



The Role of Adverse Childhood Experiences and Corporal Punishment in Early Adulthood Depression and Substance Use among Ukrainian College Students

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Abstract

Violence against children is a worldwide problem, and a large body of research demonstrates both short-term and long-term negative outcomes. The present study employs structural equation modeling to examine the pathways from parents' use of corporal punishment and childhood adverse experiences to depression and substance use in adulthood. Cross-sectional data were collected from a sample of 944 students ($M_{age} = 19.16$, 69% females) attending ten public universities in 27 Ukrainian regions. The model provided a good fit for the data: $\chi^2 (59, N = 944) = 189.49, p < 0.001$, CFI = 0.96, TLI = 0.95, RMSEA = 0.048. Higher scores on adverse childhood experiences (ACE) maltreatment items (psychological, physical and sexual abuse during childhood; $b = .26, p < .001$) were associated with higher depression during adulthood. Higher depression scores were linked with higher multiple substance use ($b = .17, p < .001$). Childhood adverse experiences had significant standardized indirect effect, mediated by depression, on adulthood involvement in substance use ($b = 0.043, p < 0.01$). Findings from this research suggest that young adults in Ukraine who remember being maltreated as children have a higher risk to develop depression and engage in substance use as adults.

Keywords Ukraine · Depression · Substance use · Child maltreatment · Corporal punishment · Structural equation modeling

Several studies have explored the use of psychoactive substances in Ukraine (Burlaka 2017; Pejnović Franelić et al. 2011; Rushchenko and Serdiuk 2016; Sreeramareddy et al. 2018). Many studies found that drug use often progresses from the use of tobacco and alcoholic beverages to marijuana and other illicit drugs, which supports the gateway drug theory (Degenhardt et al. 2009; Kandel et al. 1992). The progression to greater multiple substance use often depends on availability

and the prevalence of psychoactive substances (Degenhardt et al. 2009) that differ across sociocultural contexts. Heavier alcohol use among college students has been linked with higher risk of tobacco, marijuana and other drugs use (O'Grady et al. 2008). Hence, individual lifetime substance use can be seen as a unidimensional behavior ranging from complete abstinence, to tobacco or alcohol use only, combined alcohol and tobacco use, and up to involvement in heavy polydrug use.

Substance use among college students can also be seen as a behavior, which stems from childhood adversities, such as, for example, prior history of maltreatment. As studies show, maltreated youth are more likely than their non-maltreated peers to engage in illicit substances due to additional challenges maltreated youth face, such as mental health problems (Jonson-Reid et al. 2012; Wall and Kohl 2007). A limited number of studies have also explored whether childhood adversities might influence substance-using behavior among adult population (Herrenkohl et al. 2013; Jonson-Reid et al. 2012; Lo and Cheng 2007). One study found that adults who were maltreated in childhood reported more symptoms of mental health problems and higher risk for substance use

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(Herrenkohl et al. 2013). Another study findings suggest that childhood maltreatment was a strong predictor of young adults' substance use (Lo and Cheng 2007). In this article, we build on these study findings by exploring the pathways from childhood maltreatment and corporal punishment to early adulthood experiences of depression and multiple substance use among 944 Ukrainian college students.

Substance Use in Ukraine

With a total annual consumption of 13.9 l of pure alcohol consumed per capita, Ukrainians used significantly more alcohol compared to a total of 9.2 l consumed in the United States, 4.3 l in India, 6.7 l in China, and 2.0 in Turkey (World Health Organization 2014). Ukrainian cultural heritage is closely linked with countries that have even higher levels of alcohol use such as Belarus (17.5 l per capita) and Russia (15.1 l per capita). A study conducted with 9–16-year-old school children found that 52% drank alcohol during the previous year (Burlaka 2017). Among older youths, 84% reported lifetime consumption of alcohol (Rushchenko and Serdiuk 2016). Studies also reported that 22 % of Ukrainian adults are heavy alcohol users, consuming a minimum of 80 g of ethanol in a typical drinking day (Webb et al. 2005) and two most common 12-month mental health diagnoses in Ukraine were alcohol abuse and major depression (Bromet et al. 2005). Additionally, 27.3% adolescents reported a lifetime use of marijuana (Pejnović Franelić et al. 2011). Every second Ukrainian man smoked cigarettes (Sreeramareddy et al. 2018), 8.7% used stimulants, 6.5% used stimulants and some 5% Ukrainian youths used opioids (Rushchenko and Serdiuk 2016). More restrictive policies regarding the sales of psychoactive substances have led to lower prevalence rates of substance use in Ukraine. For example, in 2007, 80% to 94% of 14 to 17 year-old Ukrainian adolescents reported that it was relatively easy to obtain cigarettes, and up to 90% reported that they could easily buy alcohol (Balakireva et al. 2008). In a recent study, in 2019, 44% of adolescents reported it was rather easy to purchase cigarettes and up to 61% had easy access to alcoholic drinks (Balakireva et al. 2019). Also, in 2007, 65% of adolescents reported lifetime smoking, and 91% reported using alcohol (Balakireva et al. 2008). In 2019, the lifetime prevalence rate of smoking reduced to 50% and alcohol use was reduced to 86% (Balakireva et al. 2019).

Adverse Childhood Experiences and Adulthood Psychopathology

Multiple generations of Ukrainians have been subjected to trauma stemming from events, such as wars and revolutions, communist persecutions, famine, genocide, limited ability to

practice Ukrainian language and observe cultural rituals, terror, mass killings, and incarcerations (Burlaka et al. 2018). Since the beginning of an ongoing military conflict in Eastern Ukraine in 2014, over 11,000 Ukrainians were killed (Petrov 2017) and over two million have been internally displaced (IDMC 2018). In cultures with less democratic political systems, higher levels of violence, more frequent wars, parents tend to use corporal punishment more often (Ember and Ember 2005). In a recent study with 294 Ukrainian mothers from Southern, Eastern and Central Ukraine who had children aged 9–16 years of age, 70 % of mothers reported spanking their children, 56% slapped their children, and 44% hit their children with the belt or other objects (Grogan-Kaylor et al. 2018). Unbalanced family cohesion and flexibility, alcohol use, and violence against mothers contributed to poor child monitoring, corporal punishment, lack of positive parenting, and lower parent involvement with the child (Burlaka et al. 2017a).

A longitudinal study with 2232 British twin children suggests that childhood experiences of any (emotional abuse/neglect, physical neglect, sexual and physical abuse) childhood maltreatment was associated with increased odds of early adulthood depression, anxiety, self-injury, alcohol/cannabis dependence, and conduct disorder (Newbury et al. 2018). In Ukraine, parental use of corporal punishment was associated with increased child aggression, rule-breaking behaviors (Burlaka 2016) and child alcohol abuse-related problems, such as conflicts with parents, friends and teachers; school absence; feelings of guilt; frequent drinking; losing friends, getting in trouble with the police; and having memory lapses (Burlaka 2017). However, there is a paucity of research examining the relationship between memories of childhood maltreatment and corporal punishment and adulthood mental health problems in Ukraine.

Child maltreatment may increase the risks for mental health problems. Relative to children who had not been subjected to maltreatment, those who were abused at home were at significantly higher risk of meeting criteria for depressive symptoms (Bernet and Stein 1999; Kessler 1997; Merrick et al. 2017). The significance of negative parenting in child and adolescent anxiety, depression, and somatic symptoms has been documented in Ukrainian research (e.g., Burlaka et al. 2017b). Because caregivers can shape their children's regulatory styles through sensitive caregiving in the absence of hostility (Eisenberg et al. 2001), it is likely that harsh parenting would result in children's poor self-control and development of both internalizing and externalizing behaviors.

In addition to depressive symptoms, maltreatment has also been found to be linked to risk behaviors, most notably, substance use. Child maltreatment can facilitate the onset and persistence of alcohol and drug use in adolescence and in adulthood (Brody and Ge 2001; Lochman and van den Steenhoven 2002; Siebenbruner et al. 2006). A study which

longitudinally examined a link between five types of maltreatment (physical abuse, sexual abuse, emotional abuse, physical neglect, and emotional neglect) and several substance use disorders reported that all types of maltreatment were associated with increased odds of all types of substance use (Afifi et al. 2012). Moran et al. (2004) found all four categories of maltreatment (physical abuse, emotional abuse, sexual abuse, and neglect) were associated with increased levels of all three categories of substance use.

Some research with college students reported weaker association between child physical abuse and adult substance use. In a study of adverse childhood experiences among German college students, emotional and sexual abuse were associated with increased drug abuse, but physical abuse was not related to any health risk behaviors (Wiehn et al. 2018). Forster et al. (2018) found the association between childhood adverse experiences (except verbal and physical abuse) and increased polysubstance use. Physical abuse, however, was associated with increased substance use among Asian adolescents (Lau et al. 2005).

More recent research with Ukrainian families revealed that both individual-level variables (e.g., lower spirituality, emotion-focused coping) and family-level variables (e.g., low family communication) increased the rates of spanking, slapping, and hitting children with objects (Grogan-Kaylor et al. 2018) as well as parental alcohol use (Churakova et al. 2017). Koenig et al. (2002) also reported that a positive association was found between harmful caregiving strategies and the increased psychopathology in a sample of U.S. young adults. Other studies suggest that adults who report a memory of being maltreated as children have a higher risk for substance use (Elwyn and Smith 2013).

The Present Study

A large body of research literature has focused on examining the bivariate associations between either child maltreatment or corporal punishment and substance use outcomes. Whereas child maltreatment can be seen as a harmful behavior by a parent or any other adult in the child's environment (Felitti et al. 1998), the construct of corporal punishment is related to parenting behaviors (Frick et al. 1999). Prior research documented independent associations of corporal punishment (Straus and Kantor 1994) and child maltreatment (Vachon et al. 2015) with mental health outcomes. Clemmons et al. (2003) reported that many young adults with mental health problems recall experiencing more than one type of maltreatment. In our study, we aimed to examine independent associations of these constructs with depression and with each other in the same model using a sample of Ukrainian college students. Studies with college-aged adults provide a unique opportunity to explore the heterotypic continuity of depression development (Cicchetti and Toth 1998) as young adults with

higher depression transition to environments with more access to substances and may use them to cope with mental illness (Burlaka et al. 2014a, b).

As Newbury et al. (2018) have noted, “young adults who recall being maltreated have a particularly elevated risk for psychopathology” (p. 57). Research found that while 25% of Ukrainian school-age children used alcohol at parties, almost 17% used drinks to self-medicate because “it helps when you feel depressed or nervous” (Balakireva et al. 2019, p. 28). It is possible that youth who had experienced childhood maltreatment use readily available psychoactive substances to “feel better”. Consistent with the gateway drug theory, over time, some of these students might possibly proceed to using heavier drugs. No prior research has explored the mediating role of depressive symptoms in the relationship between recollection of maltreatment in childhood, and substance use in adulthood, among Ukrainian young adults. The study is guided by the self-medication hypothesis, which posits that adverse childhood experiences and corporal punishment can lead to depressive symptoms, and alcohol, drugs, and other substances are used to alleviate negative emotions or pain (Shadur et al. 2015). Specifically, we hypothesized that: (H1) Childhood maltreatment and corporal punishment would be positively associated with increased early adulthood depressive symptoms; (H2) Childhood maltreatment and corporal punishment would be positively associated with each other; (H3) Childhood maltreatment would be positively associated with increased substance use during early adulthood; and (H4) Increased depression during early adulthood would mediate the relationship between childhood maltreatment and adulthood substance use.

Method

Procedure

Participants for this research were recruited via announcements in the classrooms, which included details of the study looking at factors related to the well-being and success of students in Ukrainian universities in 2018. Students who were willing to participate were invited to classrooms and labs with internet access and were asked to bring their own computers or tablets to answer surveys. Participants were instructed to sign the informed consents and then proceed with the survey questions. The study was approved by the Commission on Ethics and Deontology of the National Academy of Medical Sciences Institute of Neurology, Psychiatry and Narcology of Ukraine. No compensation or other incentives were provided. Data were collected to the secure online site and faculty members from study sites helped students with logistical issues. The participants pursued undergraduate and graduate degree training programs in social work, psychology, special

education, sociology, philosophy, law, cyber security, medicine, and criminology. Geographically, the participants hailed from every Ukrainian oblast (region). The interviews lasted approximately 1 h during which the participants responded to a survey that included measures of mental health, substance use, childhood and family experiences.

Measures

Childhood Psychological, Physical and Sexual Abuse Three questions from the Adverse Childhood Experiences Questionnaire (ACEs; Felitti et al. 1998) were included in the study. The first question asked: “While you were growing up, during your first 18 years of life, did a parent or other adult in the household often swear at you, insult you, put you down, or humiliate you or act in a way that made you afraid that you might be physically hurt?” The second question asked, “Did a parent or other adult in the household often push, grab, slap, or throw something at you or ever hit you so hard that you had marks or were injured?” Participants also answered a question “Did an adult or person at least 5 years older than you ever touch or fondle you or have you touch their body in a sexual way or try to or actually have oral, anal, or vaginal sex with you?” Response options were 0 = no and 1 = yes. ACEs is a widely used measure that was used in studies of depression (e.g., Chapman et al. 2004) and substance use (e.g., Dube et al. 2003). In this study, the Kuder-Richardson coefficient of reliability was .62.

Childhood Corporal Punishment To examine the extent to which the participants’ parents used physical punishments, three questions from the Alabama Parenting Questionnaire (APQ; Frick 1991) were included in the study. Specifically, participants answered the following questions: “Your parents spanked you with their hand when you had done something wrong,” “Your parents slapped you when you had done something wrong,” and “Your parents hit you with a belt, switch, or other object when you did something wrong.” Response options were on a five-point Likert scale ranging from 1 = never to 5 = always. In previous research with Ukrainian participants, the APQ scales showed good reliability (Corporal punishment $\alpha = .86$; Burlaka 2016). In the present study, the Cronbach’s alpha for the Corporal Punishment Scale was .83.

Adulthood Depression A ten-item Center for Epidemiologic Studies Depression Scale Revised (CESD-R-10; Björgvinsson et al. 2013) questionnaire measuring depressive symptoms experienced during last week was utilized in this study. Example items included, “I was bothered by things that usually don’t bother me,” “I felt depressed,” and “I could not ‘get going’” and the answers ranged from 0 = “rarely or none of the time” to 3 = “all of the time.” The latent variable,

depression, was indicated by three parcels of items reflecting CES-D depression symptoms. This approach was chosen to reduce measurement error in the unidimensional construct of depression (Bagozzi and Edwards 1998; Bagozzi and Heatherton 1994). Since the present study was not concerned with dimensionality of depression or individual depression items, a random assignment technique was used to build the parcels (Little et al. 2002). The measure has been previously used to measure depression in Ukrainian adults (Cronbach’s $\alpha = .90$, Burlaka et al. 2017b). The Cronbach’s alpha coefficient was .83 for this sample.

Substance Use Substance use was measured with the World Health Organization’s Alcohol, Smoking and Substance Involvement Screening Test (ASSIST; Humeniuk et al. 2006). Participants answered a question, “In your life, which of the following substances have you ever used?” about substance use for ten substances: tobacco products, alcoholic beverages, cannabis, cocaine, amphetamine type stimulants, inhalants, sedative or sleeping pills, hallucinogens, and opioids (0 = no; 1 = yes). The latent variable substance use was treated as a unidimensional construct and was indicated by two parcels including items measuring involvement in the use of various psychoactive substances (Bagozzi and Edwards 1998; Bagozzi and Heatherton 1994). The parcels were built using the random assignment technique (Little et al. 2002). ASSIST is a reliable instrument specifically developed for use in various cultural contexts (Group 2002; Onifade 2014). The Kuder-Richardson coefficient of reliability was .77 in this study.

Demographic Covariates Participants responded to questions about gender (male/female) and age (required to fill in their age) and these two questions were treated as covariates for depression in the study.

Analysis

In this study, we used structural equation modeling (SEM; Acock 2013) to perform measurement models and path analyses. SEM allows to combine path analyses with measurement models while using multiple indicators for latent variables. Another strength of this approach was that multiple indicators were used to construct four latent variables. In doing so, we separated the random measurement error from latent variables thereby augmenting the explanatory power. In this study, the depression variable was used as the mediator in the association between childhood abuse and substance use. In turn, the presence of depressive symptoms affected multi-substance use in adulthood (increased child abuse, higher substance use). SEM is a well-established approach to estimate the direct effects as well as indirect effects, and such effects are “routinely included in structural models, assuming such

specifications are theoretically justifiable” (Kline 2011, p. 106). We followed Kline’s (2011) guidelines for evaluating SEM identification.

The model examined a continuous outcome and was fit with the maximum likelihood estimation (Kline 2016). This method examines the fit of the models to the observed variance-covariance matrices. In the analyses, we regressed the covariates on the latent variable of depression. We did not estimate the path between corporal punishment and substance use. The model was fit with Stata/MP 14.2 software package (StataCorp 2015). We estimated the goodness-of-fit using the Comparative fit index (CFI), Tucker-Lewis index (TLI), and the root mean squared error of approximation (RMSEA) (Raykov et al. 1991). We interpreted the results following the recommended cutoff points, indicating a good fit for CFI and TLI of 0.95 or above and for RMSEA, 0.05 or below (Acocck 2013). We performed analyses of indirect relationships in the model using the delta method-based nlcom command in Stata (Acocck 2013; Phillips and Park 1988; StataCorp 2015).

Results

Participants

Cross-sectional data were collected among 944 adults. The age of participants ranged from 17 to 38 years of age. Majority (69%) of participants were females. Table 1 provides additional details on participant characteristics and descriptive statistics for observed variables.

Measurement and Structural Models

We first fit the measurement model to determine if study variables were associated independently with the outcome variable of multiple substance use. A model with four latent factors denoting the study constructs showed good fit indices: χ^2 (58, $N = 944$) = 195.18, $p < .001$; RMSEA = 0.05, CFI = .96; TLI = .95 (see Fig. 1). In this model, all factor loadings were significant for all latent variables. All three latent variables were related significantly to the adult substance use.

Next, we fitted the structural model (see Fig. 2). We chose to model the path between ACEs and substance use to explore whether Adverse Childhood Experiences had significant standardized indirect effect, mediated by depression, on adult substance use. The paths are shown as straight lines and the values along the lines show that the estimated strength of influences are standardized path coefficients (betas). This model provided a good fit for the data: χ^2 (59, $N = 944$) = 189.49, $p < 0.001$, CFI = 0.96, TLI = 0.95, RMSEA = 0.048.

Results suggest that increased adversity ($b = 0.26$, $p < 0.001$) during childhood, older age ($b = 0.15$, $p < 0.001$),

and female gender ($b = -.085$, $p < 0.05$), had direct significant effects on higher depression scores during early adulthood while higher frequency of corporal punishment ($b = 0.09$, $p = 0.09$) had a trend significance. Additionally, increased depression had a direct significant effect on increased lifetime involvement with psychoactive substances ($b = 0.17$, $p < 0.001$). The direct relationships between increased adversity and adulthood substance use was not statistically significant.

Results also indicated that the participants’ older age, gender, and childhood adverse experiences had significant and indirect relationship with greater substance use during early adulthood. Childhood adverse experiences had a stronger significant standardized indirect effect, mediated by depression, on adulthood involvement in substance use ($b = 0.051$, $p < 0.01$), than did older age ($b = 0.029$, $p < 0.01$) and female gender ($b = -0.017$, $p < 0.05$).

Depression had the strongest total standardized effect on substance use ($b = 0.20$, $p < 0.001$), followed by childhood adverse experiences ($b = 0.05$, $p < 0.01$), older age ($b = 0.03$, $p < 0.01$) and female gender ($b = -0.02$, $p < 0.05$).

Discussion

To our knowledge, this is the first study comparing the relative strength of relationship of childhood corporal punishment and child maltreatment with adulthood depression in a sample of young Ukrainian adults. While both constructs explore the nuances of adult use of violence against children, they contain important differences. The APQ conceptualizes corporal punishment as a component in parenting practices. Hence, a child may perceive the violent act as a punishment for doing something wrong. In other words, the child may perceive it as a fair act by someone who otherwise loves and cares about the child. In contrast, the ACEs subscale refers to the child’s relationship with parents or other adults who live in the household and is not solely limited to the parenting context. In essence, ACEs subscale measures adult emotional, physical and sexual perpetration of the child regardless of how the child behaves. Such experiences may leave deeper scars and do more damage to a growing child.

Our data suggests that compared to corporal punishment, adults who recalled being maltreated as children had significantly higher levels of depression. This finding is congruent with findings from the United States on the link between depression and exposure to childhood adversity (Bernet and Stein 1999; Kessler 1997; Merrick et al. 2017). Adding knowledge about harmful interactions with non-parent members of the household is important because in Ukraine, up to 62% of young couples eventually divorce (UNIAN 2013), and many children are raised by stepparents, grandparents, and other non-parent family figures.

Table 1 Participant characteristics and descriptive statistics for observed variables ($N = 944$)

Variable	%	<i>M</i>	<i>SD</i>	α /KR	Range
Ethnicity					
Ukrainian	96.8				
Russian	1.5				
Other (Belarus, Jewish, Armenian, Hungarian, Tatar, and Romanian)	1.7				
Marital status					
Single	90				
Married	8				
Divorced or widowed	2				
Had job during past 6 month	28				
Currently employed	21				
Have debt	8				
Student loan/debt	7				
Gender, male	31				
Age, years		19.16	1.91		17–38
Substance use	86	2.04	1.76	KR = 0.77	0–10
Tobacco (cigarettes, chewing tobacco, cigars, etc.)	61	.61	.49		0–1
Alcoholic beverages (beer, wine, spirits, etc.)	80	.80	.40		0–1
Cannabis (marijuana, pot, grass, hash, etc.)	19	.19	.40		0–1
Cocaine (coke, crack, etc.)	5	.05	.21		0–1
Amphetamines (speed, diet pills, ecstasy, etc.)	7	.07	.25		0–1
Inhalants (nitrous, glue, petrol, paint thinner, etc.)	6	.06	.23		0–1
Sedatives or sleeping pills (Valium, Serepax, etc.)	11	.11	.31		0–1
Hallucinogens (LSD, acid, mushrooms, PCP, etc.)	6	.06	.23		0–1
Opioids (heroin, morphine, methadone, codeine, etc.)	5	.05	.21		0–1
Other	5	.05	.22		0–1
Corporal punishment	63	5.17	2.53	$\alpha = 0.83$	3–15
Spanked	58	2.02	1.07		1–5
Slapped	27	1.43	.81		1–5
Hit with belt/other object	40	1.72	1.03		1–5
Adverse childhood experiences	20	.30	.67	KR = 0.62	1–3
Insulted, threatened by a parent/other adult	15	.15	.36		0–1
Pushed, grabbed, hit by a parent or other adult	9	.09	.29		0–1
Sexually perpetrated by a person at least 5 years older	6	.06	.23		0–1
Depression		8.08	5.21	$\alpha = 0.84$	0–28

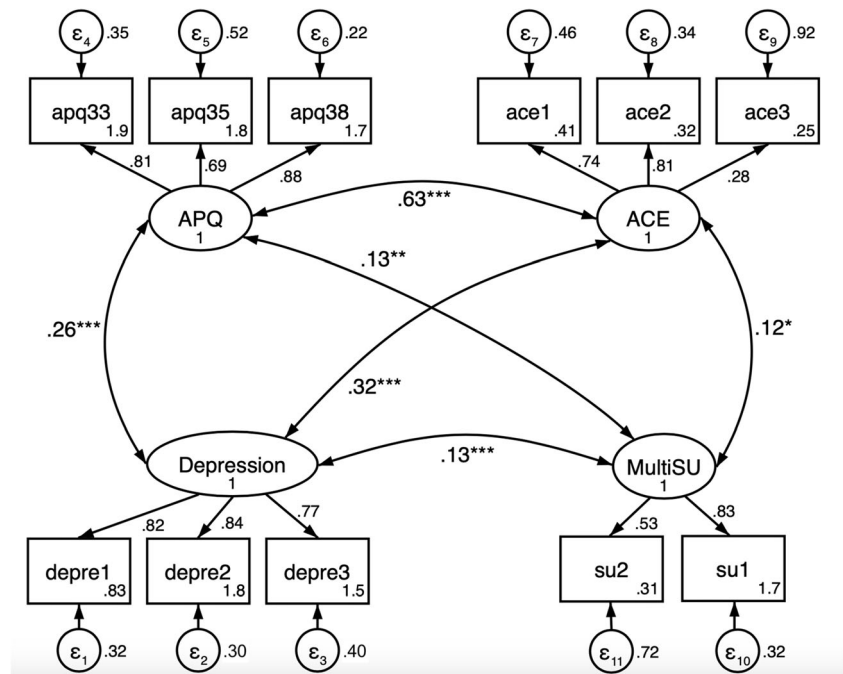
M, mean; *SD*, Standard Deviation; α , Cronbach alpha; KR, Kuder-Richardson coefficient of reliability

Previous research has established a significant relationship between negative parenting and increased mental health symptoms among Ukrainian children, aged 9–16 (Burlaka 2016; Burlaka et al. 2017b). This study suggests that corporal punishment is strongly associated with child emotional, physical and sexual abuse as measured by ACEs. The present study extends prior knowledge by testing the relationship between child memories of corporal punishment and child maltreatment and their independent association with depression among young Ukrainian adults.

An important finding of the current study needs to be highlighted. To our surprise, adverse childhood experiences were not found to be directly associated with substance use,

which was contrary to our hypothesis and past research findings with adolescents (Burlaka 2017; Elwyn and Smith 2013; Newbury et al. 2018). Perhaps, college students who participated in our study had fewer adverse experiences or were less likely to use substances than participants of previous studies who were recruited from community samples. In previous research with German students (Wiehn et al. 2018), ACE Physical Abuse was not associated with risky drinking, daily smoking and drug abuse. Similarly, in a study with U.S. college students researchers reported that “each individual ACE – with the exception of verbal and physical abuse – was positively associated with all substance use behaviors” (Forster et al. 2018, p. 300). Researchers found that ACEs had a graded

Fig. 1 Measurement Model. *Note.* * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. All factor loadings were significant at $p < 0.001$. All path coefficients are standardized. Depression was conditioned on gender and age. APQ = Alabama Parenting Questionnaire Corporal Punishment; ACE = Adverse Childhood Experiences Childhood Emotional, Physical and Sexual Maltreatment; Depression = Center for Epidemiologic Studies Depression Scale Revised; MultiSU = World Health Organization's Alcohol, Smoking and Substance Involvement Screening Test Lifetime Substance Use



relationship with the use of psychoactive substances with each additional ACE increasing the odds of substance use. In our study, ACEs were indicated only by emotional, physical, and sexual abuse and had a non-significant direct relationship with substance use.

Instead, our study found that the association between adverse childhood experience and substance use in adulthood was mediated by depression. Although not directly

comparable to our study's design, previous research by Douglas et al. (2010) reported that depression and anxiety partially mediated the relationship between ACEs and substance dependence. Rarely do young adults who had experienced maltreatment during childhood turn to substances immediately; rather, they are likely to follow complex pathways through adolescence and young adulthood, experiencing psychological problems, such as depression before eventually

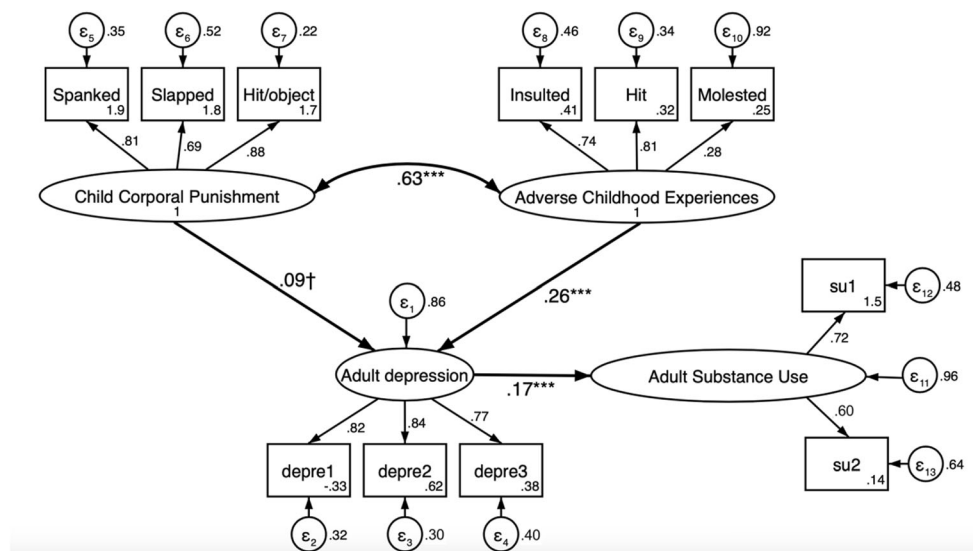


Fig. 2 Final Structural Equation Model. *Note.* Final structural equation model representing effects of childhood corporal punishment and adverse childhood experiences on adulthood depression and adulthood substance use in a sample of 944 Ukrainian college students. Large ellipses represent latent constructs. Paths between latent constructs are

statistically significant standardized path coefficients at $\dagger = 0.09$ and *** $< .001$. Non-significant path from adverse childhood experiences to adult substance use is not represented. Depression was conditioned on gender and age. Small circles represent residual variances

using substances (see Bender 2010). A better understanding of the mediating variables that explicate the link between maltreatment and substance use is essential, as this study has demonstrated.

Limitations

Despite the contributions of the present study, the present research used a convenience sample of college students. The relationships were implied in this study based on theory and prior research. The study was also limited due to the cross-sectional research design, which makes it difficult to establish causal and temporal links between the variables. Also, the study participants were asked to report on their family experiences during childhood, which might have introduced a recall bias (Hardt and Rutter 2004). Additionally, a large proportion of male participants attended a law enforcement university which has a more restrictive policy regarding our outcome variable, substance use. Because of this and the fact that the study only evaluated students at several out of hundreds of Ukrainian universities, the findings may not be generalizable to other settings. Finally, future research needs to evaluate the influence of genetic and broader environmental factors on maltreatment, depression, and substance use.

Implications for Policy and Practice

These limitations aside, the present study has implications for practice and policy in Ukraine and other Eastern European nations with high rates of depression and substance use. Additionally, study's results can be useful in understanding experiences of Ukrainians who immigrate to other countries. Although child maltreatment is very high in Ukrainian families (Grogan-Kaylor et al. 2018), Ukrainian social workers tend to lack specific training in child welfare content and therefore are not particularly prepared to effectively address cases of family violence (Burlaka et al. 2001). Moreover, many Ukrainians do not consider physical punishments by parents as child abuse (Burlaka 2007), and the legal consequences for family violence against children may include as little as 30 h of community services, administrative arrest for up to seven days (Verkhovna Rada 2018), or a \$1330 fine that tends to be paid from the household budget (Wills and Kalashnik 2018). The fact that entire family carries the burden of the fine is particularly concerning, given the average monthly family income in Ukraine of \$291 (UkrStat 2018).

Six out of ten participants remembered being spanked, slapped and hit with a belt, switch or other object during childhood years. The proportion of participants who reported childhood memories of corporal punishment was slightly lower than previously reported in studies with general samples of Ukrainian adolescents (Burlaka 2007; Burlaka et al. 2017a). Future research in Ukraine needs to test whether the lower use

of corporal punishment increases the probability that children would attend college. According to law enforcement data, in Ukraine, child maltreatment occurs in all families, regardless of their socioeconomic status (Burlaka 2007). However, parents with poor communication skills, lower education and income; and parents who experience intimate-partner violence and substance abuse problems tend to provide less structured and poorly monitored environments for their children. Such parents also have more difficulties with communicating and reinforcing positive behaviors and are more likely to resort to corporal punishments as disciplinary strategies (Burlaka 2007; Burlaka et al. 2017a).

In 2005, the Ukrainian Ministry of Labor and Social Policy has piloted the development of a child abuse prevention system in Skvyra Municipality, Kyiv oblast (Burlaka 2007). A team of Swedish experts was invited to train Ukrainian colleagues and help them develop a policy document regulating the interactions in cases of suspected child abuse. The team included a police officer, a psychologist, and social worker specialized in child abuse. They worked with each other around conducting investigation of crimes against children, providing protection and psychological help for victims of child abuse, and teaching how to communicate with children who had been in difficult life situations. Since then, the Ukrainian government has systematically advanced the national system to prevent violence against women and children. The recent *Law of Ukraine to Prevent and Counteract Domestic Violence* was developed in accordance with the Western European standards (Verkhovna Rada 2018). The new legislation targets physical, sexual and economic violence, including threats to inflict violence and lays a foundation to prevent childhood maltreatment.

References

- Acock, A. C. (2013). *Discovering structural equation modeling using Stata* (Rev. ed.). College Station: Stata Press.
- Afifi, T. O., Henriksen, C. A., Asmundson, G. J. G., & Sareen, J. (2012). Childhood maltreatment and substance use disorders among men and women in a nationally representative sample. *The Canadian Journal of Psychiatry*, 57(11), 677–686. <https://doi.org/10.1177/070674371205701105>.
- Bagozzi, R. P., & Edwards, J. R. (1998). A general approach for representing constructs in organizational research. *Organizational Research Methods*, 1(1), 45–87. <https://doi.org/10.1177/109442819800100104>.
- Bagozzi, R. P., & Heatherton, T. F. (1994). A general approach to representing multifaceted personality constructs: Application to state self-esteem. *Structural Equation Modeling: A Multidisciplinary Journal*, 1(1), 35–67. <https://doi.org/10.1080/10705519409539961>.
- Balakireva, O., Bondar, T., Rynhach, N., Andreeva, T., Sydyak, S., Hryshchenko, A., & Antonova, A. (2008). *Rates and prevalence*

- of smoking, alcohol and drug use among students in Ukraine*. Kyiv: Ukrainian Yaremchenko Institute of Social Research.
- Balakireva, O., Pavlova, D. M., Nguen, N.-M. K., Levtsun, O. H., Pivovarov, N. P., Sakovych, O. T., & Fliarkovska, O. V. (2019). *Smoking, alcohol and drug use among school adolescents: Prevalence and trends in Ukraine*. Kyiv: Obnova kompani.
- Bender, K. (2010). Why do some maltreated youth become juvenile offenders? *Children and Youth Services Review*, 32(3), 466–473. <https://doi.org/10.1016/j.childyouth.2009.10.022>.
- Bernet, C. Z., & Stein, M. B. (1999). Relationship of childhood maltreatment to the onset and course of major depression in adulthood. *Depression and Anxiety*, 9(4), 169–174. [https://doi.org/10.1002/\(SICI\)1520-6394\(1999\)9:4<169::AID-DA4>3.0.CO;2-2](https://doi.org/10.1002/(SICI)1520-6394(1999)9:4<169::AID-DA4>3.0.CO;2-2).
- Björgvinsson, T., Kertz, S. J., Bigda-Peyton, J. S., McCoy, K. L., & Aderka, I. M. (2013). Psychometric properties of the CES-D-10 in a psychiatric sample. *Assessment*, 20(4), 429–436. <https://doi.org/10.1177/1073191113481998>.
- Brody, G. H., & Ge, X. (2001). Linking parenting processes and self-regulation to psychological functioning and alcohol use during early adolescence. *Journal of Family Psychology*, 15(1), 82–94. <https://doi.org/10.1037/0893-3200.15.1.82>.
- Bromet, E. J., Gluzman, S. F., Paniotto, V. I., Webb, C. P. M., Tintle, N. L., Zakhozha, V., et al. (2005). Epidemiology of psychiatric and alcohol disorders in Ukraine. *Social Psychiatry and Psychiatric Epidemiology*, 40(9), 681–690. <https://doi.org/10.1007/s00127-005-0927-9>.
- Burlaka, V. (2007). *Preventing and counteracting child abuse*. Kyiv: Herb.
- Burlaka, V. (2016). Externalizing behaviors of Ukrainian children: The role of parenting. *Child Abuse & Neglect*, 54, 23–32. <https://doi.org/10.1016/j.chiabu.2015.12.013>.
- Burlaka, V. (2017). Effects of individual, peer, and family factors on child alcohol abuse in Ukraine. *Journal of Child and Family Studies*, 26(7), 1780–1789. <https://doi.org/10.1007/s10826-017-0718-4>.
- Burlaka, V., Semyghina, T., Gryga, I. M., Shevchuk, O., Shevchuk, S., Andriyiv, V., et al. (2001). In V. Burlaka & T. Semyghina (Eds.), *Introduction to social work*. Kyiv: Phoenix.
- Burlaka, V., Churakova, I., Aavik, O. A., & Goldstein, D. (2014a). Perceived barriers to mental health services: A mixed-method study with Ukrainian college students. *European Journal of Higher Education*, 4(2), 167–183. <https://doi.org/10.1080/21568235.2014.890524>.
- Burlaka, V., Churakova, I., Aavik, O. A., Staller, K. M., & Delva, J. (2014b). Attitudes toward health-seeking behaviors of college students in Ukraine. *International Journal of Mental Health and Addiction*, 12(5), 549–560. <https://doi.org/10.1007/s11469-014-9483-4>.
- Burlaka, V., Graham-Bermann, S. A., & Delva, J. (2017a). Family factors and parenting in Ukraine. *Child Abuse & Neglect*, 72, 154–162. <https://doi.org/10.1016/j.chiabu.2017.08.007>.
- Burlaka, V., Kim, Y. J., Crutchfield, J. M., Lefmann, T. A., & Kay, E. S. (2017b). Predictors of internalizing behaviors in Ukrainian children. *Family Relations*, 66, 854–866. <https://doi.org/10.1111/fare.12289>.
- Burlaka, V., Serdiuk, O., Nickelsen, T., Tkach, B., & Khvorova, H. (2018). Family life education in Ukraine. In M. Robila & A. C. Taylor (Eds.), *Global perspectives on family life education*. New York: Springer International Publishing AG.
- Chapman, D. P., Whitfield, C. L., Felitti, V. J., Dube, S. R., Edwards, V. J., & Anda, R. F. (2004). Adverse childhood experiences and the risk of depressive disorders in adulthood. *Journal of Affective Disorders*, 82(2), 217–225. <https://doi.org/10.1016/j.jad.2003.12.013>.
- Churakova, I., Burlaka, V., & Parker, T. W. (2017). Relationship between alcohol use, spirituality and coping. *International Journal of Mental Health and Addiction*, 15(4), 842–852. <https://doi.org/10.1007/s11469-017-9759-6>.
- Cicchetti, D., & Toth, S. L. (1998). The development of depression in children and adolescents. *American Psychologist*, 53(2), 221–241. <https://doi.org/10.1037/0003-066X.53.2.221>.
- Clemmons, J. C., DiLillo, D., Martinez, I. G., DeGue, S., & Jeffcott, M. (2003). Co-occurring forms of child maltreatment and adult adjustment reported by Latina college students. *Child Abuse & Neglect*, 27(7), 751–767. [https://doi.org/10.1016/S0145-2134\(03\)00112-1](https://doi.org/10.1016/S0145-2134(03)00112-1).
- Degenhardt, L., Chiu, W. T., Conway, K., Dierker, L., Glantz, M., Kalaydjian, A., et al. (2009). Does the ‘gateway’ matter? Associations between the order of drug use initiation and the development of drug dependence in the National Comorbidity Study Replication. *Psychological Medicine*, 39(1), 157–167. <https://doi.org/10.1017/S0033291708003425>.
- Douglas, K. R., Chan, G., Gelernter, J., Arias, A. J., Anton, R. F., Weiss, R. D., et al. (2010). Adverse childhood events as risk factors for substance dependence: Partial mediation by mood and anxiety disorders. *Addictive Behaviors*, 35(1), 7–13. <https://doi.org/10.1016/j.addbeh.2009.07.004>.
- Dube, S. R., Felitti, V. J., Dong, M., Chapman, D. P., Giles, W. H., & Anda, R. F. (2003). Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: The adverse childhood experiences study. *Pediatrics*, 111(3), 564–572. <https://doi.org/10.1542/peds.111.3.564>.
- Eisenberg, N., Cumberland, A., Spinrad, T. L., Fabes, R. A., Shepard, S. A., Reiser, M., et al. (2001). The relations of regulation and emotionality to children’s externalizing and internalizing problem behavior. *Child Development*, 72(4), 1112–1134. <https://doi.org/10.1111/1467-8624.00337>.
- Elwyn, L., & Smith, C. (2013). Child maltreatment and adult substance abuse: The role of memory. *Journal of Social Work Practice in the Addictions*, 13(3), 269–294. <https://doi.org/10.1080/1533256X.2013.814483>.
- Ember, C. R., & Ember, M. (2005). Explaining corporal punishment of children: A cross-cultural study. *American Anthropologist*, 107(4), 609–619. <https://doi.org/10.1525/aa.2005.107.4.609>.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., et al. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The adverse childhood experiences (ACE) study. *American Journal of Preventive Medicine*, 14(4), 245–258. <https://doi.org/10.1016/j.amepre.2019.04.001>.
- Forster, M., Grigsby, T. J., Rogers, C. J., & Benjamin, S. M. (2018). The relationship between family-based adverse childhood experiences and substance use behaviors among a diverse sample of college students. *Addictive Behaviors*, 76, 298–304. <https://doi.org/10.1016/j.addbeh.2017.08.037>.
- Frick, P. J. (1991). The Alabama parenting questionnaire. Unpublished rating scale, University of Alabama.
- Frick, P. J., Christian, R. E., & Wootton, J. M. (1999). Age trends in the association between parenting practices and conduct problems. *Behavior Modification*, 23(1), 106–128. <https://doi.org/10.1177/0145445599231005>.
- Grogan-Kaylor, A., Burlaka, V., Ma, J., Lee, S., Castillo, B., & Churakova, I. (2018). Predictors of parental use of corporal punishment in Ukraine. *Children and Youth Services Review*, 88, 66–73. <https://doi.org/10.1016/j.childyouth.2018.03.003>.
- Group, W. A. W. (2002). The alcohol, smoking and substance involvement screening test (ASSIST): Development, reliability and feasibility. *Addiction*, 97(9), 1183–1194. <https://doi.org/10.1046/j.1360-0443.2002.00185.x>.
- Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: Review of the evidence. *Journal of Child Psychology and Psychiatry*, 45(2), 260–273. <https://doi.org/10.1111/j.1469-7610.2004.00218.x>.
- Herrenkohl, T. I., Hong, S., Klika, J. B., Herrenkohl, R. C., & Russo, M. J. (2013). Developmental impacts of child abuse and neglect related

- to adult mental health, substance use, and physical health. *Journal of Family Violence*, 28(2), 191–199. <https://doi.org/10.1007/s10896-012-9474-9>.
- Humeniuk, R., Ali, R., & WHO ASSIST Phase II Study Group. (2006). *Validation of the alcohol, smoking and substance involvement screening test (ASSIST) and pilot brief intervention: A technical report of phase II findings of the WHO ASSIST project*. Geneva: World Health Organization.
- IDMC. (2018). Internal Displacement Monitoring Centre: Country information: Ukraine. Retrieved from <http://www.internal-displacement.org/countries/ukraine>.
- Jonson-Reid, M., Kohl, P. L., & Drake, B. (2012). Child and adult outcomes of chronic child maltreatment. *Pediatrics*, 129(5), 839–845. <https://doi.org/10.1542/peds.2011-2529>.
- Kandel, D. B., Yamaguchi, K., & Chen, K. (1992). Stages of progression in drug involvement from adolescence to adulthood: Further evidence for the gateway theory. *Journal of Studies on Alcohol*, 53(5), 447–457. <https://doi.org/10.15288/jsa.1992.53.447>.
- Kessler, R. C. (1997). The effects of stressful life events on depression. *Annual Review of Psychology*, 48(1), 191–214. <https://doi.org/10.1146/annurev.psych.48.1.191>.
- Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: Guilford Press.
- Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). New York: The Guilford Press.
- Koenig, A. L., Ialongo, N., Wagner, B. M., Poduska, J., & Kellam, S. (2002). Negative caregiver strategies and psychopathology in urban, African-American young adults. *Child Abuse & Neglect*, 26(12), 1211–1233. [https://doi.org/10.1016/S0145-2134\(02\)00422-2](https://doi.org/10.1016/S0145-2134(02)00422-2).
- Lau, J. T. F., Kim, J. H., Tsui, H.-Y., Cheung, A., Lau, M., & Yu, A. (2005). The relationship between physical maltreatment and substance use among adolescents: A survey of 95,788 adolescents in Hong Kong. *Journal of Adolescent Health*, 37(2), 110–119. <https://doi.org/10.1016/j.jadohealth.2004.08.005>.
- Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling*, 9(2), 151–173. https://doi.org/10.1207/S15328007SEM0902_1.
- Lo, C. C., & Cheng, T. C. (2007). The impact of childhood maltreatment on young adults' substance abuse. *The American Journal of Drug and Alcohol Abuse*, 33(1), 139–146. <https://doi.org/10.1080/00952990601091119>.
- Lochman, J. E., & van den Steenhoven, A. (2002). Family-based approaches to substance abuse prevention. *Journal of Primary Prevention*, 23(1), 49–114. <https://doi.org/10.1023/A:1016591216363>.
- Merrick, M. T., Ports, K. A., Ford, D. C., Afifi, T. O., Gershoff, E. T., & Grogan-Kaylor, A. (2017). Unpacking the impact of adverse childhood experiences on adult mental health. *Child Abuse & Neglect*, 69, 10–19. <https://doi.org/10.1016/j.chiabu.2017.03.016>.
- Moran, P. B., Vuchinich, S., & Hall, N. K. (2004). Associations between types of maltreatment and substance use during adolescence. *Child Abuse & Neglect*, 28(5), 565–574. <https://doi.org/10.1016/j.chiabu.2003.12.002>.
- Newbury, J. B., Arseneault, L., Moffitt, T. E., Caspi, A., Danese, A., Baldwin, J. R., & Fisher, H. L. (2018). Measuring childhood maltreatment to predict early-adult psychopathology: Comparison of prospective informant-reports and retrospective self-reports. *Journal of Psychiatric Research*, 96, 57–64. <https://doi.org/10.1016/j.jpsychires.2017.09.020>.
- O'Grady, K. E., Arria, A. M., Fitzelle, D. M., & Wish, E. D. (2008). Heavy drinking and polydrug use among college students. *Journal of Drug Issues*, 38(2), 445–465. <https://doi.org/10.1177/002204260803800204>.
- Onifade, P. O. (2014). Psychometric properties of alcohol smoking and substance involvement screening test (Assist V3.0) among university students. *Journal of Addictive Behaviors Therapy & Rehabilitation*, 3(3), 1–7. <https://doi.org/10.4172/2324-9005.1000126>.
- Pejnović Franelić, I., Kuzman, M., Pavić Šimetin, I., & Kern, J. (2011). Impact of environmental factors on marijuana use in 11 European countries. *Croatian Medical Journal*, 52(4), 446–457. <https://doi.org/10.3325/cmj.2011.52.446>.
- Petrov, V. (2017, July 21). Poroshenko: 11,000 Ukrainians killed since beginning of war in Donbas. Retrieved from <https://www.kyivpost.com/ukraine-politics/poroshenko-11000-ukrainians-killed-since-beginning-war-donbas.html>.
- Phillips, P. C. B., & Park, J. Y. (1988). On the formulation of Wald tests of nonlinear restrictions. *Econometrica: Journal of the Econometric Society*, 56(5), 1065–1083. <https://doi.org/10.2307/1911359>.
- Raykov, T., Tomer, A., & Nesselroade, J. R. (1991). Reporting structural equation modeling results in psychology and aging: Some proposed guidelines. *Psychology and Aging*, 6(4), 499–503. <https://doi.org/10.1037/0882-7974.6.4.499>.
- Rushchenko, I. P., & Serdiuk, O. O. (2016). Monitoring of addictive behaviors among Kharkiv youths: Conceptualizing empiric research data. *Ukrainian Socium*, 59(4), 42–56.
- Shadur, J. M., Hussong, A. M., & Haroon, M. (2015). Negative affect variability and adolescent self-medication: The role of the peer context: Peer context and self-medication. *Drug and Alcohol Review*, 34(6), 571–580. <https://doi.org/10.1111/dar.12260>.
- Siebenbruner, J., Englund, M. M., Egeland, B., & Hudson, K. (2006). Developmental antecedents of late adolescence substance use patterns. *Development and Psychopathology*, 18(02), 551–571. <https://doi.org/10.1017/S09545794060060287>.
- Sreeramareddy, C. T., Hon, J., Abdulla, A. M., & Harper, S. (2018). Hardcore smoking among daily smokers in male and female adults in 27 countries: A secondary data analysis of global adult tobacco surveys (2008–2014). *Journal of Global Health Reports*, 2. <https://doi.org/10.29392/joghr.2.e2018019>.
- StataCorp. (2015). *Stata statistical software: Release Stata/MP 14.2*. College Station: StataCorp LP.
- Straus, M. A., & Kantor, G. K. (1994). Corporal punishment of adolescents by parents: A risk factor in the epidemiology of depression, suicide, alcohol abuse, child abuse, and wife beating. *Adolescence*, 29(115), 543.
- UkrStat. (2018). State Statistics Committee of Ukraine: The structure of family resources in 2017. Retrieved from http://www.ukrstat.gov.ua/operativ/operativ2007/gdvvg_rik/dvvg_u/str_res2010_u.htm.
- UNIAN. (2013). The divorce rate reaches 61% in Ukraine. Retrieved from <https://www.unian.ua/society/799801-v-ukrajini-vidsotok-rozluhen-syagnuv-61.html>.
- Vachon, D. D., Krueger, R. F., Rogosch, F. A., & Cicchetti, D. (2015). Assessment of the harmful psychiatric and behavioral effects of different forms of child maltreatment. *JAMA Psychiatry*, 72, 1135–1142. <https://doi.org/10.1001/jamapsychiatry.2015.1792>.
- Verkhovna Rada. (2018). *The Law of Ukraine on prevention and counteraction of domestic violence*. Pub. L. No. 2229–VIII.
- Wall, A. E., & Kohl, P. L. (2007). Substance use in maltreated youth: Findings from the National Survey of child and adolescent well-being. *Child Maltreatment*, 12(1), 20–30. <https://doi.org/10.1177/1077559506296316>.
- Webb, C. P., Bromet, E. J., Gluzman, S., Tintle, N. L., Schwartz, J. E., Kostyuchenko, S., & Havenaar, J. M. (2005). Epidemiology of heavy alcohol use in Ukraine: Findings from the world mental health survey. *Alcohol and Alcoholism*, 40(4), 327–335. <https://doi.org/10.1093/alcalc/agh152>.

- Wiehn, J., Hornberg, C., & Fischer, F. (2018). How adverse childhood experiences relate to single and multiple health risk behaviours in German public university students: A cross-sectional analysis. *BMC Public Health*, 18(1), 1005. <https://doi.org/10.1186/s12889-018-5926-3>.
- Wills, A., & Kalashnik, O. (2018). *Counteracting domestic violence: Manual for police officers*. Kyiv: National Police of Ukraine.
- World Health Organization. (2014). *Global status report on alcohol and health – 2014 ed.* Retrieved from http://www.who.int/substance_abuse/publications/global_alcohol_report/en/.

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