

The problem of research and prevention of bullying in the school environment: analytical and practical aspects

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Abstract. The article considers the problem of studying and preventing, and also presents the results of the authors' practical experience - an express study to identify bullying in schools in Almaty. An analysis of the experience of foreign countries in preventing bullying shows that many of their programs are aimed at attracting all members of the teaching staff. The authors substantiate the fact that most programs do not take into account the potential "internal" resources of potential victims of bullying. The purpose of this study is an analytical study and practical justification of the problem of bullying in the school environment based on rapid research in teenage high schools. Some general characteristics typical of children at risk of bullying were noted on the basis of the results of Diagnostic methods: high level of anxiety, emotional lability, emotional volitional instability, timidity, low self-esteem, inadequate level of claims, low concentration of attention, avoidance - as the main strategy to overcome conflict situations. A "risk group" was identified based on the results of diagnostics and emotional development programs "World of Emotions" and trainings to develop skills to combat bullying, and "potential victims of bullying" were conducted with this risk group. The results showed positive dynamics, which confirmed the assumption that students need to develop skills to combat bullying - skills to combat bullying, such as: emotional stability, stability, poise, willpower, mental strength and so on.

1 Introduction

The educational environment of the school is diverse, it contains both positive factors and factors that have a negative impact on the mental development of students. One of these factors is bullying - a kind of harassment that "grew" out of abuse and violence in school. Humiliations, extortion, insults, threats, rejection by classmates became a characteristic phenomenon for many domestic and foreign schools, thus acquiring an international character. According to the study of the World Health Organization, 64% of 11-year-old Lithuanian schoolchildren, 50% of the Russian, 46% of the Belgian, are periodically

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bullied. This indicator is equal to 32% in Austria, Luxembourg and Scotland, 30% in Canada and Switzerland, 25% in France (World Health Organization. International Report [1]. According to a study of the United Nations Children's Fund (UNICEF) held in 2011 in Kazakhstan, 66.2% of Kazakh schoolchildren faced school violence, 63.6% of them in the role of witness, 44.7% - in the role of the injured, and 24.2% admitted to committing violent acts (UNICEF representative office in Kazakhstan [2]. The review of adolescent bullying and the direction of preventive work, organization of assistance in bullying integrates all known Russian programs for the prevention of bullying up to this time. In the same work, a systematic analysis of all interdisciplinary studies of this problem is carried out. (Volkova E. N. [3]). In some Russian studies, the problem of bullying is considered as part of the prevention and correction of criminogenic orientation of the adolescent's personality. In these cases, the work is carried out as a restrictive program for monitoring the leisure time of aggressor students by juvenile inspectors. In our opinion, in these cases, the activity becomes less effective due to the lack of work with victims of bullying (Zubova, L.V. [4]). A systematic review of universal violence and child abuse prevention programs for parents by Elisa Rachel Pisani Altafim, Maria Beatriz Martins Linhares also helped us establish that bullying is a complex phenomenon that is influenced by several factors, although research results have so far been considered only in a socio-environmental framework. In accordance with the "bullying/victimization" model, we consider factors that affect both sides in an individual, family, collegiate group, school, and community [5]. The analysis of articles in recent years has shown that the problem of bullying is considered by researchers in various, even contradictory contexts: as a tendency of bullying expressed in aggressive adolescents for the purpose of self-affirmation [6]; as a consequence of feelings of loneliness and difficulty with sleep [7]. A very interesting study was conducted to identify social characteristics in the typology of hooliganism. The article provides an in-depth description of the hooligan victim [8]. There are works that are effective in our opinion, which raise the problem of countering bullying not by bullying bullies or isolating victims from aggressors, but focused on training social skills to improve the effectiveness of intervention for bullies and victims [9]. There are works that establish causal relationships of this problem, for example, psychological, physical and academic correlates of cyberbullying and traditional bullying [10], the impact of social networks and cyber-bullying on the General condition of young people [11], etc. The sociocultural aspect of school bullying, studied by Rachel E. Maunder and Sarah Crafter [12], allowed these authors to establish a relationship between aggression and violent behavior. Researchers also identify relationships between the types of bullying experienced by primary school children and their anxiety, condition-a character trait, self-esteem and certain socio-demographic characteristics [13]; between victimization of bullying and physical fitness among children and adolescents [14]. They are also looking for tools and technologies to identify the risk of violence in schools [15]. In recent years, researchers have begun to address the gender aspect of bullying more often. Thus, American researchers, analyzing the characteristics of successful programs focused on gender issues, the well-being of children, adolescents and youth, address the issue of threats to the well-being of children and adolescents in educational systems [16].

The purpose of this study is an analytical study and practical justification of the problem of bullying in the school environment based on express research in adolescent classes of secondary schools. **Object:** bullying as a phenomenon of aggressive targeted (deviant) or victim (sacrificial) behavior in adolescence. **Research hypothesis:** If we consider that bullying is a repetitive aggression that can be reproduced not only because of the teenager - the aggressor, but also the victim of bullying, then we can assume that preventive work is more effective in order to form anti-bullying skills in victims of bullying, because they can cause aggression among peers due to differences in appearance and personality traits (for

example, psychological instability, vulnerability, impulsiveness, lethargy, arrogant relationships with others, etc.).

2 Materials and methods of research to identify bullying in schools in Almaty

We were based on the following scientific methods and techniques in the study: Theoretical methods: study and analysis of scientific literature of domestic and foreign authors, generalization, systematization. General methods and techniques: anonymous questioning of pupils in order to identify the level of emotional comfort of children in school (2nd - 11th grades); questionnaires "Evaluate yourself" and "Bullying situation at school" V.R. Petrosyants (6th-7th grades); socio-metrics of Moreno according to business and emotional criteria in order to study the structure of interpersonal relationships - positive and negative choices were evaluated (6th - 7th grades); a modified version of the method B.D. Parygin in order to assess the psychological climate of the team (6th - 7th grades). Methods for the experimental group: methods aimed at identifying the psychoemotional state of the child, his personality characteristics, formality of the communicative skills: color test of Lusher, assessment of personal and situational anxiety Spielberger-Hanin; SAN - methodology for determining self-esteem and level of claims; methodology for determining the accentuation of the character of Leonhard-Schmishek; K. Thomas questionnaire "Assessment of behavioral strategies in conflict situations"; Sociability test; diagnostic technique of dominant defense in communication V.V. Boyko; projective technique "Man in the rain"; methods for a comprehensive assessment of emotional development of a personality: "Differential schools of emotions" according to K. Isard (to identify the most frequent occurrence of a little emotion); "Emotional contacts" V.V. Boyko (for the determination of the characteristic emotional properties of the adolescent and emotional barriers in interpersonal communication), "Emin" D.V. Lucin (for measuring the level of emotional education). In total, 340 participants of adolescent classes took part in the rapid study to identify bullying in school (conducted on the basis of several secondary schools in Almaty - information about schools is confidential), including: 205 people - students of grades 6 (95 girls and 110 boys); 135 people - students of grades 7. classes (75 girls and 60 boys) and At the beginning of the work, a mass anonymous survey of pupils from grades 2 to 11 was conducted in order to identify the level of emotional comfort of children at school. Further diagnostic work was carried out among the participants of grades 6-7 using questionnaires "self-assessment" and "bullying Situation in school" by V. R. Petrosyants. The technique meant the selection of random numbers bullying I (the number of participants in respect of which the action of bullying begins not less than six months ago and carried out at least once per week) and casual bullying II (number of participants, in relation to whom the act of bullying committed: 1) less than once a week and lasted no more than six months; 2) at least once a week and last less than six months, or 3) last more than six months, but occur less than once a week. Using the questionnaire "bullying Situation in school" V. R. Petrosyants identified potential "victims" and "offenders". As a result, 160 participants were selected from 340 participants: 85 potential "victims" and 75 potential "abusers".

3 The results of the Express study

The analysis of the results showed that more than 60.0% of students experienced bullying (27.38% - bullying cases I and 33.33% - bullying cases II), this phenomenon is more typical for girls. By class, these indicators range from 20.0% to 80.0%. For sixth grades, the results are comparable (total at 58.0%, 24.4% bullying I and 37.6% bullying II), the tendency is

more pronounced for boys. The average value of the class indicator (the degree of severity of bullying, which is determined by dividing the total number of actions by the total number of respondents) is 7.17%. This result varies considerably depending on the class.

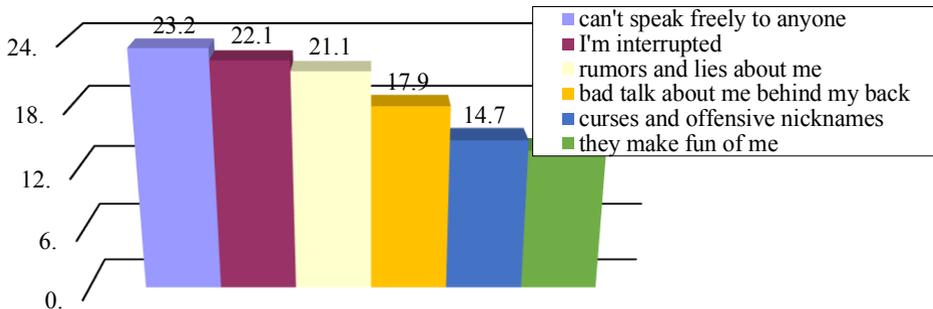


Fig. 1. Types of bullying that are common in the school according to respondents (General sample).

The prevailing frequency of occurrence are the following statements: others prevent me from talking freely with someone (23.2%); others interrupt me when I want to say something (22.1%); others spread rumors and lies about me (21.1%); others speak badly about me behind my back (17.9%); curses and offensive nicknames towards me (14.7%); some guys make fun of me (13.7%). This information is clearly shown in the histogram in figure 1.

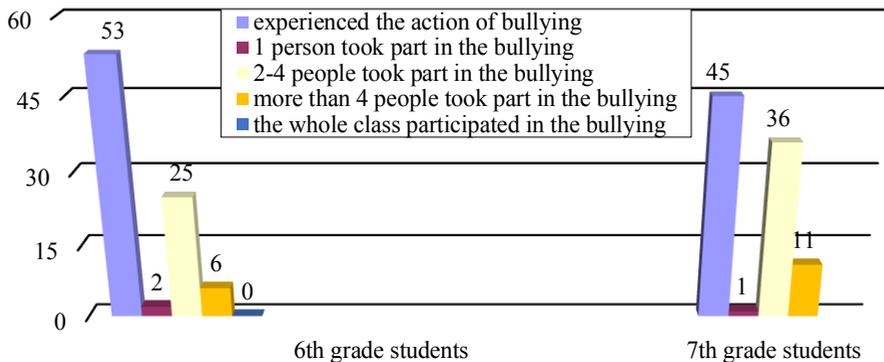


Fig. 2. Responses to the question of whether you have experienced bullying and how many people took part in it.

As can be seen in Figure 2, most of the 6th and 7th grade students noted that experienced bullying from 2 to 4 people. Over 45% of the seventh-graders and 53% of the six-graders experienced bullying from their classmates.

As you can see from the histogram (figure 3) on the question " who will you reach out to talk about it?" the first positions among 7th grade students are taken basic answers: to friends and girlfriends (29,9%); to parents (29,6%); i have no one to reach out to, but i do not need anyone; (14%). For sixth-graders in the first place among the answers was to reach out to parents (38%), the second place is dominated by teachers (3.3%) and a psychologist (10.2%), the rest of the choice of answers has the same trends. The study of the structure of interpersonal relations showed that in classes with a greater severity of bullying in the structure of interpersonal relations a group of isolated and outcasted ones (these are sixth classes) is more numerous. The total number of children who made up this group was 12 people out of 78 surveyed.

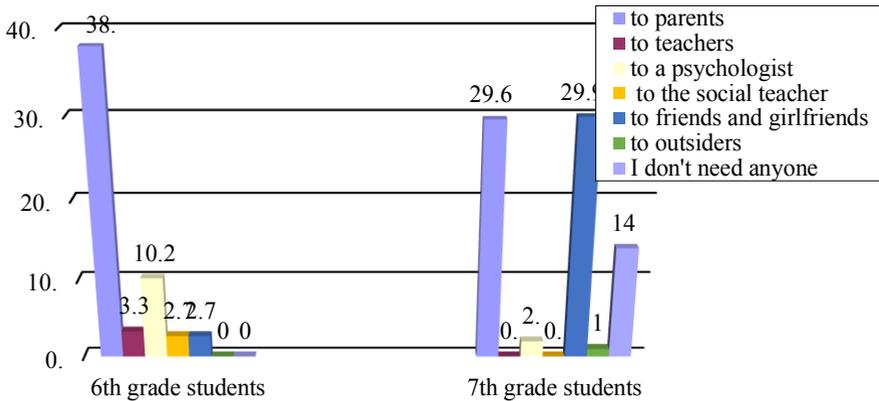


Fig. 3. Responses to the question: “who will reach out to talk about it?”.

Most of the students in the classes studied by us are included in the group of “accepted” (middle-class). The group of “stars” and “preferred” is not numerous. The structure of interpersonal relationships varies depending on the selection criteria. The most unstable group, as a matter of composition, as well as the number - is the group of “unaccepted.” More stable sympathy from classmates is seen towards the “stars”. Further, with adolescents who are at risk as “potential victims of bullying” (identified by the questionnaire “Bullying situation in school” by V. R. Petrosyants) – experimental group (17 people) the following methods were used to identify the psycho-emotional state of the child, his personal characteristics, the formation of communication skills: Luscher color test, assessment of personal and situational anxiety Spielberger-Hanin), determination of self-esteem and level of claims, determination of accentuations of the character of Leonhard-Schmischek, “Assessment of strategies of behavior in conflict situations” questionnaire by K. Thomas, “Sociability” test, methods of diagnostics of dominant defensive strategy in communication by V. V. Boyko, projective technique “Man in the rain”. Since at the individual level, the victimization of a person depends on temperament and some other characterological properties, on the genetic predisposition to self – destructive or deviant behavior, we found it necessary to study the specifics of the types of accentuations of personality with the help of the personal questionnaire of Leonhard-Schmischek. This revealed that the “victims” are most often found pedantic and exalted types of accentuation, followed by an anxious type and emotive. While “offenders” most often have a hyperthymic type, in the second place – demonstrative type, on the third - stuck and excitable types of accentuations. Thus, the most common emotive type of accentuation of personality if found among “victims”, “offenders” are mostly hyperthymic, stuck, excitable and demonstrative types.

According to the results of the methods performed, some common features of children that are capable of falling into the risk group of bullying are noted: high level of anxiety, emotional lability, emotional volitional instability, shyness, low self-esteem, inadequate level of claims, lack of communication, low locus of control, tendency of being driven, avoidance - as the main strategy for overcoming conflict situations. With the given experimental group, the implementation of the projective drawing methods “Do you need success?”, “Norms of our life”, etc., was also organized. As a result, we found that individual victim predisposition in adolescence is determined by the degree of expression of personal qualities of minors. That is, we concluded that the formation of their anti-bullying skills is prevented by previously formed complex of psychological qualities (emotional instability, anxiety, inadequate self-esteem), the absence of social support and certain strategies of family education of the father and mother. As a result of our diagnostic work with group risk - “Potential victims of bullying” can be estimated to show a small percentage increase in anti-bullying

skills: emotional stability, stability. Mental and physical strength, willpower do not have such dynamics due to this, that the experimental work was not held for a long time, and did not have a wide coverage of all the lesson and extracurricular activities of classes and risk groups. At the same time, there is a dynamics of increase in a positive way with respect to the parameters attributed by us to the highly functional strategies and skills of behaviour (on the basis of formulated anti-bullying skills): decision making and overcoming life problems (11%); assessment of the social situation and acceptance of responsibility for their own conduct in it (9%); perception, use and provision of psychological and social support (6.3%); leaving their borders and protecting their own personal space (17%); self-protection (21%), self-support and mutual support (24.6%); non-conflict and effective communication (16.7%). As a result of a consultative-corrective and rehabilitation work with "I", we found that in order for the child to adapt more easily and overcome the difficulties of communication in the team, didn't become victimized, corrupted, etc., he needs to keep a positive self-image. And also, I found that teenagers with low self-esteem so react to one or another failure, that this complicates any possibility of self-assertion. In addition, they do not evaluate the results of their activities only very low, but they are extremely concerned about the opinions of others, Especially if the latter are most likely to have an unfavorable assessment, therefore, a noticeable decrease in self-esteem in adolescence is associated with a focus on peer opinion, on a reference (authoritative for a teenager) group of people.

Consequently, the special vulnerability of these adolescents to the negative impacts of any kind is obvious by the pressure of the environment. "Potential victims of bullying", a comprehensive assessment of emotional development of the person was held to measure the level of emotional development of adolescents at risk based on the results of three methods: Methodology "Differential Schools of Emotions" (by K. Isard), the method of diagnostics of emotional barriers in the interpersonal communication "Emotional contacts" V.V. Boyko and methodology "Emin" D.V. Lucin.

Each of the methods is designed to evaluate different aspects of emotional development: the "ShDE" methodology was used in our study to identify the most frequently occurring emotions in the adolescent; methodology "Emotional contacts" to determine the characteristic emotional properties of a teenager; "Emin" method for measuring the level of emotional education. According to the method of "Emin" D.V. Lucina, diagnosis of various aspects of emotional intelligence gives reason to conclude that that: a high level of emotional intelligence in 14.30% of adolescents at risk, an average of 44.25% adolescents, low 41.45% adolescents. However, the interpretation of individual scales is more informative in our research. We would like to pay attention to the distribution of the levels of development of the individual components of the emotional intelligence, such as the level of development of the ability to recognize emotions, the ability to describe your emotional state, and the ability to control their emotional state. The research showed: 42.85% of adolescents at risk do not know how to describe emotional states, like their own, so other people; do not know how to control their emotional state 32.12% of adolescents; insufficiently developed ability to recognize emotions, as own, so and others in 50% of adolescents.

We can make the following conclusions according to the analysis of the results of the processing of the methodology "Emotional contacts" by V.V. Boyko (Figure 4): the dominance of negative emotions is observed in 6.7% of adolescents at risk; unwillingness to get closer to people on an emotional basis is observed in 43.85% of adolescents; undevelopment, insensitivity of emotions is observed in 35.7% of adolescents.

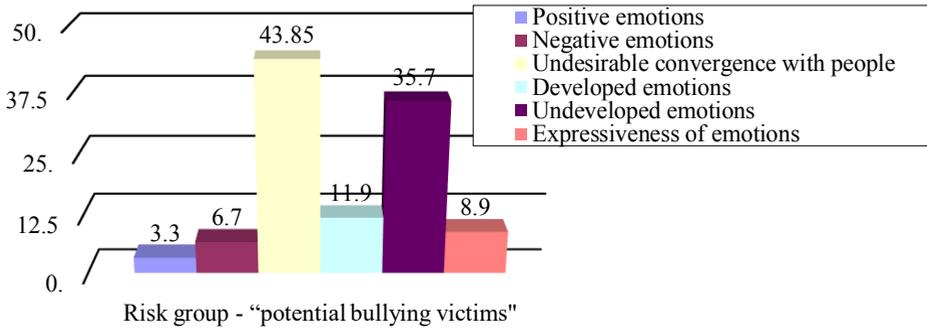


Fig. 4. Indicators of the risk group - "potential victims of bullying" by the method of diagnosis of emotional barriers in the interpersonal communication "Emotional contacts" V.V. Boyko.

The scale of differential emotions of K. Isard was used for the diagnosis of dominant emotional states of adolescents at risk, so as the emotional-motivational processes are of great importance for motivation, social communication, cognition. It is precisely in adolescence that the process of social communication is not only significant, but also often decisive, affecting all spheres of adolescence. "Differential scales of emotions" by K. Isard: negative well-being, lowered self-esteem for the given period, depressive state, depressing mood, state of anxiety, a sharp decrease in performance was observed in the amount of 34.76% of adolescents. Perhaps this was due to the fact that the diagnostics was held in the school after classes, however, these data are troubling (Figure 5).

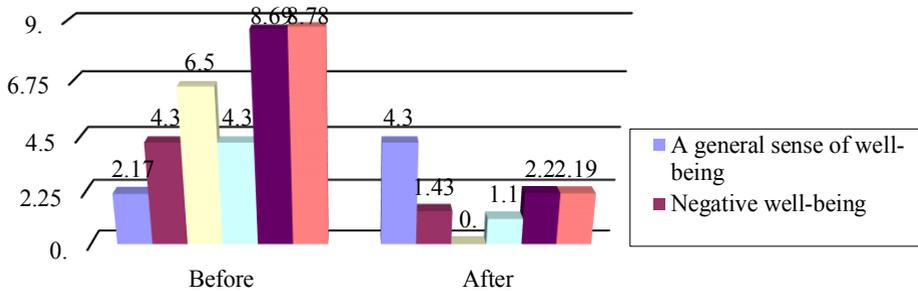


Fig. 5. Dynamics of risk group indicators - "Potential victims of bullying" by the Scale of differential emotions of K. Isard before and after the approbation of the program.

The program for raising the level of emotional development "World of Emotions" was tested based on the data of the conducted rapid research, and the identified significant problems of the emotional development of adolescents at risk. Objectives of the program: to develop risk groups for adolescents (as potential victims of bullying) the ability to recognize and describe their feelings, develop the ability to recognize and describe the feelings of others, to train the ability to manage their emotional states, to increase the general level of emotional competence, to develop skills of interpersonal interaction. These skills, in our opinion, are also anti-bullying, because they help to develop emotional stability and invulnerability. The second rendition of the School of Differential Emotions K. Izard allowed to reveal some progress in the emotional development of this experimental group (see Figure 5) for the diagnosis of dominant emotional states of adolescents of the risk group after testing the program for raising the level of emotional development "World of Emotions". Only in 8.7% of adolescents at risk were identified such a negative state of health, reduced self-esteem for a given period, a depressed state - melancholy mood, anxiety, a sharp decrease in working capacity, it is almost four times less than the initial indicators. At the same time, this

group remains in the priority of answers as well as at the initial stage: I can't understand my condition; I have nothing to say; I don't understand what I feel, etc. In conclusion, these teenagers remain emotions of uncertainty of their condition, nervousness, anxiety despite the well-formed adequate self-esteem, increased mood and decreased depression. Further, a training was conducted with this risk group on the formation of anti-bullying skills, consisting of followings: a cycle of exercises on the development of stress-resistant qualities of the personality of students; a cycle of exercises on the formation of a healthy lifestyle, highly functional strategies and skills; a cycle of exercises for the formation of skills of conflict-free and effective communication; on direct recognition and development of existing personal resources conducive to the formation of a healthy lifestyle and high-performance behavior, etc.

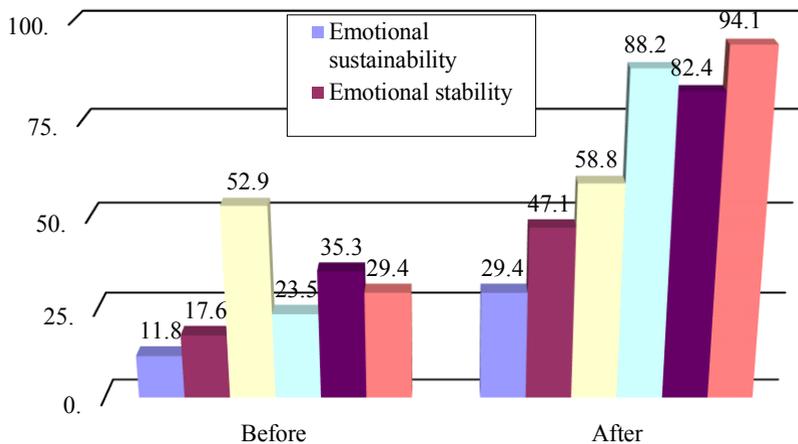


Fig. 6. Dynamics of indicators of anti-bullying skills of adolescents at risk group - «potential victims of bullying» before and after the training.

As we see from the histogram in Figure 6 “approbation the program for raising the level of emotional development “World of Emotions” (hereinafter referred to as the Program) and training on the formation of anti-bullying skills”, the experimental group increased the number of emotionally stable, balanced, having psychic power and willpower, controlling their emotions according to many indicators of the required skills. Since there are 85 participants in this group, this dynamics of the evidence indicates a slight increase in the number of participants in the risk group with anti-bullying skills. At the same time, the confirmatory test demonstrates the need for such work., because the participants in the approbation programs have acquired the necessary skills to confront bullying in a short time. And although the percentile of dynamics is not high for all skills (it varies from 17.6% to 29.5% for the necessary emotional skills), according to skill - “balance” generally almost unchanged – there is 5.9% growth. But for the skills of “managing emotions” the difference is 64.7%, and for “willpower” - 47.1%. All this suggests that these skills do not grow spontaneously, they need to be formulated in a specially organized activity. And only then we can state that a strong anti-bullying barrier of skills is created, which will become the main prevention of cruelty and violence in the school in the future.

4 Conclusion

So, the work with group risk allowed us to obtain the following positive results in the framework of approbation the program: we could touch upon some issues of every child who participated in a group work to some extent; we could discuss and work on many important

issues of communication and emotional control: listening skills, acceptance of others, the ability to recognize and express feelings and so on; the ability of reflecting each participant was greatly developed. Negative results include failures in working with two specific adolescents (X and Y). This is due to the unreadiness of these adolescents for group work, and lack of time to more fully establish contact with them, necessary for collaboration, and with insufficient analysis of their own emotional reactions (leading experimental work) in the process of working with the students. So we have established as a result of working with a group risk that the main reasons for the school bullying by the victim are: appearance, dialect, low or high self-esteem, fear and anxiety, excessive sensitivity, a good school record, pronounced physical illness, imposition one's idea on everyone, violation of the rules and boundaries of others. The main reasons for school bullying from the side of the buller are: attracting attention, revenge, power struggle, fight for justice, envy, elimination of an opponent, self-affirmation, feelings of resentment.

Thus there are following conclusion according to the results of rapid research: 1) adolescents recognize that there is a problem of violence in the school, peers and older students are as a threat of violence; 2) the prevailing forms of violence in the school, according to students, are: humiliation, gossip and intrigue, threats, exclusion from joint activities; 3) the majority of adolescents have a desire to respond in the same way, a feeling of fear and suppression in case of observance of violence; 4) the "victims" of bullying are more often ignored, ridiculed, spread of false rumors, physical violence, thus, forms of psychological violence prevail over physical; 5) most of the "victims" do not realize the reasons for bullying in relation to themselves, they consider that the reason is in their appearance or behavior; 6) adolescents who survive only physical abuse tend to have frequent contact, they need support and approval, have a high level of self-esteem; 7) after mental abuse, there are noted high suspicion and dependence in interpersonal communication, low self-esteem, lack of identification with the school, reduction of need for communication with family and peers; 8) the combination of physical and mental violence contributes to high subordination in interpersonal relationships. Thus, the results showed positive dynamics, which confirmed the assumption about the need for students to form anti-bullying skills such as: emotional sustainability, stability, poise, willpower, mental strength and so on. The research confirms the need to increase the professionalism and competence of teachers and psychologists in the prevention of bullying in the school environment.

References

1. *World Health Organization. Growing up unequal: gender and socioeconomic differences in young people's health and well-being. International Report from the 2013/2014 Survey*, http://www.euro.who.int/__data/assets/pdf_file/0003/303438/HSBC-No.7-Growing-up-unequal-Full-Report.pdf
2. *Assessment of violence against children in schools in Kazakhstan. Establishment of the Commissioner for human rights in the Republic of Kazakhstan and UNICEF Representation in Kazakhstan with the support of the Ministry of foreign Affairs of Norway* (Astana, 2013) <https://www.unicef.org/kazakhstan/media/2066/file/%D0%9F%D1%83%D0%B1%D0%BB%D0%B8%D0%BA%D0%B0%D1%86%D0%B8%D1%8F%20.pdf>
3. E.N. Volkova, *Bulletin of practical psychology of education* **16(3)**, 50-57 (2019) DOI: <https://doi.org/10.17759/bppe.2019160301>
4. L.V. Zubova, *Psychology and Psychotechnics* **1**, 15 (2017) DOI:10.7256/2454-0722.2017.1.23288

5. E. Rachel Pisani Altafim, M. Beatriz Martins Linhares, *Psychosocial Intervention* **25**, 27–38 (2016) <http://dx.doi.org/10.1016/j.psi.2015.10.003>
6. F. Yüksel-Şahin, *Procedia - Social and Behavioral Sciences* **1912**, 214-221 (2015) doi: 10.1016/j.sbspro.2015.04.415
7. R. Tavares Jomar, V. Augusto de Oliveira Fonseca, D. de Oliveira Ramos, *Jornal de Pediatria*In press (2020) <https://doi.org/10.1016/j.jped.2020.03.005>
8. M. Terrazo Felipe, S. de Ossorno García, J. Martín Babarro, R. Martínez Arias, *Procedia - Social and Behavioral Sciences* **29**, 869-878 (2011) doi:10.1016/j.sbspro.2011.11.316
9. K. Kõiv, *Procedia - Social and Behavioral Sciences* **45**, 239-246 (2012) doi: 10.1016/j.sbspro.2012.06.560
10. R.M. Kowalski, S.P. Limber, *Journal of Adolescent Health* **53(1)**, s13-s20 (2013) <http://dx.doi.org/10.1016/j.jadohealth.2012.09.018>
11. W. Craig, M. Boniel-Nissim, N. King, S.D. Walsh, W. Pickett, *Journal of Adolescent Health* **66(6)**, s100-s108 (2020) <https://doi.org/10.1016/j.jadohealth.2020.03.006>
12. R.E. Maunder, S. Crafter, *Aggression and Violent Behavior* **38**, 13-20 (2018) <https://doi.org/10.1016/j.avb.2017.10.010>
13. Birsal Canan Demirbağ, Zeynep Çiçek, Çağla Yiğitbaş, Çiğdem Gamze Özkan, Ahmet Dinçer, *Procedia - Social and Behavioral Sciences* **23721**, 398-404 (2017) doi: 10.1016/j.sbspro.2017.02.077
14. A. Garcia-Hermoso, X. Oriol-Granado, J. Enrique Correa-Bautista, R. Ramírez-Vélez, *International Journal of Clinical and Health Psychology* **19(2)**, 134-140 (2019) <https://doi.org/10.1016/j.ijchp.2019.02.006>
15. Y. Ni, D. Barzman, A. Bachtel, M. Griffey, M. Sorter, *International Journal of Medical Informatics* **139**, 104137 (2020) <https://doi.org/10.1016/j.ijmedinf.2020.104137>
16. J.K. Levy, G.L. Darmstadt, C. Ashby, M. Quandt, E. Halsey, A. Nagar, M.E. Greene, *Lancet Glob Health* **8**, e225–36 (2020) [https://doi.org/10.1016/S2214-109X\(19\)30495-4](https://doi.org/10.1016/S2214-109X(19)30495-4)