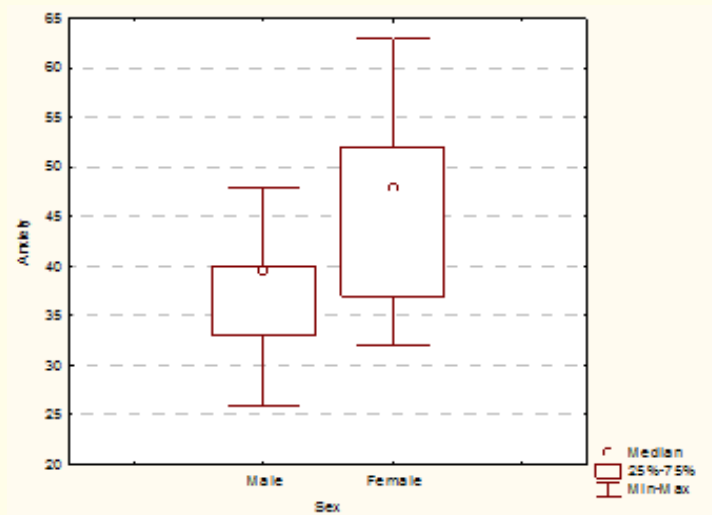


Figure 2: Anxiety level in male and female adolescents (in points) (Me, [25%; 75%], minimum and maximum values; $p=0.012858$).

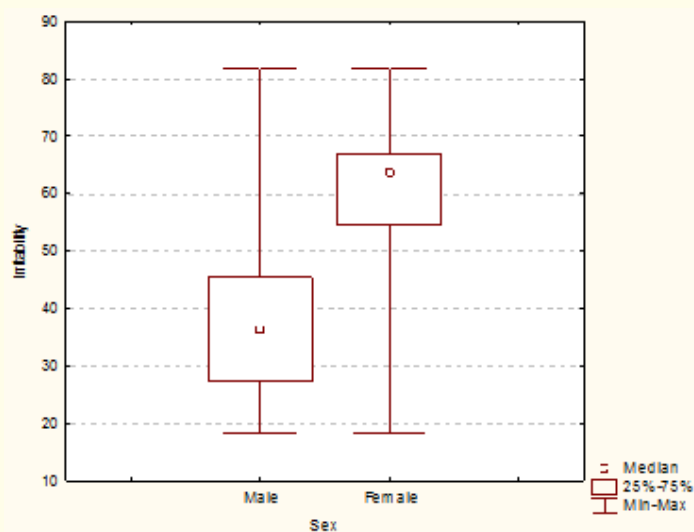


Figure 3: Irritability level in male and female adolescents (in points) (Me, [25%; 75%], minimum and maximum values; $p=0.00828$).

Significant positive correlations between neuroticism and anxiety, and high negative correlations between anxiety and verbal aggression were revealed in male adolescents (Table 1).

| | Neuroticism | Anxiety | Verbal aggression |
|-------------------|-------------|---------|-------------------|
| Neuroticism | - | +0.55* | -0.22 |
| Anxiety | +0.55* | - | -0.62* |
| Verbal aggression | -0.22 | -0.62* | - |

Table 1: Correlation coefficients between temperamental characteristics in male adolescents.

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

Significant positive correlations between neuroticism and physical aggression, neuroticism and irritability, irritability and verbal aggression, verbal aggression and extraversion were revealed in female adolescents (Table 2).

| | Extraversion | Neuroticism | Physical aggression | Verbal aggression | Irritability |
|---------------------|--------------|-------------|---------------------|-------------------|--------------|
| Extraversion | - | +0.23 | + 0.14 | +0.57* | +0.22 |
| Neuroticism | +0.23 | - | +0.58* | +0.48 | +0.77* |
| Physical aggression | + 0.14 | +0.58* | - | +0.28 | +0.21 |
| Verbal aggression | +0.57* | +0.48 | +0.28 | - | +0.54* |
| Irritability | +0.22 | +0.77* | +0.21 | +0.54* | - |

Table 2: Correlation coefficients between temperamental characteristics in female adolescents.

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

Discussion

According to our results male and female adolescents did not differ by aggression index, physical and verbal aggressions. Usually adolescent are characterized by immature and impulsive behavior and neurobehavioral excitement due to maturation of adolescent brain [10]. Glutamatergic neurotransmission predominates, whereas gamma-aminobutyric acid transmission is in formation process [10].

Higher levels of neuroticism, anxiety and irritability were found in female adolescents compared with male adolescents. Elevated levels of neuroticism and trait anxiety in female adolescents may be associated with higher levels of cortisol in women than in men [12]. This is related to testosterone organizing role in the formation of hypothalamic pituitary adrenal axis [12] and masculinization of the brain during fetal development [3]. Organizational effects of testosterone occur pre- and perinatally. Testosterone provides masculinizing and defeminizing neural circuits in males, and the absence of testosterone leads to female neural phenotype [4].

A greater reactivity in the adrenal response to adrenocorticotrophic hormone is observed in women [13]. Basal corticotropin-releasing hormone expression is lower in males, than in females [14]. Corticotropin-releasing factor regulates instinctive forms of emotional behavior (fear, anxiety, frustration and deliverance from them) [15]. Exposure to stress is associated with an increase in firing of locus coeruleus and with increased release and turnover of norepinephrine in brain regions which receive noradrenergic innervations [16]. Almost half of noradrenergic fibers begins in locus coeruleus [17]. The locus coeruleus has dense excitatory projections to cortex, hippocampus, amygdale, thalamus, hypothalamus, serotonergic neurons of the dorsal raphe nucleus [16]. These features of noradrenergic neuronal system determine its adaptability to rapid and global modulation of brain functions in response to environmental change as it comes under stress. Increased activity of locus coeruleus is associated with behavioral manifestations of fear [18]. Disorders induced by stress, such as depression and anxiety are more common among women than among men [19].

The increased anxiety in female adolescents may be also due to features of connections between amygdale and hippocampus. A stronger coupling between the left hippocampus and the left amygdale is observed in women than in men. A higher coupling of hippocampus and amygdale in women may act as a neural contributing factor to sex-specific prevalence rates in anxiety and panic disorders [20].

Neuroticism is characterized by increased emotionality, impulsivity, a tendency to irritability. Irritability belongs to aggression-related behavioral states. This state is characterized by reduced control over a temper and usually results in verbal or behavioral outbursts [21]. Significant positive correlations between neuroticism and physical aggression, neuroticism and irritability, irritability and verbal aggression in female adolescents make it possible to suggest that female adolescents are more prone to impulsive aggression than male adolescents.

Conclusions

1. Higher neuroticism, anxiety levels and irritability index were found in female adolescents compared with male adolescents, that perhaps due to a greater activity of the hypothalamic pituitary adrenal axis in women.
2. Significant positive correlations between neuroticism and physical aggression, neuroticism and irritability, irritability and verbal aggression in female adolescents make it possible to suggest that female adolescents are more prone to impulsive aggression than male adolescents.

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