



How Influential are Adverse Childhood Experiences (ACEs) on Youths?: Analyzing the Immediate and Lagged Effect of ACEs on Deviant Behaviors

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Abstract

Although the effect of adverse childhood experiences (ACEs) on antisocial behaviors is well established in the literature, limited research, if any, has analyzed the effect that ACEs have on behaviors at two different times. Limited research also has analyzed the effect that specific ACEs have on deviant behaviors after statistically controlling for respondents' protective factors. This study expands the literature in this area by analyzing in a sample of 555 adolescents the immediate and lagged effect that individual ACEs, and exposure to a number of ACEs, have on three deviant behaviors after controlling for respondents' protective factors not previously examined in ACEs studies. Results obtained from multivariate logistic regression models revealed that stealing things was predicted by being hit hard, being sexually molested, and having lived with a depressed or suicidal individual; and receiving threats over the internet predicted physical fights. Only being hit hard and living with an alcoholic had a lagged effect on smoking marijuana. Results also showed that the protective factors of school connection, anger management skills, and parental supervision reduced the effect of ACEs on the behaviors analyzed. Research, theory, and policy implications are discussed.

Keywords Adverse childhood experiences · Deviant behaviors · Protective factors · Youths

A series of childhood events that cause harm and distress are known as Adverse Childhood Experiences (ACEs) (Kalmakis & Chandler, 2014). In 2019 in the United States approximately 656,000 children, or 8.9 per 1,000 minors experienced an ACE such as maltreatment; and approximately 1,840 of them died because of the abused suffered (U.S. Department of Health & Human Services [USDHHS], 2019). Data from 2019 also indicate that 10.3% of children were physically abused, 7.2% were sexually abused, and 15.5% experienced two or more maltreatment types. According to Finkelhor et al. (2013), the official number of maltreated children (USDHHS, 2012) is underestimated, as they calculate that 25% of minors in the U.S. experience maltreatment.

ACEs have been linked to health problems (Felitti et al., 1998; Messina et al., 2007; Wilsnack et al., 1997) and to deviant and criminal behaviors (Reavis et al., 2013)

including alcohol and drugs use (Anda et al., 1999), truancy, vandalism, theft, running away from home, bullying, physical fights, carrying weapons at school, self-inflicted wounds (Duke et al., 2010), dating violence (Miller et al., 2011), and smoking (Anda et al., 1999; Ford et al., 2011).

Although the effect of ACEs on antisocial behaviors is well established (Duke et al., 2010; Felitti et al., 1998; Ford et al., 2011), research analyzing the effect of ACEs on the outcome variable measured at two different points in time is limited (Choi et al., 2019). Studies tend to analyze the effect that ACEs have on behaviors measured one time (Anda et al., 1999; Duke et al., 2010; Ford et al., 2011; Lansford et al., 2007), and with some exceptions (Choi et al., 2019), have not examined if such effect varies overtime.

Additionally, the number of control variables—including protective factors and additional risk factors—that have been statistically accounted for in the literature is relatively limited (Duke et al., 2010; Harford et al., 2014; Miley et al., 2020; Wolff et al., 2017). Risk factors are environmental circumstances, attitudes or behaviors that predict an increased probability of later offending. In contrast, protective factors predict a decreased probability of later offending, or nullify the effect

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of risk factors in interaction with them (Farrington & Welsh, 2007, pp. 17, 23, 28). According to Stouthamer-Loeber et al. (1993), protective and risk effects often co-occur in the same variables. Some risk and protective factors can be understood as a continuum of the same variable where in one extreme it can protect youths from delinquency, and on the other extreme it can favor youths' delinquency. For example, having high levels of self-control (Gottfredson & Hirschi, 1990) is a protective factor against delinquency, but on the other extreme, having low levels of self-control is a risk factor for delinquency.

Since it is possible that the effect of ACEs on behaviors will vary overtime, its empirical examination is warranted as it would increase our understanding of the temporal effect that ACEs have on behaviors. Additionally, since risk and protective factors affect the likelihood of negative behavioral and health outcomes (Farrington & Welsh, 2007, p. 17, 23, 28), their association with ACEs is important as they are likely to influence the relationship between ACEs and the outcome analyzed. Analyzing the short and long term effect that ACEs have on behaviors after controlling for protective factors not previously explored in the ACEs literature would increase our understanding of how ACEs affect individuals' actions overtime.

The present study will contribute to the exiting literature by analyzing the immediate and lagged effect that specific ACEs and their summative effect have on three forms of juvenile deviant behaviors after accounting for protective factors known to decrease delinquency—but not previously examined as confounders of ACEs—that co-occur with the delinquent behaviors.

Literature Review

Adverse Childhood Experiences (ACEs) are severe childhood events that often are chronic, occur within a child's family or social environment, cause harm or distress, and disrupt the child's physical or psychological health and development (Kalmakis & Chandler, 2014). ACEs have been shown to influence the social, emotional and cognitive abilities of those who experienced them. Such negative experiences may lead to the adoption of unhealthy and antisocial behaviors, which in turn may lead to diseases, disability, social problems, and early death (Felitti et al., 1998; Kalmakis & Chandler, 2014). Research indicates that there is great variation in the prevalence of ACEs across individuals, that experiencing more than one ACE is not uncommon, and that exposure to ACE's differ by race/ethnicity, and by gender (Baglivio & Epps, 2016).

The developmental pathology perspective (Kaufman & Cicchetti, 1989; Sroufe & Rutter, 1984) suggest that ACEs affect neural functions, neurocognitive domains, contribute

to the development of psychopathology (Cicchetti & Toth, 1995; Toth & Cicchetti, 2013), and are associated to chromosomal damage (Shalev et al., 2013). ACEs are thought to cause functional changes to the developing brain (Alink et al., 2012; Anda et al., 2010; Cicchetti, 2013; Danese & McEwen, 2012; Teicher et al., 2003), which may lead to extreme and potentially violent reactions to even trivial stimuli (Cicchetti & Toth, 2005). Maltreated children may be more prone towards aggressive or violent behaviors because they have difficulties recognizing, understanding and expressing their emotions (Toth et al., 2011).

In the field of criminology the effects that negative life events—whether they occur during childhood or not—has on individuals' deviant and criminal behaviors are explored by several theoretical frameworks, including Agnew's general strain theory of crime (Agnew, 1992, 2002). General strain theory states that individuals who have negative relations with others or experience negative life events will be exposed to strain. Strained individuals will develop coping mechanisms to deal with that strain, and some of those coping mechanisms will be deviant or criminal. Strain is more likely to result in crime when it is high in magnitude, associated with low levels of social control, perceived as unjust, and when it creates incentives for criminal coping (Agnew, 1992). General strain theory has been widely tested and has received a large amount of support in the empirical literature (Agnew & White, 1992; Baron, 2004; Hay & Evans, 2006; Jackson, 2012; Piquero & Sealock, 2000). ACEs also have been studied in the field of criminal justice to predict the likelihood that youths will become serious, violent and chronic offenders (Fox et al., 2015; Perez et al., 2018), and to determine the likelihood of recidivism among criminals (Wolff et al., 2017).

According to an ACEs pioneer study conducted by Felitti et al. (1998), ACEs are strongly related to the development of risk factors for diseases and can negatively impact the wellbeing throughout the life course of those who experienced them. Felitti et al. (1998) found that as individuals' exposure to ACEs increased, their odds for smoking, experiencing severe obesity, physical inactivity, depression, and suicidal attempts also increased. Their study analyzed seven categories of ACEs, namely: being psychologically or physically attacked by a parent or another adult in the household; being sexually touched, fondled, penetrated or attempted to be penetrated by a person at least 5 years older; living with a drug or alcohol user; living with a person suffering from depression, mentally ill, or who had attempted to commit suicide; witnessing physical violence against mother or step mother, and having a household member going to prison.

Some studies analyzing the effect of specific ACEs indicate that individuals who experience emotional, sexual, or physical abuse, who have witnessed domestic violence, lived with a substance user, or experienced parental separation

have higher odds for smoking (Anda et al., 1999; Ford et al., 2011). Other studies have found that individuals experiencing physical and sexual abuse, long term parental separation, disorder, neglect, and who live with parents who either consume alcohol and drugs, are mentally ill, are criminal, or engage in intraparental violence are significantly more likely to experience violent perpetration and victimization in dating relationships (Duke et al., 2010; Miller et al., 2011). Those ACEs also predict delinquency, bullying, fighting, and carrying weapons on school property (Duke et al., 2010). Parental divorce and family economic adversity also predict violence perpetration (Miller et al., 2011), and family violence predicted fighting perpetration, which in turn predict substance use (Espelage et al., 2014). A recent meta-analysis of longitudinal studies confirmed what individual studies tended to find, that maltreatment during childhood and adolescence is linked to higher rates of general and aggressive antisocial behaviors (Braga et al., 2017). Researchers also have found that individuals exposed to a higher number of ACEs are more likely to start using drugs (Dube et al., 2003) and alcohol at an earlier age (Dube et al., 2006; Rothman et al., 2008; Young et al., 2006).

Although it is unclear why different ACEs have different effects on individuals' behaviors, Muniz et al. (2019) found that individuals manifested their behaviors internally (e.g. depression, suicidal thoughts) or externally (e.g. anger, irritability, violence, and alcohol/drug use) based on the type of ACEs experienced. Being subject to emotional and physical abuse, and witnessing violence or substance abuse in the household, and having a household member incarcerated increased the odds of having external manifestations of behavior. Internal manifestations of behavior were more common among those who suffered sexual abuse, or who have someone in the household with a mental illness. While Muniz's et al. (2019) research does not explain why different ACEs manifest differently on behaviors, it shows that individuals who have experienced ACEs that could be considered a taboo or could be "shameful" to talk about them were more likely to internalize their behaviors.

Although the effect of ACEs on behavioral outcomes measured at one point in time is well established (Anda et al., 1999; Duke et al., 2010; Ford et al., 2011; Miller et al., 2011), little is known about the effect that ACEs have on a behavioral outcome measured at two or more points in time. Choi et al. (2019) analyzed the effect that exposure to a number of ACEs had on the likelihood of having behavioral problems at ages 3, 5, 9 and 15 years while controlling for the subjects' temperament at 1 year, among other confounders. These authors found that the effect of having experienced two ACEs increased the likelihood of having behavioral problems over time. Additionally, although the effect of experiencing three ACEs on the likelihood of having behavioral problems varied across time measures,

it decreased overtime. This study revealed that individuals who experienced three ACEs, compared to those who experienced two ACEs, had higher odds of having behavioral problems at ages 3, 5, and 9, but not at age 15. Since these individuals had more serious behavioral problems from an early age, they could have received counseling services to decrease their problematic behaviors, and maybe those who experienced two ACEs did not. A behavioral intervention only among children who experienced three ACEs and had worse problematic behaviors would explain why their odds of offending decreased overtime. This scenario would also explain why the odds of offending among those who experienced two ACEs and received not behavioral intervention increased overtime. Although this situation is plausible, Choi et al. (2019) did not control for variables that supported or rejected this scenario.

ACEs are not the only elements affecting youths' behaviors. Although researchers analyzing the effect of ACEs on delinquency have controlled for important confounders, the number of risk and protective factors that have been studied is somewhat limited (Duke et al., 2010; Fox et al., 2015; Harford et al., 2014; Rothman et al., 2008). Some of the risk factors that have been statistically controlled for in previous studies include family structure, being recipient of free or reduced-price lunch (Duke et al., 2010), marital status, lifetime mood, anxiety, personality disorders, attention deficit/hyperactivity disorder (Harford et al., 2014), family feelings about alcohol use, and number of friends who drank alcohol during their first year of high school (Rothman et al., 2008). Other studies have controlled for age of criminal onset, antisocial peers, impulsivity, family income (Fox et al., 2015), substance use, school behavior, history of running away, probation, prior offending (Wolff et al., 2017), and age at first commitment to a confinement facility, total delinquent adjudications, and total out of home placements (DeLisi et al., 2017). In a more recent study, Miley et al. (2020) analyzed the effect of experiencing ACEs during childhood on sexual, violent and drug offenses during adolescence while controlling for several risk and protective factors, including individual's self-control, levels of depression, antisocial peers, poverty status, and emotional abuse and neglect.

There are a number of factors whose known protective effects against deviant behaviors have not been analyzed in combination with ACEs. Those protective factors include positive relationship with parents (Sale et al., 2003), effective anger management skills (Brezina, 2010), and connectedness with school (Piko & Kovács, 2010). Testing the effect of ACEs on deviant behaviors while controlling for previously untested protective factors would increase our understanding of how ACEs affect individuals' actions. Analyzing the effect of these variables while studying ACEs is important because although their protective effect is well established in the non-ACEs literature, it is unknown if these

factors also attenuate the effect that ACEs have on deviant behaviors. This knowledge would contribute to the literature on ACEs as it will empirically evaluate whether these variables protect individuals from the effect that ACEs have on their deviant behaviors.

Research indicates that having positive relationships with family and school, and having parental supervision are among the strongest protective factors that prevent youths from engaging in antisocial and illegal behaviors (Beyers et al., 2004; Brooks et al., 1998; Cleveland et al., 2008, 2010; Hawkins et al., 1992; Sale et al., 2003), such as general delinquency (Smith et al., 1995a), and tobacco, alcohol, drug use, attempted suicides, and weapons related violence (McNeely & Falci, 2004).

Thinking about ones' future is also associated to positive behavioral outcomes (Harris et al., 2002; McDade et al., 2011; Stoddard et al., 2011). Researchers have found that youths with a "nothing to lose" attitude are more likely to sell drugs (Harris et al., 2002). In contrast, youths with positive hopes about their future are significantly less likely to drop out of school (Worrell & Hale, 2001), to have less violent behaviors (Stoddard et al., 2011), and to have lower levels of delinquency and drug use (Smith et al., 1995a).

Poor anger management also has been linked to aggressive and violent behaviors (Botvin et al., 2006; Brezina, 2010; Griffin et al., 2003), smoking (Eiden et al., 2011), alcohol and marijuana use (Eftekhari et al., 2004), burglary, theft, and vandalism (Sigfusdottir et al., 2004). Additionally, having higher levels of self-esteem serves as a protective factor against substance use (Lee et al., 2018), depression (Donnelly et al., 2008), delinquency (Smith et al., 1995a), suicidal ideation, and several health compromising behaviors (McGee & Williams, 2000; Wild et al., 2004).

Since the protective factors described above were presumably present in people's lives at the time they experienced ACEs and at the time they engaged in the behaviors analyzed, their consideration in statistical models will improve our understanding of how ACEs influence people's behaviors. The assumption that ACEs and protective factors were present at the same time is based on several facts. Specifically, most K-12 students—at least in the United States—live in a household with a least one parent with whom youths would have a positive or negative relationship with (National Center for Education Statistics), and whose parents exert different levels of supervision over them (Jang & Smith, 1997; Wilson, 1980, 1987). In addition, individuals in school have a positive or negative connection with their school, have some type of anger management skills, future expectations (Baumeister et al., 2016; Hicks & Holden, 2007), and different levels of self-esteem (Cast & Burke, 2002; Orth & Robins, 2014). Based on existing literature, it is safe to assume that protective factors—with various degrees of protective effects—are present on youths' lives.

Current Study

The current study expands on previous literature by analyzing the immediate and lagged effect that individual ACEs and their summative effect have on three deviant behaviors after controlling for protective factors known to affect youths' actions, but not previously analyzed in combination with ACEs. The present study will examine the following hypotheses:

H1: Each one of the seven ACEs analyzed will increase the immediate and lagged probabilities of fighting, of stealing things, and of smoking marijuana.

H2: Youths who have experienced a higher number of ACEs will have immediate and lagged higher probabilities of fighting, of stealing things, and of smoking marijuana.

H3: Higher levels of school connection, future expectations, parental supervision, relationship with parents, effective anger management skills, and higher self-esteem will mediate the immediate and lagged effect of ACEs on the outcome variables.

Method

Sample and Data Collection

Data analyzed in this study were collected by Identity, Inc. (identity-youth.org [Identity]), as part of their school-based services, through self-reported paper/pencil questionnaires at two different points in time in 2016 and 2017. Identity is a community-based 501(c)(3) organization based in Maryland, whose mission is “[i]n pursuit of a just, equitable and inclusive society, Identity creates opportunities for Latino and other historically underserved youth to realize their highest potential and thrive” (<https://identity-youth.org/who-we-are/mission-and-values/>). The data corresponds to 555 Maryland public middle school ($n = 73$) and high school ($n = 482$) Hispanic ($n = 340$) and Black/African-American ($n = 215$) students receiving services from Identity. Such services might have included, but were not limited to counseling, case management services, and after school educational programs.

Most respondents were U.S. born (55.8%) or naturalized citizens (5.2%). A minority of them (9.1%) had a Permanent Resident Card (Green Card) at the time of the first wave of data collection, and almost 30% of youths were undocumented. Most of the undocumented youths were Hispanic (97.5%).

All of the 555 youths completed the questionnaire at time 1, and 419 of them (75.49%) also completed the questionnaire at time 2. Reasons that kept youths from completing the questionnaire at time 2 include, but were not limited to transferring to another school and leaving Identity's

programs. The mean age of the students at time 1 was 14.96 years and at t2 was 15.15 years. The number of days that passed between both questionnaires ranged from 42 to 257 (Mean 102.55; Std. Dev. 56.20).

The questionnaires were completed at the students' schools during normal school hours after receiving the students' ascent and their parents/guardians' consent. Participation in this survey was voluntarily. The questionnaires were available in both languages English and Spanish. Most youths opted for the English version of the survey (69.3%), and it was also youths' most common preferred language (65.7%), which was followed by Spanish (33.3%), and French (0.9%).

The Human Subjects Protection Program of the University of Louisville, which ensures through its Institutional Review Board (IRB) that research involving human participants is conducted in accordance with Federal and State regulations, and in adherence to the ethical principles outlined in the Belmont Report, has approved the analyses of the secondary data presented in this manuscript (Research protocol number: 18.0953).

Measures

Dependent variables. Youths were asked at time 1 (t1) and subsequently at time 2 (t2) to report their frequency of fighting, of stealing things, and of smoking marijuana during the last month. Answers for these questions were Never (1), Rarely (2), Often (3) and Very Often (4). Because of the positive skewness of these answers they were dichotomized to distinguish youths who have not engaged in these behaviors from those who had. Responses indicating 'Never' were coded 0 and the rest of the responses were coded 1.

Independent Variables. Youths were only asked at t1 about the key independent variables, their exposure to eight ACEs. Youths were asked if they were 1) 'being hurt emotionally or physically by anyone at their home this time;' 2) 'if their parents or other adults in their home now or ever in the past had hit them so hard that they had marks or were injured;' and 3) 'if they now see or had ever seen in their home a parent or a household member being slapped, kicked, punched or beaten up. Youths also were asked if they 4) 'were currently being threatened by anyone through the internet;' 5) 'if they now or had ever lived with a problem drinker or alcoholic;' 6) 'if they been forced to have (oral, vaginal or anal) sex when they did not want to;' 7) 'if any person had ever forcibly touched them sexually or forced them to sexually touch this other person in a sexual way;' and 8) 'if now or in the past they had ever lived with a household member suffering from depression, mental illness, or someone who has attempted suicide. Responses indicating "yes" to experiencing the ACEs asked about were coded 1 and responses indicating "no" were coded 0. The questions asking youths if they had been 'forced to have sex'

or were 'forcibly touched' were merged into the variable 'sexually molested.' Exposure to at least one of these ACEs were coded 1 and lack of exposure was coded 0 (Cronbach's alpha=0.67).

The variable 'school connection,' captured at t1 and at t2, measured respondents' level of perceived safety and connectedness with their school. This variable is a summative index resulted from adding the responses to the statements: 1) 'I feel that I am part of my school;' 2) 'I am treated fairly at school;' 3) 'There is an adult (teacher, counselor, etc.) at school that encourages me to do well;' 4) 'If I ever felt threatened at school (like my life was in danger), there is an adult in my school I would talk to', and 5) 'I care about getting good grades in school'. Responses for these statements ranged from Strongly Disagree (1) to Strongly Agree (5). Higher values of this index indicate higher levels of school connection. Lower levels of this variable represent a poor school connection (Cronbach's alpha=0.72).

The variable 'future expectations,' captured at t1 and at t2, measured respondents' expectations about their future. This variable resulted from adding the responses to the statements: 1) 'I will graduate from high school;' 2) 'I will attend college or university;' 3) 'I feel confident I will accomplish my life goals;' 4) 'I feel good/positive about my future,' and 5) 'I feel prepared to deal with problems that I may face in the future.' Responses for these statements ranged from Strongly Disagree (1) to Strongly Agree (5). Higher values of this index indicate more positive future expectations. Lower levels of this variable represent poor future expectations (Cronbach's alpha=0.90).

The variable 'parental supervision,' captured at t1 and at t2, measured respondents' perceptions about their parents knowledge regarding the respondents' whereabouts and companions. This variable resulted from adding the responses to the statements: 1) 'My parents/guardians know where I am when I am not with them,' and 2) 'My parents/guardians know who I am with when I am not with them.' Responses for these statements ranged from Never (1) to Always (5). Higher values of this index indicate higher levels of parental supervision. Lower levels of this variable represent poor parental supervision (Cronbach's alpha=0.80).

The variable 'relations with parents,' captured at t1 and at t2, measured respondents' quality of the relationship with their parents. This variable resulted from adding the responses to the statements: 1) 'My parents/guardians ask me what I think before making decisions that affect me,' 'If I had a personal problem, I could ask my parents/guardians for help,' and 2) 'My parents/guardians tell me when I am doing things well. Responses for these statements ranged from Never (1) to Always (5). Higher values of this index indicate positive relations with parents. Lower levels of this variable represent negative relations with parents (Cronbach's alpha=0.82).

The variable ‘anger management,’ captured at t1 and at t2, measured respondents’ ability to control their anger and responses to their anger. This variable resulted from adding the responses to the statements: 1) ‘If someone makes me really angry, I would hit the person;’ 2) ‘I don’t need to fight because I have other ways to deal with my anger;’ 3) ‘I get angry easily;’ 4) ‘If things are bothering me or getting on my nerves, I do things to relax;’ 5) ‘If I am having a problem with someone, I try to talk it out instead of fighting,’ and 6) ‘When I am angry, I throw or break something.’ Responses for these statements ranged from Strongly Disagree (1) to Strongly Agree (5). Answers for the first, third and sixth statements of this index were reverse coded. Higher values of this index indicate better anger management skills, and lower levels of this variable represent poor anger management skills (Cronbach’s $\alpha = 0.71$).

The variable ‘self-esteem,’ captured at t1 and at t2, measured respondents’ level of self-esteem. This variable resulted from adding the responses to the statements: 1) ‘I have a number of good qualities,’ 2) ‘I am a failure,’ 3) ‘I am happy with who I am,’ and 4) ‘I am useless.’ Responses for these statements ranged from Strongly Disagree (1) to Strongly Agree (4). The answers for the second and fourth statements of this index were reverse coded. Higher values of this index indicate higher levels of self-esteem, and lower levels of this variable represent a low self-esteem (Cronbach’s $\alpha = 0.73$).

Control variables included gender (Female = 0, Male = 1), race (0 = African-American/Black/of African Origin, 1 = Hispanic) and age. Age was coded as a continuous variable and was adjusted for t2. The variable FARM, which served as a proxy for economic status, asked respondents if they were recipients of Free and Reduced Price Meals at school (No = 0, Yes = 1). The variable ‘days in program’ is a continuous measure indicating the number of days respondents received services from Identity. This measure was obtained by calculating the number of days that transpired between respondents completed the questionnaire at time 1 and at time 2.

It is important to mention that the data analyzed does not capture the time when the ACEs occurred. Nevertheless, all of the ACEs happened when youths in the study were under 18 years of age (Center for Disease Control and Prevention, Preventing Adverse Childhood Experiences). Additionally, none of the measures described above had been previously validated. These measures were created by Identity, Inc. to address the specific needs of their programs. Moreover, no validation methods were conducted to assess the veracity of the respondents’ answers. Previous research, however, indicate that self-reported deviant behaviors (Clark & Tift, 1966; Moffitt & Silva, 1988), and self-reported use of cannabis (Martin et al., 1988) and alcohol tend to be reliable indicators of those behaviors (Smith et al., 1995b).

Statistical Procedures

The data analyses present descriptive statistics of the sample, of the variables used in the study (Table 1) and a polychoric bivariate correlation table between the dependent and the independent variables (Holgado–Tello et al., 2010) (Table 2). These statistics are followed by a series of multivariate logistic regression models that examine the immediate individual effect that seven ACEs, measured at t1, have on fights, stealing things, and on smoking marijuana the previous month (measured at t1) (Table 3). Logistic regression models will also examine the immediate effect that exposure to a number of ACEs, measured at t1, have on the dependent variables (measured at t1) (Table 4). Similar models will also examine the lagged individual effect that ACEs, measured at t1, have on the dependent variables measured at t2 (Table 5), and the lagged effect that exposure to a number of ACEs measured at t1 have on deviance measured at t2 (Table 6). Each of the logistic regression tables will include the confounders described above. Exposure to the number of ACEs will be calculated by adding the number of ACEs that each youths reported experiencing. Experiencing zero ACEs will be the reference category.

Results

Descriptive Statistics and Bivariate Associations

As shown in Table 1, descriptive statistics from the questionnaire taken at t1 indicate that 12% of youths engaged in fights, 13% stole things, and 10% smoked marijuana the month preceding the survey. Males (49.5%) and females were evenly distributed in the sample, and their mean age was 15 years (s.d. 1.49). Exposure to ACEs varied considerably. Six percent of youths had been hurt emotionally or physically, 15% had been hit hard, 12% had witnessed domestic violence at home; and 2% had been threatened over the internet. In addition, 13% of youths had lived with an alcoholic, 5% were sexually molested, and 7% had lived with a mentally unstable individual. Sixty four percent of youths had experienced zero ACEs and 12% had experienced between 4 and 5 ACEs.

Polychoric correlations (from data collected at t1) shown in Table 2 indicate that the variables fighting, stealing, and smoking marijuana the previous month were positively and strongly correlated to one another. The variable fights had a large positive correlation with the variable being threatened over the internet and a moderate negative correlation with the variable anger management. The variable stealing had a moderate positive correlation with the variables being hit hard, and living with a

Table 1 Descriptive Statistics

	Time 1 (n=555)		Time 2 (n=419)		Min	Max
	%	n=	%	n=		
Dependent Variables						
Fights	12.43	69	9.79	41		
Stole things	13.15	73	10.98	46		
Smoked marijuana	10.27	57	9.07	38		
ACEs*						
Being hurt	6.13	34	6.21	26		
Being hit	15.32	85	14.80	62		
Witnessed abuse	12.61	70	12.65	53		
Being threatened	2.16	12	1.91	8		
Live with drinker	13.33	74	13.13	55		
Sexually molested	5.59	31	5.25	22		
Lived with suicidal	7.93	44	6.68	28		
Number of ACEs						
Zero ACEs	64.14	356	65.39	274		
One ACE	19.64	109	18.85	79		
Two ACEs	7.93	44	8.35	35		
Three ACEs	6.13	34	5.01	21		
Four to Five ACEs	2.16	12	2.39	10		
Control Variables						
Gender						
Male	49.55	275	47.97	201		
Female	50.45	280	52.03	218		
Hispanic	61.26	340	58.95	247		
African American/Black	38.74	215	41.05	172		
FARM	66.67	370	67.78	284		
	Mean	Std. Dev	Mean	Std. Dev		
Age	14.96	1.49	15.15	1.53	11	17 (18)
Days in program	-	-	102.55	56.20	(42)	(257)
Protective Factor Indexes						
School connection	24.54	3.54	24.76	3.42	6 (8)	30
Self-esteem	13.50	2.22	13.83	2.14	4	16
Future expectations	20.84	4.61	21.55	4.05	5	25
Parental supervision	8.58	1.69	8.62	1.54	2	10
Relation with parents	11.80	3.10	11.94	2.99	3	15
Anger management	21.08	4.36	20.59	3.48	6 (7)	30

The values inside the parentheses are from the data collected at t2 if different from data at t1

*The ACEs shown in the Time 2 column are from the youths whose ACEs were measured at time 1 and were still in the study at time 2. No ACEs were measured at Time 2

depressed individual. The variable smoking marijuana had a moderate negative correlation with the variable anger management.

Multivariate Analysis

The Models 1 from Table 3 explore the immediate individual effect that being hurt; being hit; witnessing violence at home; being threatened over the internet; living

with a drinker; being sexually molested; and living with a depressed or suicidal individual have on fighting, stealing, and smoking marijuana the previous month. Models 2 of each outcome variable include the same independent variables as Model 1 with the addition of youths' demographics characteristics and the indexes measuring their levels school connectedness, future expectations, parental supervision, parental relations, anger management, and self-esteem.

Table 2 Polychoric correlations table (data collected at t1 only)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1 Fights	1																					
2 Steal	.61	1																				
3 Marijuana	.56	.65	1																			
4 Being hurt	-.01	.34	-.04	1																		
5 Being hit hard	.18	.42	.23	.58	1																	
6 Witn. Violen	.26	.29	.30	.48	.60	1																
7 Threatened	.56	.19	.25	.38	.02	.30	1															
8 Live/w drink	.14	.18	.01	.20	.29	.37	.06	1														
9 Sex molested	.26	.29	.26	.29	.37	.35	-	.33	1													
10 Live/w Depre	.34	.39	.33	-.07	.43	.59	.19	.48	.14	1												
11 Age	-.12	-.15	-.00	-.02	.00	-.03	-.02	-.01	.05	.08	1											
12 Gender	.03	.18	.06	-.18	-.17	-.21	.00	-.07	-.17	-.14	.08	1										
13 FARM	-.02	.00	-.13	.01	.15	.00	-.18	.03	-.15	.05	-.06	-.14	1									
14 AA/Black	.24	.35	.37	.14	.09	.28	.03	-.19	-.04	.12	.20	.09	-.17	1								
15 Hispanic	-.24	-.35	-.37	-.14	-.09	-.28	-.03	.19	.04	-.12	-.20	-.09	.17	-.99	1							
16 School Conn	-.28	-.20	-.21	-.20	-.17	-.07	-.25	-.10	-.05	-.19	.11	.08	.11	-.08	.08	1						
17 Fut. Expect	-.15	.01	-.06	-.10	-.08	-.16	-.23	-.16	-.04	-.19	-.07	-.03	.09	.16	-.16	.24	1					
18 Par. Superv	-.28	-.33	-.36	-.23	-.34	-.29	-.30	-.02	-.06	-.29	-.06	-.23	.15	-.37	.37	.31	.14	1				
19 Rel. Parents	-.20	-.26	-.25	-.25	-.31	-.30	-.35	-.14	-.04	-.35	.02	.19	.09	-.15	.15	.35	.22	.55	1			
20 Anger Mgmt	-.46	-.37	-.40	-.13	-.30	-.19	-.35	-.21	-.17	-.39	.12	.09	.07	-.11	.11	.29	.13	.34	.33	1		
21 Self-esteem	-.08	-.09	-.03	-.18	-.10	-.13	-.17	-.13	-.00	-.28	.08	.11	-.03	.12	-.12	.32	.26	.16	.29	.25	1	

Correlations with a significant association are not denoted because Stata does not indicate statistical significance on Polychoric correlations

Model 1 predicting frequency of fights the previous month revealed that being threatened over the internet, being sexually molested, and living with a person who suffers from depression significantly affected youths' odds of fighting. Youths who have been threatened over the internet are 1,160% times more likely to engage in fights than youths who have not been threatened. Youths who have been sexually molested, and youths who have lived with a depressed or suicidal individual also are 154% and 145% times more likely to fight than youths who have not experienced those ACEs. When protective factors and control variables were included in Model 2, the significant effect of being threatened over the internet decreased and the effect of being sexually molested and living with a depressed individual disappeared. This second model also revealed that Hispanic youths, and youths who feel more connected to their school and who have better anger management skills had significant lower odds of fighting.

Model 1 predicting stealing things the previous month revealed that youths who have been hit hard by adults in their home, and youths who have lived with a mentally unstable individual had significant higher possibilities of stealing. When protective factors and control variables were included in Model 2, the effects of both predictor variables on stealing things decreased. In addition, being sexually molested significantly increased the odds of stealing things.

Model 1 predicting smoking marijuana showed that having lived with a depressed individual predicted the outcome variable. That significant effect disappeared in Model 2. Model 2 also showed that Hispanics and those with good anger management skills had lower odds of smoking marijuana. All of the models presented in Table 3 were significant ($\text{Chi-Squared} \leq 0.05$) and their Nagelkerke's R-squares increased substantially from model 1 to model 2 on all outcome variables.

The Models 1 from Table 4 examine the immediate effect that exposure to a number of ACEs had on last month's deviant behaviors. Model 2 of each dependent variable include the same independent variables as Model 1 with the addition of youths' protective factors and control variables.

Although the number of experienced ACEs that had a significant effect on the outcome variables varied, Models 1 tended to show that youths who have experienced more ACEs had a higher probability of engaging in the behaviors being predicted. This table also showed that the number of significant ACEs and their effect tended to declined when protective factors and other control variables were introduced in Models 2. The confounding variables that were significant in Table 3 also predicted the same outcome variables in these Table 4 models. The Chi-squares and pseudo R-squares of these models were similar to those from Table 3.

Table 3 Logistic Regression of ACEs from t1 on delinquent behaviors at t1 (n=555)

	Fights			Stole things			Smoked marijuana					
	Model 1		Model 2	Model 1		Model 2	Model 1		Model 2			
	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I		
Being hurt	0.48	0.14–1.66	0.36	0.08, 1.51	2.27 ^a	0.96, 5.32	2.34 ^a	0.90, 6.04	0.47	0.12, 1.77	0.29	0.06, 1.35
Being hit hard	1.37	0.67–2.80	0.89	0.41, 1.95	2.58 ^{**}	1.37, 4.87	2.31 [*]	1.14, 4.67	1.57	0.75, 3.29	1.16	0.52, 2.56
Seen violence	1.47	0.67–3.19	1.44	0.60, 3.45	1.05	0.50, 2.20	0.96	0.41, 2.22	2.00 ^a	0.90, 4.44	1.91	0.79, 4.63
Threatened	12.6 ^{***}	3.60–44.01	7.76 ^{**}	1.90, 31.59	1.88	0.45, 7.78	1.12	0.22, 5.62	3.15	0.77, 12.87	1.54	0.31, 7.49
Live/w drinker	1.03	0.48–2.21	1.16	0.51, 2.64	1.04	0.51, 2.14	1.26	0.57, 2.78	0.56	0.22, 1.41	0.73	0.28, 1.87
Sex molested	2.54 [*]	1.02–6.31	2.50 ^a	0.90, 6.92	2.11 ^a	0.87, 5.09	2.76 [*]	1.02, 7.47	2.54 ^a	0.97, 6.65	2.52 ^a	0.87, 7.26
Live/w depress	2.45 [*]	1.06–5.65	1.77	0.68, 4.54	3.11 ^{**}	1.41, 6.82	2.57 [*]	1.04, 6.32	2.44 [*]	1.01, 5.87	1.49	0.56, 3.94
Age	-	-	0.83	0.67, 1.04	-	-	0.74 ^{**}	0.59, 0.93	-	-	1.04	0.81, 1.33
Gender	-	-	1.33	0.71, 2.48	-	-	3.07 ^{***}	1.61, 5.84	-	-	1.47	0.76, 2.85
FARM	-	-	1.27	0.69, 2.36	-	-	1.3	0.71, 2.41	-	-	0.84	0.45, 1.60
Hispanic	-	-	0.46 [*]	0.24, 0.88	-	-	0.31 ^{***}	0.16, 0.60	-	-	0.40 ^{**}	0.20, 0.78
School connect	-	-	0.89 [*]	0.82, 0.97	-	-	0.95	0.87, 1.04	-	-	0.93	0.85, 1.03
Future expect	-	-	0.95	0.90, 1.02	-	-	1.05	0.97, 1.13	-	-	1.00	0.93, 1.07
Parent superv	-	-	0.90	0.73, 1.11	-	-	1.01	0.83, 1.25	-	-	0.91	0.73, 1.12
Relationship w. par	-	-	1.06	0.93, 1.20	-	-	0.92	0.82, 1.03	-	-	0.94	0.83, 1.07
Anger mgmt. skills	-	-	0.84 ^{***}	0.78, 0.90	-	-	0.88 ^{***}	0.82, 0.95	-	-	0.86 ^{***}	0.80, 0.93
Self-esteem	-	-	1.09	0.94, 1.26	-	-	0.99	0.87, 1.13	-	-	1.07	0.92, 1.25
Pearson's Chi-Squared	0.000		0.000		0.000		0.000		0.003		0.000	
Nagelkerke R-Squared	0.07		0.20		0.08		0.22		0.05		0.18	

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

^a ≤ 0.10

Table 4 Logistic Regression of the number of ACEs from t1 on delinquent behaviors at t1 (n = 555)

	Fights			Stole things			Smoked marijuana			
	Model 1		Model 2	Model 1		Model 2	Model 1		Model 2	
	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I
One ACE	1.67	0.86, 3.22	1.11	0.53, 2.32	2.01*	1.04, 3.88	1.77	0.85, 3.69	1.95 ^a	0.97, 3.90
Two ACEs	3.49**	1.60, 7.58	2.93*	1.24, 6.92	4.91***	2.31, 10.43	4.69***	1.95, 11.27	3.89***	1.72, 8.78
Three ACEs	3.77**	1.61, 8.79	2.24	0.82, 6.11	4.88***	2.12, 11.22	3.49**	1.32, 9.23	2.28	0.81, 6.41
Four & Five ACEs	3.49 ^a	0.89, 13.58	1.62	0.33, 7.84	11.71***	3.54, 38.72	14.35***	3.69, 55.81	4.41*	1.12, 17.34
Age	-	-	0.83	0.67, 1.03	-	-	0.76*	0.61, 0.95	-	-
Gender	-	-	1.38	0.74, 2.55	-	-	3.10***	1.62, 5.91	-	-
FARM	-	-	1.20	0.66, 2.17	-	-	1.34	0.73, 2.45	-	-
Hispanic	-	-	0.49*	0.26, 0.91	-	-	0.32***	0.17, 0.60	-	-
School connect	-	-	0.90*	0.83, 0.98	-	-	0.95	0.87, 1.03	-	-
Future expect	-	-	0.94 ^a	0.88, 1.00	-	-	1.05	0.98, 1.13	-	-
Parent superv	-	-	0.92	0.75, 1.12	-	-	1.02	0.84, 1.25	-	-
Relationship w. par	-	-	1.05	0.94, 1.19	-	-	0.91	0.81, 1.02	-	-
Anger mgmt. skills	-	-	0.82***	0.77, 0.89	-	-	0.88***	0.82, 0.94	-	-
Self-esteem	-	-	1.07	0.94, 1.23	-	-	0.99	0.87, 1.13	-	-
Pearson's Chi-Squared	0.002		0.000		0.000		0.000		0.008	0.000
Nagelkerke R-Squared	0.03		0.18		0.07		0.21		0.03	0.17

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$
^a ≤ 0.10

Table 5 Logistic Regression of ACEs from t1 on delinquent behaviors at t2 (n=419)

	Fights						Stole things						Smoked marijuana					
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2		Model 1		Model 2			
	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I		
Being hurt	0.52	0.10, 2.53	0.37	0.06, 2.18	1.50	0.48, 4.63	0.89	0.23, 3.46	0.17	0.21, 1.47	0.71 ^a	0.00, 1.09						
Being hit hard	1.77	0.74, 4.19	1.56	0.60, 4.09	1.35	0.58, 3.15	0.67	0.24, 1.84	3.30**	1.46, 7.47	3.26*	1.09, 9.71						
Seen violence	1.59	0.61, 4.12	1.71	0.60, 4.87	1.83	0.75, 4.44	1.93	0.69, 5.40	2.02	0.78, 5.21	0.91	0.23, 3.56						
Threatened	2.67	0.47, 15.05	0.84	0.07, 9.11	2.18	0.39, 12.06	0.79	0.07, 8.09	1.32	0.13, 12.97	0.07	0.00, 3.05						
Live/w drinker	0.79	0.28, 2.21	1.27	0.42, 3.76	0.74	0.27, 2.00	0.91	0.28, 2.87	0.74	0.25, 2.14	4.47*	1.12, 17.80						
Sex molested	0.80	0.17, 3.74	0.79	0.14, 4.37	1.11	0.30, 4.11	1.06	0.21, 5.38	1.97	0.58, 6.72	1.06	0.15, 7.36						
Live/w Depressed	1.91	0.62, 5.89	0.96	0.25, 3.57	1.00	0.29, 3.48	0.50	0.11, 2.27	1.20	0.36, 4.04	1.42	0.31, 6.53						
Dep. Variabe at t1	-	-	2.30 ^a	0.93, 5.69	-	-	7.79***	3.41, 17.76	-	-	77.02***	20.84, 284.64						
Age	-	-	0.81	0.60, 1.09	-	-	0.82	0.60, 1.12	-	-	0.98	0.62, 1.56						
Gender	-	-	4.11**	1.65, 10.26	-	-	1.20	0.51, 2.86	-	-	0.19 ^a	0.55, 0.66						
FARM	-	-	1.02	0.46, 2.25	-	-	1.13	0.51, 2.49	-	-	1.00	0.33, 3.01						
Hispanic	-	-	0.57	0.23, 1.39	-	-	0.27**	0.11, 0.67	-	-	0.52	0.16, 1.64						
School connect	-	-	0.96	0.85, 1.09	-	-	0.95	0.84, 1.07	-	-	0.91	0.76, 1.07						
Future expect	-	-	1.02	0.91, 1.14	-	-	0.96	0.87, 1.05	-	-	0.94	0.83, 1.06						
Parent superv	-	-	0.85	0.64, 1.13	-	-	0.99	0.74, 1.31	-	-	0.48***	0.31, 0.74						
Relationship w. par	-	-	0.91	0.77, 1.07	-	-	0.91	0.78, 1.06	-	-	1.20	0.94, 1.52						
Anger mgmt. skills	-	-	0.78***	0.68, 0.88	-	-	0.84*	0.74, 0.96	-	-	0.86 ^a	0.73, 1.03						
Self-esteem	-	-	0.97	0.79, 1.19	-	-	0.94	0.78, 1.14	-	-	0.85	0.66, 1.09						
Days in program	-	-	0.99	0.99, 1.00	-	-	1.00	0.99, 1.00	-	-	1.01*	1.00, 1.02						
Pearson's Chi-Squared	0.318		0.000		0.576		0.000		0.015		0.000							
Nagelkerke R-Squared	0.03		0.24		0.02		0.27		0.07		0.52							

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

^a ≤ 0.10

Table 6 Logistic Regression of the number of ACEs from t1 on delinquent behaviors at t2 (n = 419)

	Fights				Stole things				Smoked marijuana			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I	O.R	95% C.I
One ACE	0.89	0.35, 2.28	0.74	0.25, 2.12	1.68	0.78, 3.61	1.15	0.46, 2.84	1.82	0.78, 4.24	1.00	0.29, 3.46
Two ACEs	2.72*	1.07, 6.92	1.37	0.44, 4.27	2.15	0.81, 5.70	1.08	0.34, 3.42	2.37	0.82, 6.84	0.74	0.16, 3.31
Three ACEs	1.81	0.49, 6.63	0.75	0.15, 3.54	1.73	0.47, 6.31	0.48	0.09, 2.37	2.37	0.63, 8.80	0.66	0.08, 5.07
Four & Five ACEs	2.72	0.54, 13.61	4.45	0.71, 27.79	2.60	0.52, 12.96	1.56	0.19, 12.45	6.09*	1.45, 25.58	29.27***	4.49, 190.44
Dep. Variabe at t1	-	-	2.41*	1.00, 5.82	-	-	7.16***	3.24, 15.81	-	-	54.49***	17.69, 167.82
Age	-	-	0.81	0.60, 1.08	-	-	0.80	0.58, 1.08	-	-	1.02	0.65, 1.58
Gender	-	-	3.51**	1.42, 8.70	-	-	1.12	0.48, 2.63	-	-	0.16**	0.04, 0.57
FARM	-	-	1.14	0.52, 2.51	-	-	1.06	0.49, 2.29	-	-	1.66	0.57, 4.82
Hispanic	-	-	0.61	0.25, 1.48	-	-	0.26**	0.11, 0.64	-	-	0.51	0.17, 1.54
School connect	-	-	0.97	0.86, 1.10	-	-	0.96	0.85, 1.08	-	-	0.94	0.80, 1.11
Future expect	-	-	1.03	0.92, 1.15	-	-	0.96	0.88, 1.05	-	-	0.98	0.86, 1.10
Parent superv	-	-	0.84	0.64, 1.11	-	-	0.97	0.73, 1.30	-	-	0.50***	0.34, 0.75
Relationship w. par	-	-	0.88	0.75, 1.03	-	-	0.91	0.78, 1.07	-	-	1.11	0.89, 1.38
Anger mgmt. skills	-	-	0.78***	0.68, 0.88	-	-	0.85*	0.75, 0.96	-	-	0.85 ^a	0.71, 1.00
Self-esteem	-	-	0.99	0.81, 1.21	-	-	0.95	0.79, 1.14	-	-	0.94	0.73, 1.20
Days in program	-	-	0.99	0.99, 1.00	-	-	1.00	0.99, 1.00	-	-	1.01**	1.00, 1.02
Pearson's Chi-Squared	0.220		0.000		0.377		0.000		0.096		0.000	
Nagelkerke R-Squared	0.02		0.24		0.01		0.26		0.03		0.50	

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

^a ≤ 0.10

The Models 1 shown in Table 5 explore the individual lagged effect that ACEs measured at t1 have on the outcome variables measured at t2. The Models 2 have the same variables as Models 1 with the addition of protective factors and control variables measured at t2, the outcome variable measured at t1, and the number of days respondents were in Identity's programs. The models that analyze the effect of ACEs (t1) on the outcome variable from t2 controlled for the same dependent variable from t1 as failure to do so might have overestimated the effect of the independent variables on the outcome variable. As previous behaviors influence future behaviors (Albarracin & Wyer, 2000; Mossman, 1994; Ouellette & Wood, 1998), controlling for the outcome variable from t1 allowed to compute better estimates of the lagged effect of ACEs from t1, and protective factors at t2 on deviant behaviors at t2.

The Models 1 from Table 5 indicate that individual ACEs have no significant lagged effect on fights or stealing things, but being hit hard had a significant lagged effect on smoking marijuana in models 1 and 2. Living with an alcoholic at t1 also predicted smoking marijuana at t2 in model 2. Stealing things and smoking marijuana at t1 predicted those respective behaviors at t2. Additionally, higher levels of parental supervision at t2 reduced the likelihood of smoking marijuana at t2, and more effective anger management skills at t2 also reduce the likelihood of engaging in fights and of stealing things at t2. More days in the program increased the likelihood of smoking marijuana. Only Model 1 of smoking marijuana had a significant Chi-squared when examining the lagged effect of ACEs on the outcome variables, and the Nagelkerke's R-Squared were low across all models 1. When measures of the dependent variable at t1, additional risk factors and control variables at t2 were included in Models 2, all of the chi-squares became significant and the Nagelkerke's R-Squares increased substantially.

Models 1 in Table 6 show the lagged effect of experiencing a number of ACEs, measured at t1, on the outcome variables measured at t2. The Models 2 have the same variables as Models 1 with the addition of protective factors and control variables measured at t2, the outcome variable measured at t1, and the number of days respondents were in Identity's programs.

Results show that youths who have experienced two ACEs, and between four and five ACEs at t1 had significant higher probabilities of engaging in fights and of smoking marijuana at t2, respectively. The effect of two ACEs on fights disappeared when confounder variables were included in Model 2. Fights, stealing things and smoking marijuana at t1 predicted those same behavior at t2. Males and youths with higher levels of parental supervision had significant lower probabilities of smoking marijuana, and Hispanics were less likely to steal things than African Americans/Black individuals. Similar to Table 5, more days in Identity's program increased by 1% the likelihood of smoking

marijuana. In Models 2 all of the chi-squares became significant and the Nagelkerke's R-Squares increased substantially, mirroring those of Table 5.

Discussion

Consistent with previous literature, this study found that specific ACEs and the accumulation of ACEs had an impact on individuals' deviant behaviors (Anda et al., 1999; Duke et al., 2010). The analyses of the data showed that four of the seven ACEs examined had an individual immediate effect on at least one outcome variable, and two ACEs had lagged effects on one form of deviance. Being hit hard by adults at home, being threatened through the internet, being sexually molested, and living with a depressed, mentally unstable, or suicidal person had an immediate effect on deviant behaviors. Being hit hard, and living with an alcoholic had a lagged effect on smoking marijuana. These findings are important because no study, to the author's knowledge, had previously analyzed the lagged effect that individual ACEs had on behaviors measured at two or more points in time.

The analysis of the data also revealed that a higher number of ACEs had an immediate and lagged effect on predicting fights and on smoking marijuana even after controlling for those outcome variables measured at the previous wave of data collection. This finding is important as to the author's knowledge, previous studies had not analyzed the summative effect of ACEs on the outcome variable measured at two points in time while controlling for the previous measure of the outcome variable. A previous study had found that exposure to a number of ACEs affected the outcome variable across measures overtime (Choi et al., 2019), but its models did not control for the same outcome variable from the previous measure.

The current study also found that some of the protective factors not previously analyzed in the ACEs literature attenuated the effect of ACEs on deviant behaviors. Specifically, school connection and anger management skills reduced the individual and summative immediate effect of ACEs on the outcome variables. Additionally, current anger management skills decreased the probability of fights and of stealing things, and current parental supervision decreased the likelihood of smoking marijuana, net of the effect of ACEs from the past on current outcome variables. Since this study proved that current protective factors have stronger effects on current behaviors than ACEs from the past, it shows the need to continue to control for confounding variables that could mediate the effect of ACEs on current behaviors. This study also calls into question the results from previous studies that have established that ACEs have a strong effect on later behaviors, but did not control for confounding variables that also could have explained those behaviors.

Results also showed that the individual and summative effect of ACEs on deviance decreased overtime on two of the outcome variables examined, but increased the probabilities of smoking marijuana. Additionally, prior deviant behaviors were stronger predictors of current deviance than ACEs experienced in the past. These results show that the negative effect of ACEs persist overtime even after accounting for current factors that protect individuals from deviant behaviors. It is not clear why two ACEs from the past increased youths' likelihood of smoking marijuana. As previous research indicates that marijuana has been used as a coping mechanism to deal with strainful events (Preston, 2006) including childhood physical abuse (Meshesha et al., 2019), it is possible to argue that youths in this study smoke marijuana as a way to cope with the ACEs experienced. On the other hand, however, youths could smoke marijuana if they felt guilty or partially responsible for the occurrence of those ACEs (Oliveira et al., 2012; Suárez & Clua-García, 2021; Sweezy, 1997), or as a way to protect themselves by refusing to accept that those ACEs happened to them (Downey & Crummy, 2022; Welner & Welner, 2016; Zlotnick et al., 2006).

A more profound theoretical discussion regarding the effect of ACEs is needed as it is unknown why some ACEs affect only some behaviors and not others. Although Muniz et al. (2019) found that different ACEs affected individuals' likelihood of manifesting their behaviors internally or externally, no explanation exist as to why this is the case, or why ACEs manifest at different times.

Each behavioral manifestation caused by an ACE, as well as the time of the manifestation, could be related to individual and socio-environmental factors, to the type of ACE experienced, the frequency, duration, and intensity of experiencing it (Agnew, 2002), the conditions in which it occurs, and the individual responsible for it—if any. A youth who has a strong family and social support system, who is supervised by their parents, who has high self-control, effective anger management skills, a strong connection with school, and a system of values that keep him away from deviant behaviors may act differently to adverse situations than a youth who lacks these characteristics.

In addition, each ACEs is likely to have a different effect size on different individuals, and such effect could be moderated by the frequency, duration, intensity (Agnew, 2002), and stigma associated with the ACE. For example, being hit hard or being threatened over the internet might have a smaller traumatic effect and might carry less social stigma than being a victim of sexual assault (Gibson & Leitenberg, 2001; Kennedy & Prock, 2018). Because different ACEs have different characteristics and different effects on people, individuals are likely to manifest differently—and at different times—the way ACEs have affected them.

In addition, ACEs will only manifest on behaviors that the victim can actually commit. For example, if a boy has

experienced many ACEs for a long time he would not be able to manifest the effect of those ACEs on smoking marijuana if he has no access to marijuana.

Although this study contributes to the existing ACEs literature, it is not without limitations. The results from this study cannot be generalized to other populations because the study subjects were not randomly sampled from a population. Additionally, the sample used in this study is relatively small. It is possible that a larger or different sample presenting different levels of variance could have produced different results. This study is also limited by its lack of confounders—such as deviant peer association (Fox et al., 2015; Pratt et al., 2010)—that are known to predict delinquency. In addition, the indexes school connection, future expectations, parental supervision, relations with parents, anger management, and self-esteem were not created using previously validated measures. Despite this limitation the indexes used showed to be reliable in the present study.

This study is also limited by its inability to control for the type and frequency of services youths received from Identity. The characteristics of the services youths receive (e.g. counseling, after-school programs) is likely to affect their behaviors, and since this study does not account for them it is unknown if those services impact the effect that ACEs had on the behaviors analyzed.

It is also worth mentioning that the immediate effect that being threatened over the internet had on fights, and the immediate effect of having experienced four or five ACEs on stealing things should be taken with caution as those effects might be unstable because of the limited number of youths who experienced that ACE, or who experienced that number of ACEs, respectively. In addition, the effect of smoking marijuana at t1 on smoking marijuana at t2 should also be taken with caution as the Confidence Intervals for that association are very large.

The causal order of events with the respondents' personal characteristics is clear as deviant behaviors cannot affect youths' demographic characteristics. The order of causality is also clear in the models analyzing the lagged effect of ACEs on deviant behaviors measured at t2. However, the causal order of events is unclear in the models where both the dependent and independent variables were measured at t1. The author hypothesized that experiencing ACEs would affect frequency of fighting, stealing, and smoking marijuana the previous month. Those hypotheses assumed that ACEs occurred prior to the outcome variables. Unfortunately, this assumption cannot be corroborated with the existing data. There are, however, theoretical and empirical reasons to suggest that the causal order of events is well established in this paper. Fighting, stealing things and smoking marijuana are individual behaviors that should not determine whether youths experience or witness violence, lives with a drinker or suicidal individual, or is sexually molested. Although it is

well established that ACEs predict illegal and deviant behaviors (Feiring et al., 2007; Felitti et al., 1998; Lansford et al., 2007; Mersky & Reynolds, 2007), it is a possibility that deviant behaviors could predict ACEs. It is unlikely, but possible, that youths' deviance make their parents or other adults at home punish their delinquency by hurting, hitting, or sexually molesting them. Perhaps youths' delinquency makes people at home consume alcohol, engage in family violence, or get depressed. It is also possible that youths' behaviors make individuals threat them over the internet. None of the studies reviewed for this study suggested this causal order of events.

Regarding the causal order of events among the outcome variables and the protective factors examined, it is possible that deviant behaviors affect youths' connection with their school, make youths change their future expectations, to affect their levels of parental supervision, to affect their relationship with their parents, and to impact their anger management skills and self-esteem.

In this study only five ACEs predicted deviant behaviors. Future research is needed to determine if all ACEs predict deviant or delinquent behaviors, and to determine which forms of behaviors are caused by ACEs. Future research is also needed to examine if the effect of ACEs on delinquency vary by individuals' cultural or demographic backgrounds. For example, if being hit hard is a common discipline in a specific culture, youths from that culture may be less affected by that ACE than youths who belong to a culture where hitting is uncommon.

Future research is also needed to examine why and under what conditions the effect of ACEs on deviance decreases overtime. Only two ACEs had a lagged effect on one outcome variable, and the effect of one of those ACEs became significant when control variables were introduced in the model. Although it is possible to argue that the effect of ACEs decreased naturally overtime, it is also possible that the effect of ACEs decreased because of the services youths had been receiving from Identity. Results, however, showed that more days spent in Identity did not significantly reduced youths' deviant behaviors; but actually increased their likelihood of smoking marijuana. It is unclear why spending more days with Identity would increase youths' likelihood of smoking marijuana. Previous research indicates that receiving social support, understanding adverse situations differently, and coming to a resolution of those situations is conducive to catharsis (Bylsma et al., 2008). As research also indicates that social support can lead to social and anti-social forms of catharsis (Shariff & Mustaph, 2010), perhaps the services that youths received at Identity helped them go through a catharsis that manifested by smoking marijuana. It is also possible to suggest that youths' confidence on Identity's staff increased overtime, and that trust motivated youth to report their deviant behaviors more honestly during the second questionnaire (Guzy & Hirtenlehner, 2015).

As seen in this study, the effect of ACEs is attenuated by protective factors involving schools and parents. Since ACEs mostly occur within a child's family and social environments (Kalmakis & Chandler, 2014), policy efforts aimed to address the effect of ACEs on behaviors should focus on the dissemination and implementation of culturally-appropriate parenting programs designed to reduce the risk of child maltreatment (Barth, 2009; Sanders et al., 2000; Yoshikawa, 1995). Parenting programs are known to prevent delinquency (Piquero et al., 2009) and should highlight the importance of parental supervision as a protective factor against antisocial behaviors.

Policy efforts also should help schools develop strategies to increase students' levels of connection with the school. In addition, schools working in partnership with parents should develop strategies to help students foster prosocial anger management skills, as poor anger management was associated in this study with higher probabilities of engaging in fights, stealing things, and of smoking marijuana.

School teachers from grades K-12 should periodically assess, through age-appropriate activities, their students' exposure to ACEs as well as their general wellbeing. These assessments would allow teachers to identify children who are or have been victims of ACEs and refer them to the school counselor, child protection agencies, and community based organizations to receive the counseling and assistance needed to address the sources of the ACEs affecting them, and to reduce the negative effect that such ACEs could have on their behaviors, health, and mental well being. Individuals working at community based organizations also should be properly trained to work in a comprehensive and sensitive manner with youth who have experienced ACEs in order to provide adequate treatment and services to them. It is also recommended for children who have experienced ACEs to attend therapy sessions with their family. Family therapy sessions could help strengthen the bonds between youth and their parents, which in turn could decrease the negative effect of ACEs on them.

Declarations

Conflict of Interest The author has no financial interests or conflicts of interest to declare.

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