Adolescent Delinquency and Antisocial Tendencies as Precursors to Adult Violent Offending: A Prospective Study of a Representative Sample of Swiss Men

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Abstract

Studies on adult sex and violent offenders have found high rates of adolescent delinquency, while early delinquency has been shown to be significantly associated with adult offending. The examined subsample ($n = 123$) of a longitudinal prospective study ($n = 6,315$) includes all men who at the age of 19 had an entry in the criminal records. During the observation period of 34 years, 68.3% of the sample had been reconvicted as adults, 23.6% for violent or sex offenses. The odds of adult sex or violent offending were 2.8 times higher for those who had committed a violent offense in adolescence and 1.05 times higher for any offense committed before the age of 19. The characteristics of criminal history showed the highest discriminative values (area under the curve [AUC] = 0.61–0.65). The most important finding of this study was that characteristics of adolescent delinquency predicted adult violent or sex offending, whereas socioeconomic and psychiatric characteristics did not.

Keywords

adolescent delinquency, precursors, antisocial, violent offending

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Background

Birth cohort studies conducted in various countries over the last decades report of close associations between adolescent delinquency and subsequent adult criminality (Farrington, 1995, 2000; Haapasalo & Hamalainen, 1996; Loeber et al., 2001; Moffitt, 1993; Vermeiren, 2003). Such studies have also been able to show that adolescent delinquents and nondelinquents differ regarding a number of socioeconomic and psychiatric characteristics. However, such studies were also able to show that a majority of delinquent adolescents only offend once and with an offense of low severity, while a smaller group of delinquent adolescent are responsible for a large number of offenses of different types and severity (Junger-Tas, Terlouw, & Klein, 1994). Due to such empirical findings, Moffitt (1993) proposed a developmental dual taxonomy, which specifies two different groups of offenders—the *adolescence-limited* and the *life-course-persistent* offenders—who differ in regard to the continuity and severity of their antisocial behavior. Moffitt suggested that the antisocial behavior of the first group is limited to middle adolescence and is mostly of lower severity, whereas the second group (only 5%-6% of all juvenile delinquents) exhibits distinct antisocial behavior already in childhood and early adolescence, often including delinquency of a more serious nature.

The concept of life-course-persistent offenders is supported by results of studies on adult violent offenders, which have repeatedly found high rates of delinquency in adolescence. In a German prospective study among prison inmates, Dahle, Erdmann, Schneider, Sprenger, and Ziethen (2000-2004) distinguished between five offender groups. Among the group of multiple offenders with an early start at delinquency, different courses of antisocial behavior could be found: persistent antisocial behavior over the whole life span, antisocial behavior that followed the age curve of criminal behavior, and courses that exhibit the peak of and desistance from delinquency at a later point.

It has thus been a key concern of numerous studies to find predictors for continuity and for discontinuity of delinquent behavior in young offenders. Two of the most important characteristics of continuity of delinquent behavior seem to be the number and severity of the offenses committed in youth. In a German study, the Tübinger young offenders study (Mischkowitz, 1993), the number of prior convictions was found to be predictive of the continuation of antisocial behavior, whereas an early start or severity of delinquency was not. Cottle, Lee, and Heilbrun (2001) found that the number and type of prior offenses were predictive of continued delinquency.

The significance of juvenile delinquency for subsequent serious, that is, violent and sexual adult, offending has less often been the focus of research so far. One concept has been found to be central not only to the study of continued but also of violent delinquency, namely, the concept of psychopathy as defined by Hare (Hare, 2003; Rice, 1997; Silver, 1999). Psychopathy has been shown to be one of the strongest single predictors of future violent offending (Hare, 2006; Hemphill, Hare, & Wong, 1998; Krischer, Sevecke, & Lehmkuhl, 2007). This disorder is characterized by affective deficits and interpersonal deceptiveness and is accompanied by social

deviant—not necessarily but often—delinquent behavior (Hare, 2003, 2006). These characteristics and tendencies often become apparent during childhood and adolescence (Hare, 2003; Lynam, 1996), and manifest themselves in aggressive and delinquent behavior.

The aim of this study was to determine risk factors for adult violent offending in a sample of adolescent delinquents. The authors hypothesized that criminological characteristics of adolescent delinquency, such as number and severity of offenses committed, show close associations with adult violent offending. The authors further hypothesize that characteristics associated with the concept of psychopathy are good predictors of adult violent offending.

Method

Population and Sampling

The examined sample represents a subsample of the “Military Study” (Sieber & Angst, 1981)—a longitudinal prospective study of all men who were compulsorily examined for military service in 1971 in the Canton of Zurich in Switzerland. In Switzerland, all men turning 19 are required without exception to attend an examination to determine if they are fit for military service. In rare cases, where conscripts are not able to attend the examination date set for them (e.g., due to illness), they are required to attend at the next possible date. As the military conscription process includes almost all men of a certain age group, the sample can be considered representative of the Swiss male resident population of that age group living in the Canton of Zurich. The Canton of Zurich is an urban, pre-Alpine region with a population of approximately 1,200,000.

In 1971, a total of 6,315 men were conscripted to attend military examination in the Canton of Zurich. These conscripts were on average 19 years old ($SD = 0.42$, range = 17–24). They were divided randomly into two groups, one of which was the control group ($n = 3,160$) and the other one was the study group ($N = 3,155$). As the assignment to the two groups was randomized, the study group can be considered representative of the entire sample.

Data Collection I: 1971

As part of regular military examination, physicians assessed the conscripts’ physical and mental status, providing best clinical judgment diagnoses. Then the research team of the Military Study administered to all participants a questionnaire regarding personal and sociodemographic information, as well as information concerning their substance use (nicotine, alcohol, legal, and illegal drugs). Participants who had been assigned to the control group filled out the questionnaire anonymously, while the participants of the study group filled it out nonanonymously. All participants were assured of the study’s independence from military authorities and were guaranteed confidentiality by a signed letter. To test the validity of data, the answers of the control group and the study group were compared for significant differences (Sieber &

Angst, 1981). The two samples did not differ in regard to sociodemographic and personal variables or data regarding substance use (Angst & Clayton, 1986).

Following the military examination, excerpts from the criminal records were drawn for all the participants of the study group ($N = 3,155$). A total of 123 participants (3.9% of the whole study group) had a criminal record for an offense at the age of 19.

Of these 123 participants, 53.7% ($n = 66$) had been convicted of property offenses, 27.6% ($n = 34$) of traffic offenses, and 30.9% ($n = 38$) of drug offenses. In all, 27.6% ($n = 34$) of the adolescent delinquent subsample had a history of nonsexual violent offenses, which included explosives offenses, assault and battery, arson, armed robbery, or predatory extortion. A total of 8.1% ($n = 10$) were convicted of child abuse. None of the participants had a criminal record due to any other type of sex offense. The mean number of offenses was 5.7 ($SD = 8.9$) with a wide range from 1 to 68.

Data Collection II: 2004

To monitor the delinquent activities of the adolescent delinquent subsample as adults, excerpts from the criminal record were drawn regularly up until the year 2004. Adult reoffending was defined as having a new entry in the criminal records for any type of offense after the age of 19. Two types of reoffending were examined: adult reoffending with any offense (reconviction for any offense) and adult reoffending with a violent offense (reconviction for a violent and/or sex offense).

Until the year 2004, 68.3% ($n = 84$) of the adolescent delinquent subsample had been reconvicted. The prevalence of violent (including sexual) recidivism was 23.6% ($n = 29$). In all, 38.2% ($n = 47$) of the sample had been reconvicted for a property offense and 27.6% ($n = 34$) for a drug offense; 52% ($n = 64$) had been reconvicted for other offenses including traffic offenses, or other minor offenses; 19.5% ($n = 24$) had been reconvicted for offenses such as explosives offenses, assault and battery, arson, armed robbery or threat and coercion. However, no instance of homicide was recorded. A total of 9.8% ($n = 12$) had been reconvicted for a sex offense, committing child sexual abuse (4.1%; $n = 5$) or a noncontact sex offense (5.7%; $n = 7$). No instance of rape was recorded.

Statistical Analysis

Statistical analyses were carried out in two steps using STATA 9.0. First, bivariate logistic regression analyses were used to test for socioeconomic and psychiatric differences between the group of adolescent delinquents ($n = 123$) and the group of adolescent nondelinquents ($n = 3,032$) using the group identifier as dependent variable.

Second, a stratified analysis was carried out only for the adolescent delinquent group. Using bivariate logistic regression analyses, predictors for adult violent offending among this group were investigated again using the group identifier as dependent variable.

Bonferroni corrections were applied to determine level of significance, which takes multiple testing into account. Receiver operating characteristic (ROC) analyses were

carried out to assess the discriminative power of the predictor variables for any recidivism and for violent recidivism.

Results

Adolescent Delinquents Compared With Adolescent Nondelinquents

Significantly higher rates were found in all socioeconomic stressors tested among the adolescent delinquent sample ($n = 123$), 6.7% ($n = 8$) reported having grown up in a foster home and 13.8% ($n = 17$) reported their parents having been divorced or separated. Two thirds of the adolescent delinquent subsample had completed only a low level of school education by 1971. Similarly, nearly a third of the sample, 32.7% ($n = 37$), had never taken up or discontinued vocational training. Almost one fourth of the sample (23.5%; $n = 28$) reported parental history of alcohol abuse (daily use).

Compared with the adolescent nondelinquent sample ($n = 3,032$), adolescent delinquents ($n = 123$) also exhibited significantly higher rates in almost all psychiatric characteristics tested: A good fourth (27.1%; $n = 33$) had received psychiatric care at least once; 9.8% ($n = 12$) were given the best clinical judgment diagnosis of anxiety, depressive, compulsive-obsessive, and/or sexual neurosis in the psychiatric examinations during recruitment procedures; 3.3% ($n = 4$) were diagnosed with enuresis and 1.6% ($n = 2$) were diagnosed with mania and melancholia. The best clinical judgment diagnosis of schizophrenia was given to one adolescent delinquent (0.8%), however, this result was not significant. More than a fourth of the sample (27.9%; $n = 34$) was diagnosed with asocial personality and/or antisocial, criminal tendencies, and 14.8% ($n = 18$) of participants were diagnosed with substance dependence. All in all, more than half of the adolescent delinquent subsample (53.3%; $n = 65$) were given at least one best clinical judgment diagnosis. Excluding the diagnosis of asocial personality and/or antisocial, criminal tendencies lowered the prevalence of best clinical judgment diagnosis to 25.4% ($n = 31$).

To control for multiple testing, Bonferroni correction was applied. According to this very conservative measure of significance, the following characteristics were not significant anymore: having grown up in a foster home, having parents who had separated or were divorced, and having been given the best clinical judgment diagnoses of anxiety; depressive, compulsive-obsessive, and/or sexual neurosis; and mania and melancholia.

See Table 1 for an overview over prevalence and distribution of socioeconomic and psychiatric characteristics in the total sample and in the adolescent delinquent and adolescent nondelinquent subsamples.

Predictors of Adult Reoffending (Any Reoffense)

In bivariate logistic regression analyses, most of the socioeconomic and psychiatric characteristics of the adolescent delinquent subsample failed to discriminate between adult recidivists and desisters.

Table 1. Distribution and Significance of Socioeconomic and Psychiatric Characteristics in the Total Sample, the Adolescent Delinquent Subsample, and the Adolescent Nondelinquent Subsample.

Socioeconomic and psychiatric characteristics at age 19	Total sample (N = 3,155)	Nondelinquents (n = 3,032)	Delinquents (n = 123)	OR	95% CI
Low level of school education	1,458 (47.7%)	1,378 (47.0%)	80 (66.7%)	2.26 ^{***a}	[1.54, 3.33]
No vocational training	239 (7.9%)	202 (6.9%)	37 (32.7%)	6.52 ^{***a}	[4.29, 9.91]
Parents divorced or separated	259 (8.3%)	242 (8.0%)	17 (13.8%)	1.84*	[1.08, 3.12]
Lived in foster care	104 (3.3%)	96 (3.2%)	8 (6.7%)	2.18*	[1.03, 4.59]
At least once in psychiatric care	260 (8.4%)	227 (7.6%)	33 (27.1%)	4.51 ^{***a}	[2.96, 6.88]
Daily alcohol intake by mother and/or father	410 (13.3%)	382 (12.9%)	28 (23.5%)	2.07 ^{***a}	[1.34, 3.21]
Anxiety, depressive, compulsive-obsessive, and/or sexual neurosis	142 (4.6%)	130 (4.4%)	12 (9.8%)	2.36 ^{**}	[1.27, 4.40]
Enuresis	17 (0.6%)	13 (0.4%)	4 (3.3%)	7.65 ^{***a}	[2.46, 23.80]
Mania und melancholia	11 (0.4%)	9 (0.3%)	2 (1.6%)	5.44*	[1.16, 25.45]
Schizophrenia	21 (0.7%)	20 (0.7%)	1 (0.8%)	1.21	[0.16, 9.08]
Asocial personality and/or antisocial, criminal tendencies	83 (2.7%)	49 (1.7%)	34 (27.9%)	22.84 ^{***a}	[14.05, 37.14]
Substance dependence	109 (3.6%)	91 (3.1%)	18 (14.6%)	5.43 ^{***a}	[3.16, 9.38]
Any best clinical judgment diagnosis	475 (15.5%)	410 (13.9%)	65 (53.3%)	7.05 ^{***a}	[4.87, 10.22]
Any best clinical judgment diagnosis excluding asocial personality and/or antisocial, criminal tendencies	392 (12.8%)	361 (12.3%)	31 (25.4%)	2.44 ^{***a}	[1.60, 3.72]

Note: OR = odds ratio; CI = 95% confidence interval.

*Significant after Bonferroni correction.

^a $p < .05$. ^{**} $p < .01$. ^{***} $p < .001$.

The odds of being an adult recidivist were 4.74 times higher (odds ratio [OR] = 4.74; area under the curve [AUC]: 0.68) for participants who had been given any best clinical judgment diagnosis by the age of 19 and 6.79 times higher (OR = 6.79) for participants who had been in psychiatric care at least once. Of the best clinical judgment diagnoses, only asocial personality and/or showing antisocial, criminal tendencies by age 19 were significantly associated with adult reoffending, raising the odds by 395% (OR = 4.95). Enuresis and mania and melancholia were excluded from further analysis due to their low prevalence in the sample.

Of the socioeconomic characteristics, only not completing vocational training was significantly associated with adult reoffending, raising the odds by 237% (OR = 3.37).

The best predictors of adult reoffending were found among the criminological characteristics of adolescent delinquency. Number of adolescent property offenses and number of drug offenses increased the odds for adult reoffending by 19% per property offense committed in adolescence (OR = 1.19) and 43% per drug offense (OR = 1.43). Both indices were able to discriminate moderately between adult reoffenders and desisters with AUC-values of 0.62 and 0.64. Also, criminal versatility in adolescence—portrayed by having entries for offenses from different categories, such as property, traffic, drugs, violence, or sex—was able to predict adult reoffending; the odds of adult reoffending were 2.48 times higher (OR = 2.48; AUC = 0.62)

per offense category. The best discrimination was found for the total number of offenses committed in adolescence, showing an AUC-value of 0.74: The odds of adult reoffending were 1.11 times higher for each entry into the criminal register by the age of 19 ($OR = 1.11$).

After Bonferroni correction was applied to control for multiple testing, the only characteristic remaining significant was having been given any best clinical judgment diagnosis. See Table 2 for an overview over the distribution and significance of socioeconomic, psychiatric, and criminological characteristics in the total sample of adolescent delinquents and in the subsample of adult recidivists.

Predictors of Adult Violent Reoffending

Bivariate logistic regression analyses showed that predictors of adult violent reoffending differed from the predictors of adult reoffending with any offense in two ways. First, there were fewer indices able to predict adult violent offending and second, they were all save one (having been at least once in psychiatric care) criminological characteristics of adolescent delinquency. Thus, all of the socioeconomic and all but one psychiatric characteristic failed to discriminate between adult violent reoffenders and desisters.

The odds of adult violent offending were 2.61 times higher ($OR = 2.61$) for the men who had been in psychiatric care at least once during their adolescence. The odds of reoffending with a violent offense before 2004 were 2.82 times higher ($OR = 2.82$) with every violent offense committed in adolescence. Also, the number of property offenses showed significant associations: Every property offense committed in adolescence raised the odds by 12% ($OR = 1.12$). Furthermore, the sum of all offenses committed in adolescence increased the odds of being convicted for a violent offense (by 2004) by 5% ($OR = 1.05$) per one offense committed. Versatile offending in adolescence (i.e., to have committed offenses of different types) was also predictive of adult sex or violent offending—The odds were 2.47 times higher with each additional category (traffic, property, drugs, violence, sex; $OR = 2.47$). The highest AUC-values were found for the variables of criminal history (0.61-0.65).

After controlling for multiple testing using Bonferroni correction, the only characteristic remaining significant was versatile offending in adolescence. Table 3 gives an overview of the bivariate regression analyses.

Discussion

The aim of the present study was to examine if officially recorded delinquency in adolescence can predict adult reoffending, especially violent reoffending. A further aim was to examine the association between best clinical diagnosis of adolescent asocial personality and/or antisocial, criminal tendencies and adult reoffending, especially violent reoffending.

The examined sample represents an unselected and representative population of an age cohort from the Canton of Zurich (Switzerland): This cohort was examined for

Table 2. Distribution and Significance of Socioeconomic, Psychiatric, and Criminological Characteristics in the Total Sample of Adolescent Delinquents and in the Subsample of Adult Recidivists.

	Adolescent delinquents 1971 (n = 123)	Adult recidivists any offense (n = 84)	OR	95% CI (OR)	AUC	95% CI (AUC)
Low level of school education	80 (66.7%)	57 (68.7%)	1.33	[0.59, 3.00]	0.53	[0.44, 0.62]
No vocational training	37 (32.7%)	31 (40.3%)	3.37*	[1.25, 9.05]	0.62	[0.52, 0.71]
Parents divorced or separated	17 (13.8%)	11 (13.1%)	0.83	[0.28, 2.43]	0.49	[0.40, 0.58]
Lived in foster care	8 (6.67%)	6 (7.4%)	1.48	[0.28, 7.69]	0.51	[0.42, 0.60]
At least once in psychiatric care	33 (27.1%)	30 (36.1%)	6.79**	[1.93, 23.95]	0.64	[0.55, 0.72]
Daily alcohol intake by mother and/or father	28 (23.5%)	20 (24.4%)	1.17	[0.46, 2.97]	0.51	[0.42, 0.61]
Anxiety, depressive, compulsive-obsessive, and/or sexual neurosis	12 (9.8%)	10 (12.1%)	2.53	[0.53, 12.17]	0.53	[0.44, 0.62]
Asocial personality and/or antisocial, criminal tendencies	34 (27.9%)	30 (36.1%)	4.95**	[1.60, 15.29]	0.58	[0.48, 0.66]
Substance dependence	18 (14.8%)	15 (18.1%)	2.65	[0.72, 9.75]	0.55	[0.46, 0.64]
Any best clinical judgment diagnosis	65 (53.3%)	54 (65.1%)	4.74***a	[2.07, 10.88]	0.68	[0.59, 0.76]
Any best clinical judgment diagnosis excluding asocial personality and/or antisocial, criminal tendencies	31 (25.4%)	24 (28.9%)	1.86	[0.72, 4.79]	0.55	[0.46, 0.65]
Number of violent offenses in adolescence	M = 0.30 SD = 1.08	M = 0.37 SD = 1.27	1.38	[0.72, 2.66]	0.52	[0.43, 0.61]
Number of sex offenses in adolescence	M = 0.24 SD = 0.99	M = 0.25 SD = 1.14	1.02	[0.69, 1.51]	0.46	[0.37, 0.55]
Number of property offenses in adolescence	M = 2.49 SD = 4.15	M = 3.07 SD = 4.69	1.19*	[1.02, 1.39]	0.62	[0.53, 0.70]
Number of drug offenses in adolescence	M = 1.05 SD = 2.13	M = 1.35 SD = 2.33	1.43*	[1.03, 2.00]	0.64	[0.54, 0.72]
Number of total offenses in adolescence	M = 5.68 SD = 8.89	M = 6.86 SD = 9.89	1.11*	[1.00, 1.24]	0.74	[0.65, 0.81]
Number of offense categories in adolescence	M = 1.37 SD = 0.75	M = 1.49 SD = 0.81	2.48*	[1.17, 5.27]	0.62	[0.53, 0.70]

Note: OR = odds ratio; CI = 95% confidence interval; AUC = area under the curve.

*Significant after Bonferroni correction.

** $p < .05$; *** $p < .01$; **** $p < .001$.

Table 3. Distribution and Significance of Socioeconomic, Psychiatric, and Criminological Characteristics in the Total Sample of Adolescent Delinquents and in the Subsample of Adult Violent Recidivists.

	Adolescent delinquents 1971 (n = 123)	Adult violent recidivists (n = 29)	OR	95% CI (OR)	AUC	95% CI (AUC)
Low level of school education	80 (66.7%)	20 (69.0%)	1.15	[0.47, 2.82]	0.52	[0.42, 0.61]
No vocational training	37 (32.7%)	10 (38.5%)	1.39	[0.56, 3.46]	0.54	[0.44, 0.63]
Parents divorced or separated	17 (13.8%)	4 (13.8%)	1.00	[0.30, 3.33]	0.50	[0.40, 0.59]
Lived in foster care	8 (6.67%)	7 (7.7%)	0.43	[0.05, 3.64]	0.48	[0.38, 0.57]
At least once in psychiatric care	33 (27.1%)	12 (42.9%)	2.61*	[1.07, 6.36]	0.60	[0.51, 0.69]
Daily alcohol intake by mother and/or father	28 (23.5%)	7 (24.1%)	1.06	[0.39, 2.79]	0.50	[0.41, 0.60]
Anxiety, depressive, compulsive-obsessive and/or sexual neurosis	12 (9.8%)	4 (13.8%)	1.7	[0.47, 6.12]	0.53	[0.43, 0.62]
Asocial personality and/or antisocial, criminal tendencies	34 (27.9%)	12 (41.4%)	2.28	[0.94, 5.50]	0.59	[0.50, 0.68]
Substance dependence	18 (14.8%)	2 (6.9%)	0.37	[0.77, 1.65]	0.49	[0.36, 0.54]
Any best clinical judgment diagnosis	65 (53.3%)	20 (69.0%)	2.37	[0.98, 5.75]	0.60	[0.51, 0.69]
Any best clinical judgment diagnosis excluding asocial personality and/or antisocial, criminal tendencies	31 (25.4%)	8 (27.6%)	1.16	[0.45, 2.97]	0.51	[0.42, 0.61]
Number of violent offenses in adolescence	M = 0.30 SD = 1.08	M = 0.90 SD = 2.04	2.82***	[1.37, 5.82]	0.61	[0.52, 0.70]
Number of sex offenses in adolescence	M = 0.24 SD = 0.99	M = 0.45 SD = 1.55	1.25	[0.86, 1.81]	0.53	[0.44, 0.62]
Number of property offenses in adolescence	M = 2.49 SD = 4.15	M = 4.21 SD = 6.25	1.12*	[1.02, 1.24]	0.62	[0.53, 0.71]
Number of drug offenses in adolescence	M = 1.05 SD = 2.13	M = 1.10 SD = 2.66	1.02	[0.84, 1.23]	0.46	[0.37, 0.56]
Number of total offenses in adolescence	M = 5.13 SD = 7.76	M = 8.31 SD = 11.26	1.05*	[1.00, 1.10]	0.62	[0.53, 0.70]
Number of offense categories in adolescence	M = 1.37 SD = 0.75	M = 1.79 SD = 1.11	2.47***a	[1.38, 4.42]	0.65	[0.56, 0.73]

Note: OR = odds ratio; CI = 95% confidence interval; AUC = area under the curve.

aSignificant after Bonferroni correction.

*p < .05. ***p < .01. ****p < .001.

military service in 1971 and of these men, those who had committed an offense by the age of 19 and thus had an entry in the criminal records ($n = 123$; 3.9% of the complete sample of $N = 3,155$) were included into our sample. The criminal registers of these 123 men were examined during a 34 years prospective study design. The offenses committed by the participants of this sample until the age of 19 mainly included traffic and property offenses (66.7%, $n = 82$). Violent offenses were committed by approximately one fourth of the delinquent adolescent sample (23.6%, $n = 29$). In the category of sex offenses (9.8%, $n = 12$) only sexual acts with minors were recorded. The violent offenses in this sample did not include any homicides. Overall, the offenses recorded in adolescence were of a less serious nature which is in agreement with the findings of international studies on adolescent delinquency (Junger-Tas et al., 1994). However, adolescent delinquents differed from nondelinquents regarding a number of socioeconomic and psychiatric characteristics, for example, they more often attained only a low level of school education, grew up in foster care, and were diagnosed with a best clinical judgment diagnosis of substance dependence or asocial personality by the age of 19. Also, these findings are in accordance with a whole body of literature on adolescent delinquency (Farrington, 1995, 2000; Haapasalo & Hamalainen, 1996; Loeber et al., 2001; Moffitt, 1993; Vermeiren, 2003). After Bonferroni corrections were applied to control for multiple testing, most characteristics remained significant.

During the long follow-up period of 34 years, 68.3% of the 123 participants were reconvicted as adults, the rate of violent reoffending being 28.5%. More than half of the participants (52.0%) had been reconvicted due to a minor offense such as a driving offense. One of the most important finding of this study, and in agreement with the authors' hypotheses, was that adult violent offending was predicted by characteristics of officially recorded adolescent delinquency such as versatility, overall number, and severity of recorded offenses. In contrast, adult violent offending was not predicted by socioeconomic variables or by psychiatric clinical judgment diagnoses (e.g., asocial personality and/or showing antisocial, criminal tendencies or substance use disorders) unlike recidivism with any offense, which was significantly associated with this type of risk factors.

The odds of being convicted for a violent offense as an adult were 2.8 times higher for each violent offense committed before the age of 19. A further risk factor seems to be versatile criminality in adolescence. The more versatile, the higher were the odds for violent offending in adulthood. The odds were increased by 146.9% for each offense type committed from the categories traffic, drugs, property, sex, or violent offenses before the age of 19. Also, the overall number of offenses committed by the age of 19 was significantly related to serious adult criminality, each offense raising the odds by 5.3%. This variable alone identified 61.7% of adolescent delinquents correctly as adult violent offenders. After Bonferroni correction, only versatile offending in adolescence remained significantly associated with adult violent offending. However, Bonferroni correction is a very conservative measure to control for multiple testing and may well lead to an underestimation of the strength of the associations between the predictors and outcome tested.

Predictors of any adult reoffense seemed to be of a less specific nature in this sample, seeing as many different types of risk factors were able to discriminate between adult recidivists (any offense) and desisters. In contrast, only criminological factors were able to predict both any and violent/sexual adult recidivism. This may be the case as criminological factors tend to be static ones, which have been shown to be the most robust factors, leading to the most accurate predictions (Harris, Phenix, & Thornton, 2003; Quinsey, Harris, Rice, & Cormier, 2006).

Having been in psychiatric care at least once before the age of 19 was an equally robust predictor of both types of outcome just as the criminological indices. This is of high practical relevance as it shows that a substantial portion of delinquent adolescents who go on to more serious adult offending present early signs of disturbance which brings them in contact with mental health services. Recognizing adolescents at risk for serious adult offending and taking preventive measures at this point may well be suited to reduce or even prevent future victimization of other persons.

The finding that best clinical judgment diagnosis of asocial personality was not predictive of serious adult recidivism was contrary to the authors' expectation as well as the findings of other research which has shown the concept of psychopathy as conceptualized by Hare (2003) to be significantly associated especially with violent recidivism (Hare, 2006; Hemphill et al., 1998; Krischer et al., 2007). This could be explained by the fact that psychopathy in this study was not determined according to the criteria of Hare (2003) but by short psychiatric interviews rendering best clinical judgment diagnoses at a time when the concept of psychopathy had not yet been defined as precisely as it is today.

The findings of several studies concerning the predictive validity of adolescent delinquency (Dahle et al., 2000-2004; Laub & Sampson, 2003; Moffitt, 1993; Morizot & Le Blanc, 2003; White, Bates, & Buyske, 2001) for adult reoffending have largely been confirmed by this study. Not all adolescent and young adult delinquents persist in delinquent behavior, but those young delinquents who offend frequently with serious and different types of offenses are at a higher risk for adult violent and sex offending.

One obvious limitation of the study is that only characteristics of male offenders were examined. A further limitation consists of the fact that only residents of the Canton of Zurich, who are Swiss nationals and of one age cohort, were included in the study. However, the most important limitation of the study is that due to practical linkage problems, it was not possible to observe the course of offending in the entire sample, thus rendering it impossible to compare predictors of adult violent reoffending found in the adolescent delinquent subsample with predictors of adult violent reoffending of the adolescent nondelinquent subsample.

Conclusion

The results of this study suggest first that adolescent delinquency can be considered episodic in nature only to a certain degree, as almost a quarter of adolescent delinquents go on to commit a violent offense as adults. Second, psychiatric diagnoses and sociodemographic variables have not shown to be sufficiently valid predictors of adult

violent criminality. However, characteristics of offenses committed in adolescence can validly identify adolescent offenders who are at risk of adult violent offending. Important predictors are versatile criminality, multiple offending, as well as the severity of offenses committed.

Authors' Note

Arja Laubacher was involved in the analyses and interpretation of data and in writing the manuscript. Jérôme Endrass has given substantial contributions to the conception, analysis, and interpretation of the data, and has critically revised the manuscript. Jules Angst carried out the study design and revised the manuscript critically. Astrid Rossegger performed the statistical analyses, was involved in writing the manuscript, and has given her final approval for this version to be published. Frank Urbaniok and Stefan Vetter have revised the manuscript critically. All authors read and approved the final manuscript.

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