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RUSSIAN PSYCHOLOGICAL JOURNAL, 2021, Vol. 18, No. 3, 6–17. **doi**: 10.21702/rpj.2021.3.1

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Research article

A Study on the Effectiveness of Psychotherapeutic Interventions in Different Age Groups of Anxious Children and Adolescents

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Abstract

Introduction. Mental health of the young generation is one of today's most urgent problems. This study examines the impact of various psychotherapeutic interventions on anxiety in children and adolescents. **Methods**. The study sample comprised 83 school students aged 7–16 years. We assessed anxiety using (a) the projective test by R. Tamml, M. Dorkey, and V. Amen (group 1), (b) the Multidimensional Anxiety Scale for Children, MASC (groups 2–4), and (c) the Spielberger–Khanin scale (group 5). We used the following psychotherapeutic interventions: cognitive-behavioral training (CBT), biofeedback (BFB), sandtray therapy, and fairytale therapy. **Results**. In the group of first-graders aged 7.1 ± 0.07 years (group 1), we found a significant (p < 0.01) 1.6-point decrease in anxiety levels after psychotherapeutic sessions. In group 2 (9.3 ± 0.14 years), there was a 1.5–4-point decrease in anxiety levels for the MASC scales 1, 2, 5, 6, 7, 9, and 10 (p < 0.01). In group 3, school students aged 10.5 ± 0.09 years showed a significant 0.5–2-point decrease in anxiety levels for the MASC scales 1, 3, 4, 7, and 10. After 8 months of CBT in the group of school students aged 12.4 ± 0.11 years (group 4), we observed a 1–3-point decrease in anxiety levels for 9 MASC scales (p < 0.01). After 1.5 months of biofeedback training in group 5, adolescents aged 15.5 ± 0.17 years demonstrated a significant decrease in the levels of state anxiety and trait anxiety (up to average levels). **Discussion**. Situations related to examinations, self-expression, and judgments by others are the most stressful for school students. In general, any psychotherapeutic interventions represent an effective way to reduce anxiety levels in children and adolescents and to improve their emotional states and school adaptation.

Keywords

Highlights

➤ Psychotherapeutic work with high-anxious children and adolescents led to a decrease in anxiety levels and to an improvement in their psycho-emotional states.
➤ In the groups in which we used the MASC to diagnose anxiety, there was a tendency – a longer duration of psychotherapy resulted in more intense changes.
➤ To achieve greater efficiency in psychotherapy, specialists should take into account children's individual and typological characteristics and implement such interventions as biofeedback and sandtray therapy in individual work with them.

Introduction

In the context of increasing stress associated with the use of innovative technologies, mental health of school students is a problem in today's society (Hoge, Bickham, & Cantor 2017; Belousova, Karpov, Utkuzova, Prusakov, & Ostudin, 2019). Many researchers note that in the process of schooling children and adolescents experience psycho-emotional stress, increased anxiety, and a decrease in the functional capabilities of the body (Tarasova & Osnitsky, 2015; Nesterovskii, Zavadenko, Shipilova, & Suvorinova, 2017; Gribanov, Nekhoroshkova, Deputat, Pankov, & Kozhevnikova, 2019). High anxiety may result in psychosomatic disorders (Groen, van Gils, Emerencia, Bos, & Rosmalen, 2021), which may contribute to depression and suicidal tendencies (Cummings, Caporino, & Kendall, 2014). The onset of anxiety in childhood and adolescence may escalate into full-blown anxiety disorders, deviant behavior, and problems with school and social adjustment (Prikhozhan, 2000; Barlow, 2002; Van Ameringen, Mancini, & Farvolden, 2003; Beesdo, Knappe, & Pine, 2009; Bartosh, Bartosh, Mychko, & Dorokhova, 2018).

In terms of anxiety, early school age is the most vulnerable age (Romitsyna, 2006; Beesdo et al., 2009), when a child adapts to new social conditions. Anxiety may manifest itself in educational situations; it is associated with the expectation of negative judgments by adult referent others (parents and teachers). Elementary school students constantly feel insecure and doubt the correctness of their behaviors. During adolescence, peer and social interactions become important (Chiu, Clark, & Leigh, 2021). Anxiety has a negative impact on many areas of activity, social adaptation and causes negative changes in the functional state and personal structure as a whole, and also reduces stress resistance (Keeton, Kolos, & Walkup, 2009; Murray, Creswell, & Cooper, 2009; Bartosh et al., 2018).

Therefore, there is a need for preventive measures at school that would reduce anxiety levels, affect successful school adaptation, academic performance, personality formation, and the child's emotional well-being. Biofeedback has been shown to be effective when working with high-anxious children and children with various disabilities (Gevensleben, Heinrich, Moll, & Rothenberger, 2011; Bartosh & Bartosh, 2018; Bartosh & Bartosh, 2020). Sandtray therapy is optimal in relieving internal tension in children and discovering new developmental pathways (Kalff, 1991; Zinkevich-Evstigneeva & Grabenko, 2005; Kwak, Ahn, & Lim, 2020). Scientists have

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shown the effectiveness of cognitive behavioral therapy for high anxiety and anxiety disorders in children and adolescents (Vopel, 2004; James, James, Cowdrey, Soler, & Choke, 2015; Wolk, Kendall, & Beidas, 2015).

This study *aims* to examine the impact of psychotherapeutic interventions on anxiety in different age groups of children and adolescents.

Methods

Research design: stage 1 – assessment of students and identification of high-anxious individuals; stage 2 – a course of psychotherapeutic sessions; and stage 3 – repeated assessment after the course. Our study involved students from different age groups who studied at three schools in the city. We formed 5 groups.

We carried out all the assessments and psychotherapeutic sessions during the winter–spring period, in the first half of the day, in a manner consistent with the Declaration of Helsinki. The Ethics Committee of Biomedical Research at the NSC FEB RAS (Protocol No. 1 dated 29/03/2019) approved the legitimacy of the research procedure.

Anxiety assessment instruments

To examine anxiety in *group 1*, we used the Choose the Right Person projective anxiety test by R. Tamml, M. Dorkey, and V. Amen) (Yasyukova, 2008). In a certain sequence, we presented children drawings depicting certain situations typical for primary school students. There were 14 situations. Verbal statements and children's choices were recorded in the protocol; then we calculated anxiety index (AI) for all the children. AI = the number of negative emotional choices multiplied by 100 %. Schoolchildren were divided into three subgroups according to anxiety levels as follows: (a) high level of anxiety (AI = more than 50 %); (b) average level of anxiety (AI = 20–50 %); and (c) low level of anxiety (AI = 0–20 %). In *groups 2–4*, we used the standardized Multidimensional Anxiety Scale for Children, MASC, (Romitsyna, 2006), which was originally developed by B. N. Phillips (Phillips, 1978). The MASC differentiates an individual's anxiety according to 10 scales, with a maximum score of 10 for each scale. The scores were classified as follows: 1–2 – low anxiety, 4–5 – pronounced anxiety, and 7–10 – high anxiety. Integral anxiety index (IAI) was the sum of all the scales.

In *group 5*, we used the Spielberger–Khanin scale (Khanin, 1976) to study state anxiety (SA) and trait anxiety (TA). The scores were classified as follows: 30 – low anxiety, 31–45 – moderate anxiety, and over 46 – high anxiety.

Psychotherapeutic interventions

We used the following psychotherapeutic interventions: cognitive-behavioral training (CBT), biofeedback (BFB), sandtray therapy, and fairytale therapy.

Cognitive-behavioral training (CBT) aims at gaining social and psychological experience. In our work with children, we applied psychological games that help develop self-knowledge and communicating skills, relieve emotional and muscle tension, rally the class, and develop volitional regulation. The participants sat in a circle.

The *biofeedback method* was developed at the Research Institute of Molecular Biology and Biophysics, Siberian Branch of the Russian Academy of Medical Sciences, Novosibirsk (Stark & Schwartz, 2002). The BFB-Pulse gaming computer simulator was developed to acquire self-regulation

skills. The heart rate (HR) was recorded from the nail phalanx of the finger. In our study we used the Vira and Rally games. The sessions were held twice a week for 20–30 minutes.

Sandtray therapy consisted in playing in a psychological sandbox with miniature figurines. Thus, children built their fairytale 'sandy worlds', drew parallels with their real lives, learned to control their motives, to express them in a symbolic form, and to find a way out of similar situations (Kalff, 1991; Zinkevich-Evstigneeva & Grabenko, 2005). Interaction with sand also has a relaxing effect.

Fairytale therapy was based on reading stories or fairy tales, analyzing the actions of the characters, and searching for solutions in overcoming difficulties.

The course of training sessions in group 1 (7.1 ± 0.07 years, n = 15). There were 6 CBT sessions, 4 sessions of group fairytale therapy, and 10 biofeedback training sessions. The course lasted 2.5 months.

The course of correctional sessions in group 2 (9.3 ± 0.14 years, n = 12). For the entire class, regardless of the level of anxiety, we conducted 10 weekly cognitive-behavioral training sessions; each training session lasted 1 hour. All the high-anxious children additionally participated in individual sandtray therapy sessions (3–4 sessions). Moreover, high-anxious children took a self-regulation course using the BFB-Pulse simulator (8–12 sessions, twice a week). The entire therapeutic course lasted 4 months.

The course of training sessions in group 3 (10.5 ± 0.09 years, n = 14). A total of 7 cognitive-behavioral training sessions were carried out 1–2 times a month. Each student completed 5-6 sessions using the BFB-Pulse simulator 1–2 times a week. The entire therapeutic course lasted 3 months.

The course of training sessions in group 4 (12.4 ± 0.11 years, n = 12). CBT lasted almost the entire academic year. The school students took part in 20 training sessions. The course lasted 8 months (2–3 times a month, each session lasted 1 hour).

The course of training sessions in group 5 (15.5 ± 0.17 years, n = 30). During 1.5 month, each student completed 8–12 sessions using the BFB-Pulse computer simulator.

Relaxation techniques (Jacobson's progressive muscle relaxation technique, visualization, and breathing exercises) were used in conjunction with the biofeedback method (Kamattari & Baskakov, 2012). School students mastered relaxation techniques, chose their own strategies, and used them in virtual stressful situations in order to control their psychophysiological states.

Statistical processing

We used the Statistica 6.0 software and parametric and nonparametric methods for statistical data processing. The groups were compared using a paired two-sample t-test for mean values for dependent samples and the parametric Student's t-test for dependent and independent samples. The critical level of significance was $p < 0.05$.

Results

Assessing anxiety in group 1

After psycho-correctional sessions in group 1, first-graders demonstrated a significant ($p < 0.01$) decrease in anxiety scores (by 1.6 points) (Table 1).

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Table 1

School students' anxiety levels before and after psycho-correction (Me 25th, 75th percentile; M ± m)

Group, age (years), n	Anxiety test / anxiety index (score)	Me (C_{25}; C_{75}) before after	(M±m) before after	$P_{before-after}$
Group 1 7.1 ± 0.07; n = 15	Tamml, Dorkey, and Amen test	6 (6; 6) 5 (4; 5)	6.33 ± 0.19** 4.73 ± 0.23	t = 5.5; p < 0.01
Group 5 15.5 ± 0.17; n = 30	Spielberger–Khanin scale: SA	49.0 (41.3; 53.0) 38.0 (35.3; 45.8)	47.3 ± 1.60** 40.6 ± 1.45	t = 92; p < 0.01
	TA	51.0 (48.3; 56.0) 44.0 (39.0; 53.5)	52.6 ± 1.26** 45.2 ± 1.70	t = 38.5; p < 0.01

Assessing anxiety in group 2

After training sessions in group 2 (Table 2), we observed a significant decrease in anxiety scores for 7 out of 10 MASC scales – 1, 2, 5, 6, 7, 9, and 10. Anxiety decreased from a high to an average level by 1.5 – 4 points (p < 0.05 – p < 0.01). However, with a detailed individual examination of the anxiety scores in the interquartile range, Me (C25; C75), the scores remained high.

Table 2

Dynamics of multidimensional assessment of anxiety levels among school students of different ages in the process of psycho-correction (Me 25th, 75th percentile)

MASC, point	Group 2, age 9,3 ± 0,14 (n = 12); Me (C_{25}; C_{75}) before after	$P_{before-after}$ Wilcoxon's criterion	Group 3, age 10,5 ± 0,09 (n = 14); Me (C_{25}; C_{75}) before after	$P_{before-after}$ Wilcoxon's criterion	Group 4, age 12,4 ± 0,11 (n = 12); Me (C_{25}; C_{75}) before after	$P_{before-after}$ Wilcoxon's criterion
1.	6.5 (5.5; 8.0) 3.0 (1.8; 5.3)**	t = 1; p < 0.01	6.0 (5.0; 7.0) 4.0 (3.0; 5.0)**	t = 4.5; p < 0.01	5.0 (4.8; 6.3) 4.0 (3.8; 5.0)**	t = 3.0; p < 0.01
2.	6.0 (5.0; 6.0) 3.0 (2.0; 4.0)**	t = 3.0; p < 0.01	3.5 (2.0; 5.0) 3.5 (1.3; 4.8)	t = 28; p > 0.05	6.0 (5.0; 6.0) 4.0 (3.8; 5.0)**	t = 1.0; p < 0.01
3.	5.5 (4.0; 8.0) 4.0 (3.0; 5.0)	t = 16.0; p > 0.05	5.0 (4.3; 6.8) 4.5 (3.0; 5.0)**	t = 10.0; p < 0.01	6.5 (6.0; 8.0) 5.0 (4.0; 5.3)**	t = 1.0; p < 0.01
4.	5.5 (3.8; 7.3) 4.5 (1.0; 6.0)	t = 14.0; p > 0.05	5.5 (5.0; 7.0) 4.0 (3.3; 4.8)**	t = 8.0; p < 0.01	7.0 (5.0; 8.0) 5.0 (3.8; 5.0)	t = 3.0; p < 0.01
5.	5.0 (3.0; 6.0)** 2.0 (1.0; 4.3)	t = 4.5; p < 0.01	4.5 (3.3; 6.0) 4.0 (3.0; 5.0)	t = 16.5; p > 0.05	5.0 (4.0; 7.3) 4.5 (3.0; 5.3)	t = 15.0; p > 0.05
6.	6.0 (5.0; 7.3) 4.5 (3.0; 5.3)**	t = 2.0; p < 0.01	5.0 (4.3; 6.0) 4.5 (3.0; 5.8)	t = 16.5; p > 0.05	7.0 (6.0; 8.0) 5.0 (4.8; 6.0)**	t = 1.0; p < 0.01

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Table 2

Dynamics of multidimensional assessment of anxiety levels among school students of different ages in the process of psycho-correction (Me 25th, 75th percentile)

MASC, point	Group 2, age 9,3 ± 0,14 (n = 12); Me (C_{25}; C_{75}) before after	P_{before–after} Wilcoxon's criterion	Group 3, age 10,5 ± 0,09 (n = 14); Me (C_{25}; C_{75}) before after	P_{before–after} Wilcoxon's criterion	Group 4, age 12,4 ± 0,11 (n = 12); Me (C_{25}; C_{75}) before after	P_{before–after} Wilcoxon's criterion
7.	7.0 (5.8; 9.0) 3.0 (2.0; 5.3)**	$t = 6.0$; $p < 0.01$	6.0 (5.3; 7.0) 5.0 (3.3; 5.0)**	$t = 3.0$; $p < 0.01$	7.0 (5.8; 8.0) 4.5 (4.0; 5.0)**	$t = 4.7$; $p < 0.01$
8.	6.0 (5.0; 6.3) 5.0 (3.8; 6.3)	$t = 13.0$; $p > 0.05$	7.0 (5.3; 8.0) 6.0 (6.0; 7.0)	$t = 7.5$; $p > 0.05$	7.0 (6.0; 8.0) 5.0 (4.8; 6.0)**	$t = 1.0$; $p < 0.01$
9.	6.0 (4.8; 6.3) 4.0 (1.0; 5.3)*	$t = 8.0$; $p < 0.05$	5.0 (4.0; 5.8) 5.0 (3.3; 6.0)	$t = 18.5$; $p > 0.05$	5.5 (4.0; 6.3) 3.0 (3.0; 4.3)**	$t = 3.0$; $p < 0.01$
10.	6.0 (4.5; 7.0) 2.5 (0.0; 4.3)**	$t = 6.0$; $p < 0.01$	5.0 (3.3; 7.5) 3.0 (1.3; 5.5)**	$t = 2.0$; $p < 0.01$	4.5 (4.0; 6.0) 2.5 (2.0; 4.0)**	$t = 1.0$; $p < 0.01$
IAI	56.0 (50.3; 64.3) 38.0 (27.0; 43.0)**	$t = 1.0$; $p < 0.01$	54.0 (47.0; 58.3) 39.0 (33.3; 50.0)**	$t = 3.3$; $p < 0.01$	64.0 (56.0; 67.0) 44.0 (39.0; 50.0)**	$t = 5.8$; $p < 0.01$

Note: the MASC scales – 1) general anxiety; 2) anxiety in relationships with peers; 3) anxiety related to judgments by others; 4) anxiety in relationships with teachers; 5) anxiety in relationships with parents; 6) anxiety related to academic performance; 7) anxiety related to self-expression; 8) anxiety related to examinations; 9) decreased mental activity associated with anxiety; and 10) increased vegetative reactivity associated with anxiety; IAI – integral anxiety index.

Assessing anxiety in group 3

We applied cognitive-behavioral training 1–2 times per month. In total, we held 7 sessions. Each student completed 5–6 sessions using the BFB-Pulse simulator 1–2 times per week. The entire therapeutic course lasted 3 months.

Group cognitive-behavioral trainings and individual sessions using the BFB-Pulse simulator determined the results in this group – anxiety levels reduced by 0.5–2 points ($p < 0.01$) for scales 1, 3, 4, 7, and 10 (Table 2). Scales 1, 3 and 7 are associated with general anxiety, anxiety related to others' judgments, and anxiety that occurs in situations of self-expression. These scales correspond to the anxiety block, which is associated with a child's personality traits. A decrease in anxiety levels on these scales confirms the appropriateness of psycho-correctional interventions and their effectiveness.

Assessing anxiety in group 4

After 8 months of CBT in group 4, we observed a decrease in anxiety levels by 1–3 points for 9 MASC scales ($p < 0.01$) (Table 2). After 8 months of applying cognitive-behavioral therapy in the adolescent group, we reduced anxiety levels for all its structural directions. An exception is scale 5, which is associated with anxiety in relationships with parents. There was an insignificant decrease in this scale scores. Apparently, the training program did not emphasize parent-child interaction, which is important to consider in subsequent studies. Moreover, the parents did not participate in these activities.

Assessing anxiety in group 5

After a complex application of biofeedback sessions using the BFB-Pulse system, Jacobson's progressive muscle relaxation technique, and breathing exercises ($p < 0.01$), we found a decrease in SA and TA (Table 1). During trainings adolescents learned how to consciously manage their functional states using these interventions, which had a favorable effect. Thus, the mean SA indices decreased by 5.3 points, and the mean TA indices – by 7.4 ($p < 0.01$).

Discussion

During the adaptation period, elementary school students exhibit school-related anxiety, which may negatively affect their performance (Lyutova, 2007). At this age, the issue of examination-related anxiety is very important, which was confirmed by our research. This should be taken into account when children start to adapt to the educational process.

Our studies demonstrated that the use of CBT, sandtray therapy, fairytale therapy, and biofeedback training among elementary school students help reduce their anxiety levels, improve their emotional states, and acquire the skill of self-knowledge. During therapy, children could train themselves in anxiety-related situations, which provided an outlet for aggression and helped acquire the skill for joint communication with classmates. During games and discussions, children and adolescents learned to understand their emotional states and those of their peers.

Our results indicate the formation of children's positive self-esteem, self-acceptance, and the acceptance of their own capabilities. In the process of interacting with peer and adult referent others, sensitivity to their judgments decreased. At this age, special attention should be paid to teachers' and parents' carelessness in value judgments. For a highly anxious child with increased vulnerability, this may worsen the situation and lead to traumatic consequences.

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In result of our correctional work, younger adolescents (group 4) acquired the skill for effective communication with each other. We observed a decrease in levels of anxiety related to examinations and self-presentation, a decrease in anxiety-related vegetative reactivity, which affects the child's adaptation to stressful situations. After participating in this training, adolescents with deviant behaviors communicated with a psychologist more easily; they desired to improve their behaviors and to learn to control it.

In groups 2–4, where we used the MASC to assess anxiety, there was a tendency – a longer duration of psychotherapy resulted in more intense changes. Thus, in group 3, where psycho-correctional sessions lasted 3 months, anxiety levels decreased for 5 out of 10 scales; the integral anxiety index (IAI) decreased by 15 points ($p < 0.01$). In group 2, where the sessions lasted 4 months, anxiety levels decreased for 7 scales; IAI decreased by 18 points ($p < 0.01$). In group 4, where CBT lasted 8 months, there was a decrease in anxiety levels for 9 MASC scales; IAI decreased by 20 points ($p < 0.01$).

We should note that in the adolescent group (group 5), school students achieved a decrease in the levels of state anxiety and trait anxiety within a short period of psycho-correction (1.5 months). We know that to reduce state anxiety, individuals should acquire the skill for conscious managing their emotional experiences and states. This skill was acquired during the biofeedback training sessions. This indicates the advisability of using biofeedback training sessions among high-anxious adolescents.

In general, our work has shown the effectiveness of using such psycho-correction interventions as cognitive-behavioral training, biofeedback, fairytale therapy, and sandtray therapy. Today's teaching trends negatively affect mental states of children and adolescents and require huge personal resources. When choosing preventive psycho-correctional interventions, specialists should take into account the state of the nervous system and the age of the child. That may help students learn how to effectively overcome school problems and to improve their psycho-emotional states and academic performance.

Conclusion

Therefore, to improve the psycho-emotional states of children and adolescents, it is necessary to discuss the possibilities of introducing correctional classes that may use various interventions. For their greater efficiency, it is necessary to consider children's individual-typological characteristics and to involve individual work with them. The longer psychotherapeutic work with anxious children lasts, the more effective it is. Psychological work should be aimed at acquiring self-regulation skills, relieving muscle tension, increasing self-esteem and, as a consequence, increasing the level of school adaptation.

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O. P. Bartosh contributed to the research design, developed the theoretical framework, collected the data, carried out the statistical data analysis, and wrote the text of the manuscript.
T. P. Bartosh contributed to the research design, developed the theoretical framework, carried out the statistical data analysis, and edited the manuscript.

The authors declare no conflicts of interest.