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Correlates of Violent Behaviour among Finnish
Adolescents Aged 12 to 18: Exploring the
Feasibility of a Health Survey
in Criminological Analysis

- The Adolescent Health and Lifestyle Survey (AHLS) is a nationwide (Finland) monitoring system of health and health behaviours conducted every second year among the age cohorts of 12, 14, 16, and 18. This research brief explores the feasibility of using the AHLS in the study of risk factors of violence. For that purpose, the 2011 AHLS survey contained questions about violence (taking part in a fight, weapon-carrying, and serious violence, source: ISRD-2).
- Taking part in a fight manifests the highest 12-month prevalence among 12-year-olds (11.4%) and the lowest prevalence among 18-year-olds (7.0%). The reverse is the case for weapon-carrying (1.8 per cent in the youngest group and 6.6 per cent in the oldest group). Serious violence did not manifest a clear age pattern.
- The AHLS questionnaire contains multiple questions that tap crime-relevant dimensions of social adjustment, background, and lifestyle. The current tentative analysis indicates that peer delinquency, low self-control, low social control, and some other core variables (such as male gender and low school performance) are risk factors for violent behaviour.
- Some risk factors were age-dependent. Thus, being outside educational institutions emerges as a risk factor after the age of compulsory education (16- and 18-year-olds). Peer-related learning processes may be particularly relevant in the younger age cohorts.
- Different types of violent behaviour, including weapon-carrying, are similarly linked to risk factors for violence.

1 Study Aims

Due to recent incidents of massacre-type violent crime committed by young adults, juvenile violence has become a particular point of interest in Finland and the other Nordic countries. In the future, there is a need to integrate public health and criminological perspectives in the study of youth crime. In this research brief, we explore whether the Adolescent Health and Lifestyle Survey can be used in the analysis of violence. We first describe the prevalence of violent behaviours by age and gender in the nationally representative AHLS data. We then explore the correlates of violent behaviour in each of the four age cohorts, with a particular focus on using the available measures as indices of criminological theories.

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2 Data and Method

We use data from the Adolescent Health and Lifestyle Survey in 2011 (Raisamo et al. 2011). The AHLS is a nationwide (Finland) monitoring system of health and health behaviours of adolescents. The study targets a nationwide sample of 12-, 14-, 16-, and 18-year-olds. In 2011, the number of respondents was 4566 and the overall response rate was 47 per cent. The respondents could answer via the Internet with personal usernames and passwords or via a paper questionnaire. The first request was sent in February 2011. Since response rates and sample sizes vary by gender/age group, we calculated weights to adjust for such differences.¹

Regarding the measurement of violence, this research brief is based on the methodology of a self-report delinquency survey. The method is widely used in contemporary criminology globally and also in Nordic crime research (Kivivuori & Bernburg 2011; Kivivuori 2011). It is generally regarded as manifesting high reliability and satisfactory validity, especially in young age cohorts (Kivivuori 2007).

3 Measures of Outcomes and Risk Factors

The violence questions were adapted from the questionnaire of the second International Self-Report Delinquency Study (Enzmann et al. 2010). The questions concerned taking part in a fight, carrying a weapon,² robbery, beating someone up, and beating someone up so that the victim needed to see a doctor. Due to the small number of offenders for robbery and beating someone up, we combined the relevant three questions to form a single measure for 'serious violence'.³ Additionally, we use the complete five-item violence scale as an outcome (participation in any violent behaviour type during the preceding 12 months).

Regarding the risk factor variables, we utilized AHLS variables that could be interpreted as tapping into key theoretical constructs of criminology. In other words, we regard specific questions as operationalizing relevant theories. From the full repertory of AHLS variables, we were able to construct measures reflecting strain theory, social control theory, self-control theory,

and learning theory. According to strain theory, crime is caused by structural disadvantage and/or situational adversity; social control theory is based on the notion that a lack of social control (for example, a lack of ties to social institutions such as school, family, or work) causes crime; self-control theory stipulates that an individual level trait, low self-control, explains population variation in crime; and learning theory sees crime as behaviour that is learned, typically in peer group socialization (for an overview, see Akers 2000).⁴ In addition, we categorized gender, academic achievement, biological maturation, and depressive mood as biosocial factors. The way variables are linked to specific theories and how each construct is operationalized are shown in Appendix 1.

In this analysis, we use dichotomous variables flagging the known presence of specific risk factors of crime.⁵ It has been observed that dichotomous variables do not compromise the ability to detect relevant risk factors and have the advantage of being clear-cut and easily understandable (Farrington & Loeber 2000).

4 Prevalence of Violence

The overall prevalence of violence in the four age groups was fairly similar, as shown in the last row in Table 1. However, there were differences in specific offences. Thus, taking part in a fight was most prevalent (11.4%) in the youngest age group and least prevalent (7.0%) in the oldest age group. The association between weapon-carrying and age was the reverse: it was least prevalent among 12-year-olds and most prevalent among 18-year-olds. To a large extent, these findings reflect differences between male age cohorts, as males were much more likely than females to report fighting behaviour and weapon-carrying. Participation in serious violence did not show a consistent pattern in relation to age.

Regarding the finding that some types of violence manifest higher prevalence in younger (especially male) age cohorts is consistent with prior findings (Salmi 2002; Mattila et al. 2005). Conceivably, this may reflect increasing knowledge regarding social norms. Apart from the true behavioural differences, the age differences may partially reflect differences in what is regarded as violence; it is possible that younger age categories include more trivial incidents.

¹ Weights were calculated for this analysis in each of the eight age-gender groups based on the total population in the corresponding age groups.

² The question wording emphasizes sharp and blunt objects used as weapons and excludes firearms.

³ Of course, taking part in a fight and weapon-carrying can also include serious cases.

⁴ Concerning what theoretical resources are lacking, see the concluding discussion.

⁵ Missing values were replaced with modes (0 in all cases) in all independent variables. In outcome variables, missing values were not replaced. Sum variables were computed using the sum function of the SPSS software.

Table 1 Prevalence of violent behaviours by age and gender, %. Based on 12-month recall period.

	Age group			
	12	14	16	18
Taking part in a fight				
Males*	19.7	16.6	11.8	11.1
Females	2.8	3.2	3.2	2.9
All*	11.4	10.0	7.5	7.0
Carrying a weapon				
Males*	2.8	6.0	10.4	10.3
Females	0.6	1.9	2.5	2.7
All*	1.8	4.0	6.5	6.6
Serious violence^a				
Males*	2.8	5.3	3.0	5.1
Females	2.5	1.7	2.6	2.2
All	2.6	3.5	2.8	3.6
Any of the above^b				
Males	22.3	21.3	19.5	19.2
Females	4.9	4.9	6.1	6.2
All	13.7	13.2	12.9	12.8

* = $p < .05$ (difference between age cohorts); a = Committed at least one of the following: robbery, beating someone up, and beating someone up so that the victim needed to see a doctor; b = Committed at least one of the violence types shown in this table.

5 Correlates of Violence

We used logistic regression to explore how the risk factors are related to violence when the variables are mutually adjusted. Table 2 shows the results of four regression analyses. In each of these, the dependent variable was participation in violence (of any type) during the last 12 months. Since all predictors are dichotomous, the reference category comprises students who are not known to carry the relevant risk factor.

Overall, the analyses indicate that there is some support for each theoretical group of risk factors. On the other hand, some variable groups appear to have stronger links with violence than others. Peer group-related variables, interpreted here as standing for learning processes, manifest particularly robust links to violence. Male gender and low self-control are also rather consistently related to violence risk.

In this analysis, variables related to strain theory do not figure prominently as risk factors for violence. The detected links between strain and violence are not consistent in terms of age. Mother's low education was close to reaching statistical significance in the youngest and oldest age groups. Parental unemployment was consistently unrelated to violence, perhaps due to the fact that the model controls for lack of money and low parental education. Regarding the more situational strain sources, it appears that frustration about not having enough money is relevant among 14-year-olds.

Of the social control related variables, being outside educational institutions has a significant association with violence. Due to Finland's compulsory basic education system, this category was not relevant for 12- and 14-year-old respondents. In contrast, for 16-

and 18-year-olds, being outside educational institutions is a particularly strong correlate of violence. Regarding family-related social control variables, having a non-nuclear family was not related to violence in the current analysis, possibly because of the presence of other family-related variables. The absence of close relations with parents was a risk factor in the 12 and 16 age groups. Living apart from parents/parent was a risk factor among 16-year-olds.

While we did not have a measure designed to capture self-control as a personality trait, the AHLS nevertheless included variables that could be used as proxies for it, comprising a mix of cognitive and behavioural measures (see Table 2, cf. Tittle et al. 2003). Based on these, low self-control was associated with a risk of violence. In the 12 and 14 age groups, the behavioural measure (tobacco smoking) is clearly a correlate of violence. Feeling irritation or having bouts of anger weekly was a risk factor among the older age group. It is possible that the construct of self-control and its impact is stable, but different questions capture its operation for different ages.

Consistent with Sutherland's classic differential association theory of crime (Sutherland & Cressey 1955), we measured learning processes by variables describing whether the friends or acquaintances of the respondent were engaged in criminal or quasi-criminal activity. This theoretical variable set emerges as a particularly strong and consistent correlate of violence here as in many other prior studies (Pratt et al. 2010). Knowing people who use drugs and having friends who have fought in public places appear to be

Table 2 Correlates of violent behaviour in four age cohorts. Logistic regression odds ratios based on full models including all variables.

	12	14	16	18
Strain theory				
Father blue collar worker	1.14	1.69*	0.98	1.03
Father's education low	0.95	1.58	0.65	0.74
Mother's education low	2.30 ^a	..	1.64	1.97 ^d
Parental unemployment	0.70	0.81	0.89	1.30
Not much personal money	0.90	0.81	1.41	0.88
Feels a shortage of money	1.38	1.97**	0.86	1.05
Social control theory				
Lives in a city	1.02	0.85	0.86	0.69 ^e
Non-nuclear family	0.62	1.10	1.20	0.92
Absence of close relations with parents	3.20**	1.26	1.98*	1.48
Outside educational institutions	4.79**	3.06**
Does not live with the family	2.25*	1.07
Self-control theory				
Irritation or bouts of anger	1.27	1.48	2.03**	1.77*
Low educational aspiration	1.71*	1.09	1.23	1.76*
Used/tried tobacco	2.44**	3.22**	1.31	1.01
Learning theory				
Knows drug users	..	2.25 ^b	1.80*	2.05**
Friends as sources of tobacco	..	1.11	1.72*	1.44
Friends participated in fighting	7.08**	4.02**	3.75**	3.35**
Biosocial factors				
Male gender	4.77**	7.67**	5.87**	4.03**
Below-average school performance	3.69**	1.50	2.29*	1.00
Early biological maturation	1.22	1.36	1.01	0.84
Depressive mood	2.05*	1.78 ^c	0.91	1.52 ^f
Nagelkerke R ²	0.37	0.36	0.30	0.26
N	646	1396	1432	1086

* = p<.05 ** = p<.01; a) p=.093; b) p=.057; c) p=.077; d) p=.060; e) p=.058; f) p=.082.

.. = not applicable due to less than 10 persons at risk in weighted data.

risk factors of violence in all age groups. It should be noted that having delinquent peers can result from selection processes if criminally prone individuals self-select themselves to peer groups comprising similar persons. The fact that we control for self-control and depressive mood probably controls for some individual-level self-selection effects, but we still cannot rule out the possibility that learning theoretical variables reflect some unmeasured selection-triggering heterogeneity in the data.

The final set of risk factors includes male gender, below-average academic achievement in school or course, early biological maturation, and depressive mood. Of these, male gender was (not surprisingly) the most consistent risk factor of violence. Below-average school performance appears also to be a risk

factor, but there is some age-related inconsistency. Consistent with prior research, depressive mood is a probable risk factor for violence (Ritakallio et al. 2005). Early biological maturation was measured by onset of menarche (females) or ejaculation (males) at age 11 or earlier. This variable did not emerge as risk factor in the presence of other adjusted variables.⁶

It seems that the available AHLS variables are comparatively more adequate in the analysis of violence in the younger age cohorts (Table 2). If the theoretical variable blocks are used alone, it appears that learning theoretical variables have the highest explanatory potential in all age groups save that of 14-year-olds. In comparison, structural strain/disadvantage and social control do not appear similarly relevant in the explanation of violent behaviour (see

⁶ If we exclude tobacco use and friend-related risk factors, biological maturation emerges as a significant predictor of violence among 12- and 14-year-olds. The findings, therefore, are consistent with the earlier findings of Stattin and Magnusson (1989), who found that the criminogenic impact of early biological maturation is (partially) mediated by peer and dating relations.

Appendix 2). The role of delinquent peers is particularly pronounced in the youngest age group (where learning theory was operationalized by a single variable; see also Table 2).⁷

6 Different Violence Types

To explore tentatively the behavioural specificity of risk factors, we additionally fitted the full model shown in Table 2⁸ separately for three outcomes: taking part in a fight, serious violence, and weapon-carrying (results not shown). The overall finding is that the risk factors are typically similar in different types of violence-related behaviours. Weakness of social control, low self-control, and ties to criminal peers are associated with violent behaviours. Risk factors for violence appear to be rather general as opposed to specific in different types of violence. However, in weapon-carrying, father's blue collar occupation and mother's low education emerged as significant correlates (but not so for fighting and serious violence). It is possible that weapon-carrying is more structurally-culturally embedded than the other two violence types. Of the social control variables, only being outside education was linked to weapon-carrying, while, for other violent behaviours, family ties also mattered.

7 Discussion

The current exploratory analysis suggests that the Adolescent Health and Lifestyle Survey can be used in the analysis of violence. The AHLS contains multiple variables that are meaningfully related to key criminological theories. Factors that are conceptualized as health behaviours or health risk factors can often be "translated" into the theoretical language of criminology. From the point of view of the outcome variables, the ISRD-2-based violence measures appeared to function well.

The current findings are consistent with social learning theory, self-control theory, social control theory, and the impact of biosocial factors. The role of delinquent peers, interpreted here as tapping into the

dimension of learning processes, appears particularly relevant in the explanation of juvenile violence. In other respects, the findings are consistent with prior findings showing, for instance, that low self-control and poor school performance are correlates of delinquent behaviour and more serious criminal careers as well (Salmi & Kivivuori 2006; Kivivuori & Linderborg 2010).

Furthermore, the AHLS is strong in enabling age-specific analyses. Learning theoretical variables are linked to violent behaviour in all age groups, but perhaps particularly so in the youngest age groups. Regarding social control, detachment from educational institutions appears to be particularly relevant after the compulsory age of education, in the 16 and 18 age groups. This finding is consistent with other findings related to the importance of educational ties during the transition from youth to young adulthood and with recent research suggesting that a lack of educational qualifications is a major risk factor for youth crime in general (Aaltonen et al. 2011; Savolainen et al. 2012). This result is robust across different data types (survey vs. recorded crimes).

Factors related to the socio-economic background of the respondent do not appear to be strong correlates of violence in the current sample. It should be noted that Finland is a relatively highly developed welfare state, so variations in social disadvantage may be truncated, at least from a comparative perspective. Furthermore, it is possible that social disadvantage is related to non-response (see the discussion below). That strain-related factors did not emerge as particularly robust risk factors in this analysis may also partially be a function of the available variables.⁹ However, the subjective feeling of not having enough money was a risk factor for violence among 14-year-olds. Conceivably, a lack of money creates frustration, which can be expressed as violence.

Different manifestations of violent behaviours are, by and large, related to the same set of risk factors. This is consistent with previous research using register-based data sources and indicating that, while effect sizes differ, the risk factors of violent victimization tend to be the same in serious and less serious violence (Aaltonen et al. 2012). Even studies based on prison inmates reveal that similar variables are involved in serious criminal careers (Kivivuori & Linderborg 2010).

⁷ To examine the robustness of the findings, we fitted the models shown in Table 2 with un-weighted data. Overall, the basic findings remained the same. In the un-weighted analysis, depression was not significantly related to violence (OR 2.11, $p=.106$) among 12-year-olds, while among 18-year-olds, depression reached significance (OR=1.72, $p<.05$). Among 12-year-olds, avoiding an academic track did not reach significance in the un-weighted analysis (OR=1.71, $p=.117$).

⁸ Age was also adjusted in this analysis, which included all four age cohorts.

⁹ For instance, family economic situation might have better captured strain-related criminogenic influences (see Salmi & Kivivuori 2006; Kivivuori & Salmi 2007).

Different crime types tend to have relatively similar risk factors, partially because criminal behaviour tends to be generalized rather than specialized in one offence type (Sourander et al. 2006). It is, therefore, not surprising if different manifestations of violence share risk factors.

There are some noteworthy limitations in the current analysis. We lack some important variables, such as measures of risk-related routine activities (staying out late at night, use of public transportation, etc.) and family economic situation. Additionally, the ability to control for dating relationships would be useful in analysing violence causation. While differential response rates are compensated by weights, the full impact of the relatively low response rate is currently unknown;¹⁰ possibly, the most socially disadvantaged youths are less likely to respond than better-adjusted youths. There is some evidence that compared with school-based research, home contacts may result in the underrepresentation of socially disadvantaged and immigrant groups (Naplava & Oberwittler 2002). This may partially explain why strain theoretical variables have a relatively weak link to violence in the current data. The findings may underestimate the role of social disadvantage in crime causation. On the other hand, the AHLS is very strong in targeting post-comprehensive school age cohorts (16- and 18-year-olds), which are difficult to reach by data collection in institutional environments.

¹⁰ To However, see the analyses of “late responders” by Raisamo et al. (2011), which suggest that non-response may not be an overwhelming problem.

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Appendix 1 Prevalence of violent behaviour (last year), by the known presence of selected risk factors (%) in the total sample

	Risk factor:		p
	Known to be present	Not known to be present	
Strain theory			
Father blue collar worker ^a	15.1	12.4	.013
Father's education low ^b	14.8	12.9	.242
Mother's education low ^b	19.0	12.8	.003
Parental unemployment ^c	14.1	13.0	.512
Not much personal money ^d	12.6	13.4	.468
Feels a shortage of money	18.5	11.5	.000
Social control theory			
Lives in a city	12.6	13.6	.303
Non-nuclear family	16.0	12.5	.006
Absence of close relations to parents ^e	21.1	12.1	.000
Outside educational institutions	36.8	12.8	.000
Does not live with the family	19.5	12.7	.001
Self-control theory			
Irritation or bouts of anger ^f	17.2	11.3	.000
Low educational aspiration ^g	21.3	10.7	.000
Tobacco use/trial (ever)	19.3	8.9	.000
Learning theory			
Knows drug users ^h	29.2	11.8	.000
Friends as sources of tobacco ⁱ	29.3	11.8	.000
Friends participated in fighting	25.6	5.4	.000
Biosocial factors			
Male gender	20.5	5.5	.000
Below-average GPA ^j	25.3	11.8	.000
Early biological maturation ^k	16.9	12.2	.000
Depressive mood ^l	19.9	12.1	.000

a) Isco88 codes 7-9.

b) Only basic education.

c) At least one parent unemployed.

d) Less than 7 euros of spendable money per week.

e) Based on variables tapping the ease of discussing troubling matters with the mother or father (sum of 2 items ranging from 1=very easy to discuss to 5=impossible due to lack of mother/father; sum scores of 7 or higher indicate the absence of close relations. Note that this variable represents a strict control theoretical interpretation: youths at risk may, thus, be persons with one dead parent and another distant one (difficult to talk to). Excluding "does not have [a parent]" from consideration yields similar results.

f) Irritation or bouts of anger weekly or more often during the last 6 months.

g) The question was: "What plans you have for continued education?" Those aiming at a vocational school track or directly to work scored 1. This taps a dimension of self-control because more academic careers are known to require the exercise of self-control (concentration on academic studies, postponing the prospect of personal income).

h) Knows at least five persons who have used drugs.

i) Has smoked tobacco and has bought tobacco from friends or has friends who bought tobacco for the respondent.

j) Subjective assessment of the most recent grades, in comparison with class/course average; "clearly worse" is coded as 1.

k) Onset of menarche (females) or ejaculations (males) at age 11 or before.

Appendix 2 Nagelkerke R² shown separately for each theoretical variable block of the full model shown in Table 2.

	Age group			
	12	14	16	18
Strain theory	.03	.04	.02	.02
Social control theory	.04	.01	.04	.05
Self-control theory	.09	.13	.07	.07
Learning theory	.22	.17	.16	.14
Biosocial factors	.18	.18	.11	.10
N	646	1396	1432	1086

Note: The number of variables tapping the theoretical dimensions may vary in different age groups (cf. Table 2 in the text).

Suomenkielinen tiivistelmä

Katsauksessa tarkastellaan, voidaanko Nuorten terveystapatutkimuksen (NTTT) aineistoa hyödyntää kriminologisessa rikollisuuden riskitekijöiden tutkimuksessa. NTTT on joka toinen vuosi toistettava postikysely, jonka kohdejoukkona on edustava otos suomalaisista 12-, 14-, 16- ja 18-vuotiaista nuorista. Vuoden 2011 kyselyyn (N=4566, vastausprosentti 47 %) liitettiin väkivaltaa koskevia kysymyksiä, jotka on alun perin kehitetty Kansainvälisessä nuorisorikollisuuskyselyssä (International Self-Report Delinquency Survey, ISRD-2). Kysymykset koskivat tappeluun osallistumista julkisella paikalla, lyömä- tai teräaseen mukana pitämistä sekä muuta väkivaltakäyttäytymistä kyselyä edeltäneen vuoden aikana. Julkisella paikalla tappeleminen oli yleisintä nuorimmassa ikäryhmässä (11 % kuluneen vuoden aikana) ja harvinaisinta vanhimmassa ikäryhmässä (7 %). Lyömä- tai teräaseen mukana pitäminen suhtautui ikään päinvastaisesti: teko oli 12-vuotiaiden parissa harvinaisin (2 %) ja 18-vuotiailla yleisin (7 %).

Katsauksen kysymyksenasetteluna oli sen arvioiminen, voidaanko Nuorten terveystapatutkimuksen standardikysymyksiä käyttää kriminologisten teorioiden mittareina väkivallan riskitekijöitä tutkittaessa. Metodologisesti tulokset ovat rohkaisevia: terveystapatutkimuksen muotoiltuja kysymyksiä voidaan monin osin käyttää rikoskäyttäytymisen riskitekijöiden teoreettisesti relevantteina mittareina. Sisällöllisesti analyysin tulokset ovat linjassa useiden keskeisten kriminologisten teorioiden kanssa. Selkeintä tukea sai kriminologinen oppimisteoria. Se, että nuorella on rikosaktiivisia ystäviä, näyttäytyi väkivallan itsenäisenä riskitekijänä, kun suurehko määrä muita tekijöitä oli tilastollisesti vakioitu. Rikosaktiiviset ystävät/tutut olivat väkivallan riskitekijä kaikissa neljässä ikäryhmässä. Myös alhainen itsekontrolli näyttäytyi väkivallan riskitekijänä. Lisäksi analyysissa voitiin havaita ikäryhmätyypillisiä riskitekijöitä. Peruskoulun jälkeisissä ikävaiheissa oppilaitosten ulkopuolella oleminen oli väkivallan riskitekijä, mikä on linjassa rekisteripohjaisten analyysien ja kriminologisen kontrolliteorian kanssa.

Verkkokatsaus perustuu Oikeuspoliittisen tutkimuslaitoksen kriminologisen yksikön ja Tampereen yliopiston terveystieteiden yksikön yhteistyöhön.