

Psychological Indicators of Delinquent Behavior in Adolescents: The Potential of the 'Psychological Risk Factors of Deviant Behavior in Adolescents Inventory' for Differentiating Between Adolescents with Delinquent Behavior, Drug Addiction, and Controls

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Background. The Psychological Risk Factors of Deviant Behavior in Adolescents Inventory was developed based on "empirical keying" comparisons of answers to a pull of self-regulation-related items in clinical (drug addicts) and control groups.

Objective. To reveal differences between adolescents with delinquent behavior from drug addictions and controls using the Psychological Risk Factors of Deviant Behavior in Adolescents Inventory and to study their relationships to anxiety, depression, and personal resources.

Design. 760 adolescents aged 13–17 from three schools of the Murmansk Region of Russia, 288 from eight Russian special education institutions for adolescents with delinquent behavior (prevalent diagnosis was F91), and 108 adolescents having drug addiction filled out the Psychological Risk Factors of Deviant Behavior in Adolescents Inventory. Adolescents from the control and delinquent behavior groups also filled out the Hospital Anxiety and Depression Scale. Additionally 280 pupils in the 10th–11th grades and 99 adolescents with delinquent behavior in the 10th grade and up filled out the Hardiness Test, Life Orientation Test, and Self-Efficacy Scale.

Results. Data reproduced results indicating higher dissatisfaction with relationships with parents, "black-and-white" thinking, a technology addiction tendency and antisocial tendencies, a low level of self-regulation and a high level of risky behavior and sensation seeking in adolescents with drug addictions that could be explained not only by psychological differences but also by different social situations or strategies in responding to items. Adolescents with delinquent behavior also reported higher antisocial tendencies, novelty seeking, as well as lower self-regulation. In both the clinical and control groups, there were reasonable correlations between better self-regulation (lower technological addiction and antisocial tendencies, better self-regulation and emotion control) and personal resources of self-regulation.

Conclusion. Antisocial tendencies, novelty seeking, and lower self-regulation could be psychological indicators of self-regulatory deficiencies in adolescents with a risk of involvement in delinquent behavior, but further studies are needed to distinguish whether these differences are explained by self-regulation, social situation or strategy of responding to items in adolescents with deviant behavior compared to controls.

Keywords: psycho-diagnostic, self-regulation, adolescents, drug addiction, delinquent behavior, Psychological Risk Factors of Deviant Behavior in Adolescents Inventory

Introduction

Psychodiagnostic instruments for screening for risk factors of possible deviant behavior in adolescents is of acute importance due to the high sensitivity of children and youth to psychological interventions and the negative prognosis for deviant behavior if it develops in adolescence. Existing data suggests that there are common self-regulatory deficiencies underlying different forms of deviant behavior, which could potentially be used as psychological indicators of risk: impulsivity (Patton, Stanford, & Barratt, 1995) and low self-control (Maranges & Baumeister, 2016; Hagger, Wood, Stiff, & Chatziasarantis, 2009); risky behavior and sensation seeking (Zuckerman, 2007); and imbalanced time perspective (Hall & Fong, 2007). For instance, drug addiction was related to impulsivity and self-control deficiencies (Shin, Chung, & Jeon, 2013; Verdejo-Garcia, Bechara, Recknor, & Pérez-García, 2007); difficulties in emotion regulation (Poon, Turpyn, Hansen, Jacangelo, & Chaplin, 2016), as well as antisocial behavior patterns including aggressive ones (Jesús Gázquez et al., 2016), and sensation seeking and risky behavior (Bidwell et al., 2015; Kong et al., 2013). Similarly, sensation seeking and impulsivity (Mann et al., 2017), low self-control (Bahadorikhosroshahi & Habibi-Kaleybar, 2017), and aggression and antisocial attitudes (Xie et al., 2017; Savolainen et al., 2012) were found in people with delinquent and aggressive forms of behavior, especially adolescents.

However, taking into account that psychological deficiencies in clinical samples are frequently explained by the common factor of “demoralization” (Tellegen et al., 2008), these psychological factors require proof of their specificity compared to general psychopathological symptomatology. There is also a need for comparisons of such risk factors with the wide range of personal resources suggested in positive psychology as factors contributing to successful self-regulation and buffering negative effects of stress and high situational demands (Leont’ev [Ed.], 2011). Another problem in the screening for risk factors is related to possible falsifications in responses by adolescents with deviant behavior, which could be not only an attempt to give socially desirable answers, but also a result of compensation or poor reflection.

Tellegen and colleagues (2008) differentiate three approaches to personality psychodiagnostics: (a) “empirical keying”, which is used in the MMPI-2 and is based on empirical choice of items with different patterns of endorsements in the normative and clinical groups; (b) a theoretical approach that is based on theoretical models; and (c) a psychometric approach that is based on defining as many research constructs as possible and further statistical selection of items that allow for the best description of the sphere of research. However, as the authors mentioned, today most researchers use a mix of approaches. For instance, in the MMPI-2, most constructs were revised due to their psychometric properties.

This strategy was embodied in our study of the risk factors of deviant behavior in adolescents (Demenko, Rasskazova, Tkhostov, Brun, & Arshinova, 2018). First, based on expert appraisals and existing studies, we chose items from various inventories related to self-regulation, and also formulated some new items. Second, items differentiating clinical and normative samples (the “empirical keying”

strategy) were selected, and, finally, new scales were created from these items based on expert appraisals (content validity), reliability, and factor structure, especially in the clinical sample. Comparison of 108 adolescents with drug addiction and 637 adolescents from various Russian schools revealed 50 items that differentiated the clinical and control groups. Expert and psychometric appraisal of the items made it possible to suggest the following scales: technological addiction, antisocial tendencies, low self-regulation, emotional control, novelty seeking, risky behavior, and child–parent relations, as well as additional indicators of answers that are considered socially desirable, random answers, and answers that express “black-and-white” thinking (the last of these indicate a tendency to either complete agreement or complete disagreement with some items, which was typical of addicts compared to controls). Adolescents with drug addiction compared to controls demonstrated dissatisfaction with child–parent relations, “black-and-white” thinking, low self-regulation, and a tendency toward technological addiction, but reported high emotion control and did not report novelty seeking and risky behavior.

The aims of the present study were to reproduce previous differences between adolescents with drug addictions and controls on the Psychological Risk Factors of Deviant Behavior in Adolescents Inventory (Demenko et al., 2018) using another control sample, as well as to reveal their difference from another form of deviant behavior: delinquency. We suggested that at least some of the psychological risk factors revealed in drug addicts would be similar to those in adolescents with delinquent behavior. Moreover, for further validation of the Inventory, we studied relationships of the scales for anxiety, depression, and personal resources (hardiness, optimism, self-efficacy). Based on Leont’ev’s model of personal resources of self-regulation (Leont’ev [Ed.], 2011), we suggested that a deficiency in self-regulation typical of delinquent behavior would be related to a deficiency in personal resources underlying that type of self-regulation.

Methods

The control group included 760 pupils (356 males) from three schools in the Murmansk Region of Russia; 480 adolescents were in the 7th-9th grades and 280 were in the 10th-11th grades.

The clinical group included 288 adolescents (205 males) aged 13–17 from eight special education institutions for adolescents with delinquent behavior. It should be noted that proportions of male and female offenders in the sample does not correspond to their proportions in the population. There are separate male and female special education institutions for offenders in Russia. Five male and 3 female institutions agreed to participate in the study. Information about delinquencies and diagnoses was obtained by psychologists of each institution who organized access to a computer-based platform with inventories and assisted participants if they had questions. In Russia such institutions are closed ones so there was no opportunity to control for differences between organization of the testing in different institutions, and that is the limitation of the study. For the same reason all the information about delinquencies and diagnoses obtained was general for the subsamples (we could have it for 5 out of 8 institutions) and could be used only for general descrip-

tion not allowing for statistical comparisons. The most frequent delinquencies were theft, drug selling and use, and robbery. Most of the adolescents had either F91 diagnoses according to ICD-10 (verified by psychiatrists either before their offense or after they were referred to the institution) or no mental disorder diagnoses. The subjects included 189 in the 7th–9th grades, 75 in the 10th–11th grades, and 24 were first- or second-year college or university students before they were referred to the special education university.

An additional comparison group included 108 adolescents (62 males) aged 12–19 from various Moscow schools and with another form of deviant behavior, drug addiction, from the previous study (Demenko et al., 2018).

The *Psychological Risk Factors of Deviant Behavior in Adolescents Inventory* includes 56 items combined into 8 scales: social desirability, technological addiction, antisocial tendencies, low self-regulation, emotional control, novelty seeking, risky behavior, and child–parent relations (Demenko et al., 2018). There is an additional scale for answers that express “black-and-white” thinking, which includes 7 items that evoked either complete agreement or complete disagreement in addicts more frequently than in controls ($p < .05$). The initial pull of items for the Inventory included items from Zuckerman’s Sensation-Seeking Scale (Zuckerman, 2007), the Barratt Impulsivity Scale (Patton et al., 1995); the Style of Behavioral Self-Regulation Questionnaire (Morosanova, 2001); the Frontal Systems Behavior Scale (Grace & Malloy, 2001), the Behavior Rating Inventory of Executive Functions (Gioia, Isquith, Guy, & Kenworthy, 2000); the Technology-Related Psychological Consequences Questionnaire (Emelin, Tkhostov, & Rasskazova, 2014); and the Parent–Child Relationships Questionnaire (Trojanovskaia, 2003), as well as new items suggested by the researchers.

The final items were derived using the “empirical keying” method and were combined into scales based on expert appraisals and psychometric characteristics. Cronbach’s alphas were .67–.91 for the different scales in adolescents with drug addiction, except for the antisocial tendencies scale, which had demonstrated low consistency in the previous study (.55). In the present study, Cronbach’s alphas for the scales in the normative sample were acceptable (.64–.90) for all the scales except the antisocial tendencies and low self-regulation scales. As for MMPI-2 (Tellegen et al., 2008), while combination of “empirical keying” with expert appraisals and reliability testing led to meaningful and reliable scales, it could not provide a clear meaningful factor structure across groups, thus not allowing us to test measurement invariance. We address this limitation below in the paper. For convenience, the raw scores for each scale were standardized based on our normative sample and transformed into an IQ-type scale with a mean of 100 and standard deviation of 15. This transformation does not affect any of the statistical analysis below, but it makes perception of the results easier for teachers and for further implementation of the results in consultations with pupils (Prochaska, Wright, & Velicer, 2008).

All the adolescents from the control and delinquent behavior groups filled out the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983); 280 pupils in the 10th–11th grades and 99 adolescents with delinquent behavior from 10th grade and up additionally filled out the Hardiness Test (Maddi, 2002; Leont’ev & Rasskazova, 2006), the Life Orientation Test (Scheier & Carver, 1985; Gordeeva,

Sychev, & Osin, 2010), and the Self-Efficacy Scale (Schwarzer, 1993). The Life Orientation Test was suggested as a screening measure of dispositional optimism, and the Self-Efficacy Scale as a measure of the general confidence of the person in his/her capacity to follow their chosen goals and to achieve them. The Hardiness Test includes three components of hardiness as a system of beliefs buffering stress and its negative impact on health: commitment (the belief that through active involvement one could find important and interesting things in life); control (the belief that through active achievement and struggle one could be successful); and challenge (the belief that a person should stay active or even take risks, because even negative results could be used as a positive experience and resource for the future; an important part of challenge is the capability to learn from mistakes). In the control group Cronbach's alphas for all the scales, but depression, varied from medium to excellent (.70–.91). In the clinical group they were of the same range (.77–.87) for all the scales but depression and challenge. Reliability of depression scale was low in both groups (.40–.50) as well as reliability of the challenge scale in adolescents with delinquent behavior (.45). Although we describe results on all the scales below, it should be noted that data on depression and data on challenge in adolescents with delinquent behavior may be not trustworthy, and demand further studies.

Data were processed in SPSS Statistics 23.0. Taking into account the relatively large sample sizes, in addition to null hypotheses testing, we computed effect sizes (Henson, 2006).

Results

Common patterns of self-regulatory factors in adolescents with drug addiction and delinquent behavior compared to controls included a higher level of antisocial tendencies and novelty seeking, as well as low self-regulation (*Table 1*). Unlike the adolescents with drug addiction, adolescents with delinquent behavior were not dissatisfied with their relationships with their parents, did not demonstrate interest in risky behavior or think in “black and white” patterns, and had a significantly lower level of “socially desirable” answers and technological addiction tendencies comparing to controls. The latter result could be explained by their current experience of being in special education institutions, where technology use is limited and controlled. All the patterns of differences remained after implication of Bonferroni correction (*e.g.*, Bonferroni correction for comparisons of 9 scales lead to $p < .005$) and most of them were characterized by small (Cohen's $d > .20$) or medium (Cohen's $d > .50$) effect size (Cohen's $d > .20$).

Since previous study revealed some gender differences in the scales of Inventory although not moderating group differences (Demenko et al., 2018), we completed 2 (Controls versus Delinquent) \times 2 (Males versus Females) MANOVA for all the nine scales. Females scored higher than males on technological addiction tendency, antisocial tendencies, and novelty-seeking scales but lower on the emotion control scale ($F = 17.10\text{--}41.55$, $p < .001$). However, all the major effects of group on scales remained significant ($p < .005$), and no interaction effects between gender and group were revealed.

Age was almost unrelated to the scales of Psychological Risk Factors of Deviant Behavior in Adolescents Inventory. In the clinical group there were no scales correlated with age stronger than $r = .15$ while in the control group there was only one weak correlation between age and a lower score on “black-and-white thinking” scale ($r = -.16$). Consequently, we did not include age in further analysis.

Table 1

Comparison of adolescents with drug addiction and delinquent behavior with the control group, on the scales of the Psychological Risk Factors of Deviant Behavior in Adolescents Inventory

Scales	Adolescents with drug addiction (N = 108)		Student's t-test	Effect size Cohen's d	Adolescents with delinquent behavior (N = 288)		Student's t-test	Effect size Cohen's d
	Mean	St. dev.			Mean	St. dev.		
Parent-child relationships	89.87	18.28	-5.45***	.59	100.79	14.34	.76	.05
“Black-and-white” thinking	110.20	17.94	5.47***	.62	99.13	14.94	-.84	.06
Social desirability	101.60	18.07	.88	.10	96.24	12.94	-4.01***	.27
Technological addiction tendency	106.23	17.47	3.53***	.38	96.60	14.82	-3.29***	.23
Antisocial tendencies	107.62	19.79	3.85***	.43	103.46	14.54	3.36***	.23
Low self-regulation	108.08	20.43	3.96***	.45	106.42	14.15	6.28***	.44
Emotion control	96.49	17.85	-1.95	.21	98.50	15.17	-1.45	.10
Risky behavior	106.11	16.73	3.90***	.38	99.19	13.58	-.80	.06
Novelty seeking	109.25	18.84	4.89***	.54	104.31	12.77	4.64***	.31

Note. $N = 750$. * — $p < .05$. ** — $p < .01$, *** — $p < 0.005$.

Taking into account gender differences in some scales of the Inventory in the correlational analysis, we calculated both Pearson's correlations and partial correlations adjusted for gender. The general pattern of correlations remained the same and Table 2 provides partial correlations. In the normative sample, satisfaction with relationships with parents is related to greater hardiness, optimism, and self-efficacy, but also to higher anxiety. By contrast, there is no correlation between parent-child relationships and personal resources in adolescents with delinquent behavior. Antisocial tendencies and low self-regulation as possible general indicators of deviant behavior, as well as a tendency toward technological addiction, are related to lower levels of hardiness, optimism, and self-efficacy, but also to a lower level of anxiety. On the other hand, greater emotion control is correlated to higher levels of

anxiety, depression, and hardiness, but is unrelated to optimism and self-efficacy. There are only low or nonsignificant correlations between personal resources on the one hand, and risky behavior and novelty seeking on the other.

Differences in correlations in the control and clinical samples are rare. The most prominent differences are the positive correlations of hardiness challenge, hardiness control, and self-efficacy with parent-child relationships in the controls, compared to no such correlations in the group with delinquent behavior. Additionally, hardiness challenge could be affected by a socially desirable strategy for answers in controls, but not in adolescents with delinquent behavior. Greater emotion control is related to self-efficacy in controls, but not in the clinical sample. However, after implementation of Bonferroni correction for multiple comparisons, the only difference in correlations between groups is that warmer parent-child relationships are related to higher control in the control group but not in the clinical group.

Table 2

Partial correlations adjusted for gender of scales of the Psychological Risk Factors of Deviant Behavior in Adolescents Inventory with anxiety, depression, and personal resources (in control / clinical groups)

Scales	Anxiety	Depression	Hardiness - Total Score	Hardiness - Commitment	Hardiness - Control	Hardiness - Challenge	Optimism	Self-efficacy
Parent-child relationships	.32*** / .14	.12 / -.18	.40*** / .12/	.36*** / .20	.37*** / -.01	.36*** / .12	.31*** / .22*	.33*** / .09
“Black-and-white” thinking	.04/ .04	-.08/ .31***	.27*** / .42***	.27*** / .43***	.29*** / .29***	.20*** / .32***	.21*** / .27**	.22*** / .19
Social desirability	.24*** / .11	.10/ .30***	.35*** / .19	.36*** / .21*	.34*** / .24*	.26*** / .03	.21*** / .15	.21*** / .16
Technological addiction tendency	-.21*** / -.19	.01/ -.21*	-.38*** / -.35***	-.31*** / -.26*	-.42*** / -.31***	-.29*** / -.32***	-.24*** / -.27**	-.22*** / -.25*
Antisocial tendencies	-.23*** / -.24*	-.14* / -.08	-.35*** / -.36***	-.34*** / -.33***	-.33*** / -.27***	-.27*** / -.29***	-.29*** / -.27**	-.23*** / -.17
Low self-regulation	-.32*** / -.18	-.17** / -.17	-.46*** / -.38***	-.43*** / -.38***	-.43*** / -.34***	-.39*** / -.24*	-.32*** / -.37***	-.40*** / -.38***
Emotion control	.45*** / .29***	.15* / .23*	.47*** / .33***	.39*** / .22*	.46*** / .32***	.42*** / .27***	.26*** / .12	.26*** / .03
Risky behavior	-.22*** / -.15	-.08/ -.22*	-.14* / -.22*	-.12* / -.31***	-.12* / -.20	-.14* / -.04	-.07 / -.27***	-.06/ -.16
Novelty seeking	-.14* / -.28***	-.08/ -.08	-.11/ -.05	-.08/ .04	-.09/ -.07	-.12/ -.09	.01/ .02	.03/ .08

Note. * — $p < .05$. ** — $p < .01$, *** — $p < .005$. The scores that are in *Italic* are correlations that are different ($p < .05$) in the control and delinquent groups; correlation that is different ($p < .001$) is **bolded**.

Discussion

The aim of the study included further validation of the Psychological Risk Factors of Deviant Behavior in Adolescents Inventory (that was developed for differentiation between adolescents with drug addictions and controls) on adolescents with delinquent behavior, as well as revealing relationships between self-regulatory factors measured by the Inventory with anxiety, depression and personal resources. Due to the correlational design of the study, sampling strategies and methodological issues underlying this instrument (more details in Limitations section), we could not conclude about psychological factors for the risk of deviant behavior. However, based on previous studies, it seems reasonable that regulatory deficiencies could be typical for a wide range of deviant behaviors and thus could be used as psychological indicators of risk groups.

Comparisons of drug addicts' data with another normative sample replicated previous findings (Demenko et al., 2018), that they either appraised or just reported their relationships with their parents more negatively than did controls; they more frequently responded to a number of items with either complete agreement or disagreement ("black-and-white" thinking); and they admitted antisocial tendencies, signs of technology addiction, and a low level of self-regulation. However, inconsistent with previous findings, they did not respond in the "socially desirable" manner and appraised their emotion control as high as frequently as did controls. Moreover, in line with Zuckerman's (2007) model, adolescents with drug addiction expressed a higher (not lower) level of novelty seeking and risky behavior. These inconsistencies, which require validation in further studies (especially using another clinical sample of addicts), seem to reflect occasion fluctuations in the normative data.

Consistent with previous findings, gender differences on scales of inventory didn't explain nor interact with group differences. However, there was an interesting general pattern when females tended to respond more problems related to emotion control, antisocial tendencies, technological addiction as well as novelty seeking. While these results could be interpreted in terms of earlier pubertal changes in female adolescents, that it also possible that females are more sensitive to their emotion control problems and are more ready to report them. Age seemed to be only weakly related to scales of the Inventory.

Self-Regulation Patterns in Adolescents with Delinquent Behavior: Comparison with Drug Addicts and Controls

In line with our hypotheses, there are three indicators distinguishing both adolescents with drug addiction and those with delinquent behavior from the normative sample: higher antisocial tendencies, novelty seeking, and lower self-regulation. Interpreting these results, it should be noted that the antisocial tendencies scale includes items indirectly describing interest in socially disapproved behavior (for instance, "Beliefs about the harmfulness of alcohol are exaggerated" or "I would like to have a tattoo or piercing"). Thus, the antisocial tendencies scale does not describe current antisocial behavior, but rather beliefs that negative social opinion about some behavior could be inaccurate. Moreover, it should be noted that differences between adolescents with delinquent behavior and controls could

reflect not only self-regulatory differences but also differences in their current social situation (special education institutes) or differences in the reactions to items.

Suggesting that there are psychological differences underlying our results, our data are in line with the Zuckerman model of high sensation seeking and risky behavior as factors of deviant behavior (Zuckerman, 2007): While drug addicts demonstrated interest in both novelty seeking and risky behavior, adolescents with delinquent behavior had higher scores for novelty seeking only. Although this result might be explained by their experience of being caught, comparisons between the control and clinical groups by hardiness components suggest another interpretation.

Another interesting pattern of results is the low level of reported self-regulation in both adolescents with drug addiction and those with delinquent behavior, accompanied by a mean level of emotion control (in the previous study it was higher than the mean; Demenko et al., 2018). When initially developing the inventory, we expected that addicts would demonstrate lower levels of self-control and self-regulation than the controls. However, the “empirical keying” strategy revealed that there are items that indeed indicate the tendency of reporting regulatory problems in drug users (as shown by the low self-regulation scale) and items rated by the addicts to be even higher than those in the controls (the emotion control scale). Although that latter higher level of emotion control was not supported in this study, there is an important difference in content between the two kinds of items. Items from the low self-regulation scale express problems with or unwillingness to plan for tomorrow and to think about the future, while the emotion control scale measures subjective appraisal of emotion and the capacity for self-control. We suggested that emotion control items are much more vulnerable to perceived social desirability and could reflect illusions or self-presentation as a successful person with high self-regulation. Another possible explanation is that items from emotion controls scale are more affected by social desirability than items from low self-regulation scale leading to different patterns of answers in clinical samples.

The lower level of technological addiction in adolescents with delinquent behavior should not be considered a specific risk indicator, because it is clearly explained by the limited Internet access in special education institutions.

Convergent and Discriminant Validity of the Psychological Risk Factors of Deviant Behavior in Adolescents Inventory

Supporting the discriminant validity of the inventory, the strongest correlation of the scales with anxiety, depression, hardiness, optimism, and self-efficacy was .47 if using partial correlations (adjusted for age), and .48 using bivariate correlations. Nevertheless, in both samples, anxiety was related to a lower level of technological addiction and antisocial tendencies, as well as to greater emotion control and self-regulation, while depression was related to greater emotion control only. This pattern of correlations is not in line with the “demoralization” hypothesis, because anxiety and depression are not related to self-regulatory deficiency. We suggest that high emotion control that is merely illusory or self-presentational in this sam-

ple is related to poorer well-being, because it is not self-congruent. It is also possible that anxious adolescents with deviant behavior try to reject technological addictions and antisocial tendencies to feel more safe when replying to the test. Additionally, planning for the future, prosocial orientations, and low likelihood of technological addiction in stressful situations could be factors of sensitivity to anxiety versus avoidance or ignorance. It should be also noted that the depression scale in our samples was inconsistent, so results regarding this scale need further replications.

Supporting the convergent validity of the inventory in both clinical and control samples, antisocial tendencies, technological addiction, low self-regulation, and low emotion control are related to greater hardiness and optimism. In the normative sample, satisfaction with parent–child relationships is also related to hardiness, optimism, and self-efficacy but that is not true for the clinical sample. We suggest that satisfaction with parent–child relationships in adolescents isolated from their families could be of a defensive or compensatory nature and not based on personal resources. Another explanation could be that parent-child relationships are perceived differently by those involved in deviant behavior.

Limitations and Further Research

Although the study provides some background for comparisons of psychological factors associated with delinquent behavior in adolescents comparing to drug addiction and controls, there are several limitations. First, the methodological strategy of “empirical keying” (Tellegen et al., 2008) is based on deriving items from some initial pull that differentiate between groups and is frequently lead to inventories without clear structure. As for MMPI-2, combining this strategy with expert appraisals of the items and reliability analysis led to reliable and meaningful scales of our Inventory (Demenko et al., 2018), but did not come yet to clear factor structure. That is the reason for the impossibility of measurement invariance testing suggesting that differences between groups could be explained not by psychological differences per se but by different subjective meaning of items. Further research on the Inventory concentrating on item-by-item comparisons between different clinical groups could be helpful in establishing both better factor structure and measurement invariance. At the moment results should be interpreted merely as psychological indicators that could be associated with underlying regulatory differences but not factors of delinquent behavior.

Second, due to the organization of a special education system for adolescents with delinquent behavior in Russia (closed-type institutions, limited access to personal information, separate institutions for males and females), the question of whether our clinical sample is representative of well Russian adolescents with delinquent behavior, especially females, needs further study. Another interesting dimension of further studies is taking into account diagnoses and type of crime of these adolescents. Unfortunately, we could not compare clinical data by participants' gender and even had access to such data in 5 out of 8 institutions only. In none of these cases were data on comorbid internalizing problems provided, and further data on structured clinical interviews, probably with smaller samples, are

needed. It should be also noted that while adolescents with deviant behavior were from different Russian regions, adolescents from the control group were from only one region (Murmansk) that could have an impact on results. However, given that the data of control group were close to those obtained in the previous study using a number of Russian regions (Demenko et al., 2018), we consider this last problem as unlikely to occur.

Third, while some scales (*e.g.*, depression in both groups, hardiness challenge in adolescents with delinquent behavior) did not reach good reliability, these results need further study and explanation of the reasons for the low reliability.

Fourth, the cross-sectional design of the study doesn't allow for conclusions in terms of psychological factors so we could only speculate on the possible interpretations of differences in scores as indicators corresponding to delinquent behavior. Of the most importance is that clinical groups include adolescents who either are already in the special education system (group with delinquent behavior) or are already registered by hospitals as addicts (group with drug addiction). Obviously, differences in their responses could be due to their current social situation. Further studies using prospective data could be helpful for clarification of this problem.

Conclusions

The data support the validity of the Psychological Risk Factors of Deviant Behavior in Adolescents Inventory in differentiating between adolescents with drug addiction, delinquent behavior and controls. We reproduced results indicating higher dissatisfaction with relationships with parents, "black-and-white" thinking, a technology addiction tendency and antisocial tendencies, a low level of self-regulation and a high level of risky behavior and sensation seeking in adolescents with drug addictions that could be explained not only by psychological differences but also by different social situations or strategies in responding to items. Adolescents with delinquent behavior also reported higher antisocial tendencies, and novelty seeking, as well as lower self-regulation. Supporting the discriminant validity of the inventory, no correlations with anxiety, depression, hardiness, optimism, and self-efficacy were higher than .50. In both the clinical and control groups, there were reasonable correlations between better self-regulation (lower technological addiction and antisocial tendencies, better self-regulation and emotion control) and personal resources of self-regulation. Further research is needed to clarify whether these differences are explained by psychological differences, current social situation, and past experience of adolescents or strategies on responding to items.

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