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SCIENTISTS

BRITISH SEXUALLY ABUSIVE
ADOLESCENTS

VIOLENCE FROM PATIENTS IN THE
COMMUNITY

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The relations between accidents, deviance and leisure time

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ABSTRACT *This article is concerned with two questions. (1) Is there a relation between mild deviance and involvement in accidents? (2) Are there correlates of problem behaviour which are also correlates of involvement in accidents? The findings show that participation in mild deviance is strongly associated with having been involved in an accident. To investigate whether there are common correlates the study looked at leisure-time activities. Generally it is found that leisure-time activities are related to deviance as well as to accident involvement. This supports the claim for a common aetiology of both accidents and deviance. The results support the idea that there is an exposure effect of leisure-time activities on accidents, as well as the fact that individuals have a differential accident liability. Support for this latter explanation comes from the finding that certain variables which decrease exposure (such as passive forms of leisure time) do increase the likelihood of accidents. The results have theoretical implications which are briefly discussed. For example the findings indicate that explanations of crime need to include individual differences and cannot resort to macro-level explanations only (such as subculture or strain theories). An important policy implication is that social services in general (such as health services and correctional services) do, to a certain extent, deal with the same (type of) individuals.*

INTRODUCTION

It has been argued by a few authors that criminal behaviour and risk-taking in other fields might be related phenomena. For example, Gottfredson and Hirschi (1990) recently introduced a theory on self-control as a new aetiology of crime. They argued that their theory predicts a positive relation between

accidents and crime. According to them this association between accidents and crime is theoretically important and competing theories on crime can not comply with it. Strain and cultural deviance theories are unable to explain this association, according to these authors.

Gottfredson and Hirschi (1990) are probably the first authors in criminology to state explicitly that their theory predicts a relation between accidents and crime. However, this relation has been described by other authors such as the Gluecks (1950), Robins (1966), Suchman (1970), West and Farrington (1977), Wadsworth (1978), Dahlbäck (1990a, 1990b), and Bagley (1992). All of these authors imply that the relation is spurious or indirect and argue (as do Gottfredson & Hirschi, 1990) that accidents and crime share to some extent a similar aetiology. However, at the moment there is only limited empirical information on the relation between accidents and crime. Furthermore, as far as we know, no study investigated the question whether correlates of crime would also correlate with accidents. The present study will address these issues and attempt to answer two questions:

1. Is there a relation between various forms of problem behaviour and involvement in accidents?
2. Are there correlates of problem behaviour which are also correlates of involvement in accidents? A positive answer to this question will support claims for a common aetiology.

To investigate the second question information on behaviour by parents and friends and on leisure-time activities will be used. Activities undertaken in leisure time are usually found to be relatively strong correlates of crime, but not many studies systematically studied their impact on criminal behaviour.

THEORETICAL CONSIDERATIONS AND EMPIRICAL SUPPORT

Definition of accidents

Accidents are unintentional injuries. According to Baker, O'Neil, Ginsburg, and Li (1992) *injuries are caused by acute exposure to physical agents such as mechanical energy, heat, electricity, chemicals and ionising radiation interacting with the body in amounts or rates that exceed the threshold of human tolerance*. Although there is no sharp distinction between injuries and disease, injuries are usually perceived as occurring immediately after the contact with a causal agent. They are generally divided in three (in principle mutually exclusive) intent categories, namely: (1) self-inflicted, (2) intentional injuries inflicted by others (e.g. assaults and homicides) and (3) unintentional injuries (see Baker et al., 1992). Some authors in this field of research reject the concept of *accidents*, because it implies randomness, and advocate the concept of *unintentional injuries* instead (see Petersen & Brown, 1994). The matter of intent is a

difficult issue. Petersen and Brown (1992) argue persuasively that there are no clear standards to evaluate intent, and that intent is probably best conceived as a scale with *no intent at all* at one end of the continuum, *neglect and carelessness* somewhere in the middle and *clearly intended injuries* at the other end. Although we think Petersen and Brown's (1992) argument is correct, in this article for convenience we will mostly use the term 'accident'. In this study 'accidents' are conceived as 'unintentional injuries' as perceived by the respondents (see later). However, as will appear from our approach, we do not think or imply that accidents occur randomly.

The relation between accidents and crime

Researchers have approached the question of whether there is a link between deviance and accidents from a number of different viewpoints. Although we present this short overview in these terms, the distinctions are somewhat arbitrary and it must be stressed that some researchers have been active in more than one field. In general there has been little attention to any direct relationship between unintentional injuries and deviance. However, this subject caught the attention of a few authors in various fields.

Criminology

Criminological literature on this subject is rather scarce and comes mainly from relatively older studies. Glueck and Glueck (1950) were the first to report on this subject. They found that delinquents were more often involved in accidents than non-delinquent (matched) controls (33% versus 15%). The control group was matched by race, sex, IQ and socio-economic status.

A second important study was published by Robins (1966). She compared children in a child guidance clinic referred for anti-social behaviour with normal controls 30 years after their graduation from elementary school. She reported more injuries and more deaths by violence among the children referred for anti-social behaviour than the control group (injuries: 84% versus 67%, deaths by violence: 5% versus 1%, respectively, p. 295). For Robins (1966) this finding fits with her theoretical concept of a sociopathic personality. Sociopathic individuals will exhibit a broad variety of antisocial and problematic forms of behaviour. They are 'characterised by a gross, repetitive failure to conform to societal norms in many areas of life, in the absence of thought disturbance suggesting psychosis' (Robins, 1966, p.79, italics as in original).

A third well-known study was published by West and Farrington (1977). They report that convicted boys sustained injuries more often than not convicted boys, especially as a result of traffic accidents. They also found that many types of antisocial behaviour (such as gambling, precocious sexual behaviour, unstable job records, excessive smoking and drinking, drug use, aggression, driving under influence, and 'hanging around') have a tendency to

cluster and are related to registered delinquency. Their findings support the sociopathic personality concept of Robins.

Fourth, Gottfredson and Hirschi (1990) recently introduced the theory of self-control and give an important place to the relation between accidents and crime. (Low) self-control is defined in terms of 'the tendency to pursue short-term interests without considering the long term consequences of acts' (Gottfredson & Hirschi, 1990, p. 177). The authors propose self-control as the main barrier that stands between people and the possibility to commit a crime. Self-control is mainly acquired within the first years of life, as a result of socialising, which at that age occurs primarily within the family frame. Low self-control has a broad range of consequences which vary from delinquent behaviour to various forms of behaviour which are not criminal but deviant and risky (such as excessive drinking and smoking). One possible outcome of this behaviour is accident involvement (see Gottfredson & Hirschi, 1990, pp. 91–94). Consequently, crime and accidents are related because both are results of the same cause: a lack of self-control.

Finally, in a literature review, Junger (1994) compared the correlates of crime and the correlates of accident involvement. She looked at health problems and psychiatric problems in the family, education of mother, age of mother, employment status of the mother, marital tensions, mobility rate, family type, home environment, socialisation practices, adverse life events, psychological and psychiatric problems (such as hyperactivity), social disadvantage, sex and ethnic group. Most of these factors are related to accident liability and they relate globally in the same way to crime. This supports the claim of a common aetiology.

Psychology

In 1977 Jessor and Jessor formulated their problem behaviour theory. In their approach problem behaviour is defined as a very broad category including deviance, status offences and behaviour which is likely to generate accidents or injuries, such as speeding, driving under the influence, driving without a seatbelt (see also Lavery & Siegel, 1993).

Sociology

Suchman (1970) found a relation between injury liability and deviant behaviour. Deviant behaviour was defined as being involved in fights during the school year, disobeying teachers, being punished by teachers and drinking alcoholic beverages. Suchman (1970) formulated explicitly the process leading to a relation between accidents and social deviance, namely social controls. According to him, social controls serve to protect the individual from harm. 'Social controls may also serve to regulate hazardous consumer products such as poisons and lethal weapons. Obviously, a great many social controls,

traffic laws and safety regulations, for example, are aimed directly at reducing harmful anti-social behaviour. To the extent that social controls are violated by the individual, we may hypothesise that he places himself in a situation of additional risk of injury or death' (1970, p. 5). Suchman's (1970) study, however, only starts the process of investigating the relation between delinquency and crime. His delinquency scale, for example, is rather limited. Later research has suggested more extensive measures of self-reported delinquency (see Elliott & Ageton, 1979; Hindelang, Hirschi & Weis, 1981).

Recently Dahlbäck (1990a) proposed to consider crime as a particular form of risk-taking. In a questionnaire, he submitted 14 different situations of the game of roulette and asked his subjects how they would play. He categorised the level of risk-taking on the basis of the choices made in these 14 situations. He also asked question about delinquent behaviour. For all subjects (71 male students) the correlation between self-reported delinquency and risk-taking was 0.62 (Dahlbäck, 1990a, p.267 and 1990b). The implication is that a very broad characteristic such as risk-taking can explain a variety of problematic behaviours.

Finally, Bagley (1992) compared a group of children with pedestrian and bicycle accidents with a non-accident group ($n = 201$) all going to school in the centre of Brighton (UK). He found that 'accident children' had a higher score on the factors 'over-activity and aggression' and 'involvement with police, social or mental health services'. The term *accident children* is often used for children who are (frequently) in accidents.

Traffic research

In the field of traffic research, an interest in the individual characteristics of those involved in accidents was an important subject of inquiry before the Second World War. At that time 'accident proneness' was the term used. An example of this type of research is the study on the 'accident-prone automobile driver' by Tillmann and Hobbs (1949). Although in some respects these studies seem 'old fashioned' most of these studies did control for confounding factors (such as driving experience, exposure) and put a lot of care in the data gathering process and possible flaws such as differential validity of self-reports on accident. Tillman and Hobbs, for example, noted that 'particularly those with a high number of accident records tended to minimise the number of accidents and to exaggerate the magnitude of their driving experience' (p.324). This is interesting because this tendency will decrease the differences found between high and low accident drivers. They described two studies which compared high accident drivers with low accident drivers. The first study concerns taxi drivers. They found that high accident taxi drivers differed from the low accident drivers on almost all the background factors which were studied. In childhood they showed more conduct disorders, at school they had higher records for truancy, their work record was poorer (more short time jobs,

less well-adjusted), their social adjustment was poorer (e.g. less friends), when married they were more often unfaithful to their wives, they had a history of childhood accidents, and, finally, their driving habits were worse. These results were checked on drivers selected from the general population with high versus low accident records. The results confirm the previous study. For example, it appears that the low accident drivers were known to the juvenile and the adult courts in only 1% of the cases. For the high accident drivers this is 17% and 34%, respectively. The well-known conclusion of the authors is that 'a man drives as he lives' (Tillmann & Hobbs, 1949, p. 329).

After the Second World War the term accident proneness was abandoned. The search for individual differences was given less attention, but has been growing again in the last decade (see Lester, 1991). These 'individual characteristics' include deviance. West, Elander and French (1993) looked at rates of intention to commit crimes and accidents. They found a relatively strong relationship which is in part mediated by thoroughness (measuring the degree of thoroughness of decision making in general) and speed. Other examples can be found in Sivak (1983, 1987), Hansen (1988), Hilakivi, Veilahti, Asplund, Sinivuo, Laitinen and Koskenvuo (1989), Rothengatter (1993), and Parker, West, Stradling and Manstead (in press). Thorough reviews are presented by Lester (1991) and Elander, West and French (1993).

Children's injuries

There are a number of psychological and medical studies which focused on childhood injuries and investigated the association between accident liability and deviant behaviour. On the whole, the studies showed that children involved in accidents are characterised by relatively high levels of *antisocial behaviour* (Langley, McGee & Williams, 1983), *disciplinary problems and aggressive behaviour* (Manheimer & Mellinger, 1967), *overactive behaviour and aggressive behaviour* (Bijur & Stewart-Brown, 1986). Several studies mention that accident children differ from non-accident children on the Rutter behaviour scale (Wadsworth et al., 1983; see also Read et al., 1963; see Junger, 1994, for a review). An interesting finding was reported by Wadsworth (1978) in the UK. He reports, on the basis of a large scale cohort study that, over 21 years, *the most striking and significant associations with later delinquency were found to be in the experience of injuries between the ages of 6 and 10 – which, as far as we know were all accidental – and of admissions to hospital before the age of 5 years* (Wadsworth, 1978, p. 47). Thus, accidents predict future delinquency.

Petersen and Brown (1994) presented a review of the literature on unintentional injuries and child abuse. They argue that both phenomena are related conceptually and that they share a common aetiology.

Situational approaches

It is important to note that most authors in the field of criminology do

acknowledge the importance of a situational approach to crime. For example, opportunity aspects such as surveillance and (easy) access to goods do influence the likelihood of a criminal act being committed (Cohen & Felson, 1979; Cornish & Clarke, 1986; Felson, 1994). There seems to be a widespread agreement, in criminological journals, that the opportunity approach provides an important contribution to our understanding of crime.

Similarly to the distinction between crime (the fact) and criminality (individual differences in crime-proneness), in accident research a distinction can be made between attributes of an individual on the one hand and characteristics of the situation and exposure on the other hand as predictors of accidents. For example, neighbourhoods having relatively dense traffic and few playgrounds do have higher accident rates among children than neighbourhoods with less traffic and more playgrounds; weather conditions are also related to accident rates (see for example, a special issue of *Social Problems*, 1987 and Elander, West & French, 1993).

It is important to note that opportunities for crime and exposure to dangerous situations do not occur at random. People can create their own opportunities and level of exposure. The amount of time youngsters spend outside the house and the type of leisure activities they engage in are related to the way they function in their family and at school (see for example, Junger, 1990). Children who are strongly attached to their parents and closely supervised will probably spend less time outside their home and will therefore be less exposed to danger (see for example, Junger & Tremblay, 1993).

In conclusion, it is worth a reminder that most authors are active in different fields and they do not usually cite work from other disciplines. Although the theoretical approaches of these studies differ in some respects they are comparable in other important ways. Generally, all imply very general and related behavioural tendencies and, as a result, a relation between deviance and accident involvement. All argue that this relation arises as a result of the fact that both variables share a common aetiology. It should be emphasised, however, that while there is a lot of *indirect* evidence taken from various fields the *direct* support is scarce. Further, to the best of our knowledge, up to now no study empirically compared the *correlates* of crime and accidents *within the same sample*.

The relationship between leisure-time activities and delinquency

For the study of a relationship between crime and accidents, leisure time seems especially relevant. A number of aspects of leisure time have been discerned in the literature.

1. Delinquent children are more involved in *going out*, that is, they are away from home (Hirschi, 1969; West & Farrington, 1977; Junger-Tas et al., 1983; Junger, 1990). Agnew and Petersen (1989) find that delinquency is

positively associated with time spent in unsupervised peer-orientated social activities.

2. Delinquents participate less in *conventional and structured activities* than non-delinquents. They spend less time on homework (Hirschi, 1969) and go less often to evening classes (West & Farrington, 1977). In addition they do not like structured activities. West and Farrington (1977) also noted that delinquents were less often members of organisations such as Boy Scouts, and did not like organised sports. Many team sports require respect for rules, teamwork and enduring effort, all of which are forms of behaviour in which delinquents are less competent (Kruissink, 1988; Ferwerda, 1992).
3. Delinquents participate more frequently in *unconventional activities*, such as going to bars, discotheques, etc., in comparison with their non-delinquent peers (West & Farrington, 1977; Junger-Tas, 1988; Hauber, Toornvliet & Willemse, 1987; Junger, 1990).
4. It has been reported that delinquents are more often involved in withdrawal behaviour, and have 'little to do in their spare time' (Junger-Tas et al., 1983). West and Farrington (1977) reported that it was more characteristic for delinquents than non-delinquents to hang out, just driving or riding a bicycle around.
5. Some studies explicitly looked at the *companions* during leisure time. It is well known that delinquents associate with delinquent peers (Agnew & Petersen, 1989; see Junger, 1988, for a review). In the UK, Riley (1987) carried out a comprehensive study on this subject. He also found that boys who spend much time outside their home, go out frequently with friends, visit bars and discotheques, and those who spend much money have relatively high delinquency rates. An interesting finding is that, after controlling for leisure-time activities, the effect of delinquent friends on delinquent behaviour disappeared.

Different explanations can be provided for the findings described above. According to Riley (1987) one of the most important aspects of leisure time is its implications for opportunity. The amount of leisure time without supervision has above all a strong effect on the opportunity to commit crimes. In any case, the opportunity factor should weigh much heavier than the influence of 'bad friends'. For Hirschi (1969) leisure time is essentially considered as an expression of the strength of the bond to society. The way leisure time is spent is an indication of the degree of commitment to conventional society. Children who spend much time doing their homework invest in their future careers. Children going out a lot indicate that they do not care about their educational and professional careers. Agnew and Petersen (1989) simply argue that strain (people experience strain when they have ambitious goals in life but – given their situation in society – they can expect only little success in reaching these goals), cultural deviance and social control theory all predict a

relationship between leisure time and delinquency. Some authors, however, prefer emphasis on the idea that certain leisure-time activities and delinquency are both expressions of the same underlying dimensions (lack of social controls or sociopathy).

We would like to emphasise that in this article no attempt will be made to differentiate between the nature of pathways between leisure time, accidents and deviance. Our aim is more modest, and simply to investigate (see section 1) whether a relatively well-known correlate of crime, namely leisure time, correlates with accident involvement.

The importance of leisure time for accident involvement

To the best of our knowledge, accidents have not been related to leisure time in the ways described in the studies mentioned above. However, several findings seem to imply that leisure-time activities are related to accident involvement. Accidents, for example, are positively related with drinking alcoholic beverages, often during leisure time (see for example, Suchman, 1970; Donovan, Jessor & Costa, 1988, Sheehy, 1982).

Conclusions

It seems plausible that there is a relationship between leisure time, accidents and crime and that there are several ways in which it might arise.

1. The relation is spurious, as delinquency, leisure time and accident involvement are indicators of the same causal processes such as a weak social bond, self-control or sociopathy. All three variables are outcome measures. In that case (as leisure-time activities are an outcome variable), it follows that delinquents do behave more dangerously as a result of their lack of social bonds, self-control or sociopathy. For example, they drive faster, drink and drive and make more risky decisions in traffic. This is a *behavioural effect*.
2. The other possibility is that leisure activities provide opportunities for crime as well as for accident involvement. Riley (1987) sees leisure time mainly as an opportunity for crime. Similarly, leisure-time activities can bring people into potentially dangerous situations and consequently lead to exposure to accidents. This is an *exposure effect*.
3. Both explanations may be correct to some extent.

RESEARCH DESIGN

The information presented in this report is based on the answers to a self-administered questionnaire taken from 1328 high school students in the Province of Groningen (The Netherlands). The schools were selected through

stratified sampling. Four schools were selected randomly from each of the four existing types of secondary education in The Netherlands (in rising order of academic expectation: Special Secondary Education; lower vocational education; general education; middle level and general education preparing for professional education and for university.) In each selected school children of class two and four (age approximately 13 and 15) were asked to fill out a questionnaire. A medical assistant distributed and collected the questionnaires after they were filled out. More information on the study can be found in Wiegersma (1992) and Junger and Wiegersma (1994). The following variables are used in this paper.

Dependent variables

To simplify the analysis we decided to divide various possible outcome variables into two sets which would be conceptually distinct from each other. We decided to make the distinction between forms of intentional behaviour versus unintentional outcomes of behaviour.

(1) *Mild deviance*

The first set of variables consists of forms of deviant behaviour that tend to lead to social disapproval and which are clearly intended by the youngster, namely: gambling, drinking, smoking, soft-drug use, shoplifting and vandalism (see also Appendix I). First it was necessary to check whether these variables measured roughly the same underlying construct. This was done with HOMALS – a scaling program developed for categorical variables. It is a part of the Categories procedure of SPSS. The HOMALS analysis showed that the six variables are related and all score relatively highly on a single dimension. The resulting scale is a *variety scale* which counts the number of different activities in which the respondent is involved. Therefore, a scale was formed by counting the positive scores on the six variables (see Appendix). It was named the *mild deviance scale* (sometimes abbreviated to *deviance*). Two further methods were used to form a scale. First, the scores of the first HOMALS *dimension* were saved. This scale produces relatively abstract scale-scores with a mean of 0.009 and a standard deviation of 1.03. Second, the original frequency scores for each deviant act were added which produced a *mean frequency score* of participation in the six deviant acts. However, as it had to be taken into account that the range of the answers differed for several acts (from three to five answer categories) the mean frequency score is also relatively abstract. The scale formed by the count seemed easy to interpret and was, therefore, used in the rest of the analyses in this article. As is often the case, the *count scale* correlated highly with the other two scales (0.93 in both cases). The results of the analyses with the background factors are almost identical. The frequency distribution of the scale is, as could be expected, relatively (but not extremely) skewed (see Table 1). The fact that a scale could be formed is not really surprising and

confirms that many types of socially deviant or problematic behaviour are related. It could be argued that, although each of the six items measures to a certain extent the propensity to deviance, it is the cumulation of deviant activities which represents the best way to measure the underlying construct which we labelled 'deviance'. In the past, the reliability and validity of this type of scale has been studied by using the test-retest method and by doing reverse record checks (comparing police information with self-report information). Previous research has shown that, by and large, this type of self-report measures provides a relatively reliable and valid scale (see for example, Hindelang, Hirschi & Weis, 1981; Elliott & Ageton, 1985) although this may not be true for particular groups such as ethnic minorities (Junger, 1989).

(2) Accidents

The second dependent variable is involvement in accidents. Involvement in physically dangerous behaviour can be regarded as intentional behaviour in itself. However, accidents in themselves are not a form of behaviour and are by definition unintentional. As a result, in the present research, involvement in accidents is considered as conceptually distinct from involvement in deviant behaviour or behaviour with a higher than ordinary risk of those accidents taking place. Accident involvement was measured by the answer on a single question: 'Have you been involved in an accident during the last 12 months?' Accidents were described as follows: '... an accident at home, during sports, or in traffic. Wounds that were inflicted during a fight also count. By

TABLE 1: Deviant behaviour and involvement in accidents: 'Did you have an accident during the last 12 months' (%)^a

Variety of deviant and risky behaviour	0	1	2	3	4 and more	
<i>n</i>	584	337	218	106	81 ^b	<i>P</i>
% Children involved in accidents:						
Overall	16.2	26.8	23.0	37.3	33.8	0.00001
traffic	3.9	8.3	8.3	8.5	14.8	0.001
school	2.6	3.6	2.8	5.7	3.7	0.52
home	3.4	3.6	6.0	5.7	2.5	0.39
Elsewhere	3.4	5.6	2.8	7.5	7.4	0.09
Among those who play sport						
sports	2.1	6.1	2.9	11.0	6.7	0.0007 ^c

^a Mantel-Haenszel test for linear association significant ($P = \leq 0.05$) for accidents overall, traffic accidents and sport accidents.

^b For the overall measure of accident: *n* varies slightly due to missing values.

^c Selection for those engaging in sports at least once a month: *n* for the five categories is (0 to 4 and more): 485, 277, 174, 82, 60.

accident we mean an accident which had such serious consequences that treatment by a physician or even a visit to the hospital was necessary. Thus, we mean a broken leg (hospital admission) or a concussion but not a small cut or a thick ankle if no treatment by a physician was needed.'

It should be noted that the introduction mentions *being wounded as a result of a fight*, and fighting in itself is a form of deviant behaviour. Consequently, the formulation of the deviant behaviour scale introduces a small bias in favour of the hypothesis, as fighting and other forms of deviant behaviours are known to be related – see, among others Jessor and Jessor (1977), Robins and Wish (1977), Osgood et al. (1988), Elliott, Huizinga and Menard (1989), Osgood (1990), Rowe, Osgood and Nicewander (1990), Dembo, Williams, Wothke, Schmeidler, Getreu, Berry and Wish (1992), Jessor (1993).

There are several reasons, however, to think that this bias is probably relatively small. First, the deviant behaviour scale does not include fighting, and as a result there is no overlap between the operationalisation of accidents and deviant behaviour. Second, additional information shows that most accidents are traffic accidents (31%), occur at school (14%), during sports (17%), at home (18%) or elsewhere (18%; total number of respondents with accidents: 298). Only a small minority of accidents, namely 2%, occurred in a disco or a bar. This last category is probably the most likely to include injuries because of fights.

Independent variables (see Appendix 2 for the exact wording of the questions)

(1) *Smoking in the family and by friends*

Two questions were asked about smoking: (1) by parents and (2) by friends.

(2) *Leisure time and opportunity*

Several questions were aimed at measuring the type of activities of the children. Factor analysis was used to find out whether types of leisure time were related to each other. Like Agnew and Petersen (1989), we did not find strong relations between the leisure time variables, and accordingly, no strong dimensions. However, using varimax and oblique as methods of analysis, two sets of variables appeared to be related enough to consider forming two scales. The first was formed by the variables which represent *conventional leisure-time activities*, namely helping one's parents, having a hobby, and reading, and loaded 0.42 or higher on this dimension. The second set was formed by the three variables measuring *passive forms of spending leisure time*, namely: watching TV, doing nothing and listening to music, and loaded 0.55 or higher. Each dimension explained about 15% of the variance, while no other explained more than 11%. The latter did not show meaningful combinations. Each scale

counts the number of variables for which respondents mentioned that they did these activities 'every day'. As there are three variables for each scale, the minimum score is 0 and the maximum score is 3. As the scales are not formed by strongly related variables, and the interest of this paper lies, among other things, in the strength of the relations of the distinctive activities spent during leisure time, the original variables will be used as well as the summary scales.

The remainder of the variables concerned activities unrelated among each other and are labelled *diverse activities spent during leisure time*. First, a question was asked about 'going out with friends (to the city centre, disco or snack bar, etc...)'. Respondents were also asked whether they participated in a sport and if they had a paid job. Answers on all these questions were scored on a five point scale ranging from each day, 4–6 times a week, 1–3 times a week, 1–3 times a month and (almost) never. Finally, a question was asked how many kilometres they had to cycle daily from home to school.

We would like to comment briefly on some of the *weaknesses* of the data collection used. It has been argued that random samples are not very well suited to find respondents with high deviance rates (Gottfredson & Hirschi, 1990, see also Elliott, 1994). Hirschi and Gottfredson (1993) argue that low self-control is distributed in a very skewed fashion in the general population and only a few subjects with very low self-control will appear in most unselected samples. Frequent truants, for example, are relatively likely to have been missed by the present survey as the data were gathered at school. As a result the variance on the mild deviance scale is likely to be smaller than in reality. A second problem is that the questionnaire was relatively short and contained only a few questions about deviant behaviour, as insight in deviance was not the main purpose of the study. Any valid attempt to rank order respondents according to their involvement in deviant behaviour, would require, for example, questions on more types of deviance, applying to a longer time range, and untruncated estimations about the frequency of deviant behaviours (Elliott & Ageton, 1985).

The study design will have influenced the present results, but limitations mentioned above probably did not lead to an underestimation of the number of individual deviant acts (see Appendix I). They may, however, have led to under-sampling of relatively deviant youths. In reducing the variance in the data, the strength of the real relations between variables is likely to have been weakened. Finally, it should be stressed again that this article is based on a secondary analysis and that we had to do the best we could with the available information.

RESULTS

The relationship between accidents and deviant behaviour

In Table 2 deviant behaviour is related to accidents overall and specific types of accidents. Results show that children who are involved in deviant behaviour are more likely to have been involved in accidents overall during the last 12

months. Only 16% of the children who scored low on the deviant behaviour scale were involved in accidents, as opposed to 34% of the children who scored high on this scale. Table 2 shows that this relationship also holds for traffic accidents and sports accidents, but not for accidents which happen at home or at school.

It is not clear from these data whether youngsters involved in deviant behaviour are behaving more dangerously when they take part in sport, or if they are involved in more dangerous sports. Kruissink (1988) finds support for the latter. The possibilities are not mutually exclusive and both might in part explain the relation between sport accidents and deviant behaviour. For accidents elsewhere there is a clear trend.

TABLE 2: Accidents and deviant and risky behaviour by type (%)												
Accidents	Smoking		Hashish		Alcohol use		Gambling		Vandalism		Shoplifting	
n =	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
	875	444	1143	171	823	490	1153	138	1154	141	1211	79
Traffic	5	9*	6	10*	5	9**	6	12**	6	9ns	6	9ns
School	3	6*	4	5ns	4	4ns	4	3ns	4	6ns	4	3ns
Home	3	6*	4	7ns	4	5ns	4	3ns	4	4ns	4	2ns
Other	5	6ns	5	7ns	5	6ns	4	8ns	4	9*	5	7ns
Selection: Sports accidents	4	6*	4	5ns	3	6**	3	12***	4	4ns	4	7ns
Total	19	30***	22	29*	19	29***	21	35***	22	29*a	23	23ns
Note: a $P = 0.06$; * $P = \leq 0.05$; ** $0.01 \leq P = \leq 0.05$; *** $P = \leq 0.001$												

For a more detailed analysis we also looked at the relations between each of the five types of accidents and each of six types of deviance (see Table 1). It appears that, of all the forms of deviance, smoking is the one which is consistently correlated with the five types of accidents. If one looks at the various forms of accidents, it seems that traffic accidents and sports accidents are most often related to various forms of deviance.

More specifically, traffic accidents are most strongly related to the use of alcohol and to gambling, as are sports accidents. Accidents overall are related to each of the separate deviance categories (smoking, hashish and alcohol use, gambling and vandalism), except shoplifting.

In a number of cases the relations are not significant but differences are in

the expected directions. It appears neither shoplifting nor vandalism are related to specific forms of accident involvement, with one exception; vandalism is related to *other accidents*. In contrast with this finding, a recent Dutch study reports a positive relation between traffic accidents and accidents generally on the one hand and with vandalism and property crime on the other (Junger et al., in press). We believe the absence of a relationship in the present research may be due to the fact that, usually, vandalism and property crimes are measured by several questions and scales are formed on the basis of a number of variables. As mentioned in section 3, participation in delinquency is probably best measured by taking into account participation in a broad variety of different delinquent acts. Participation in one relatively rare act is probably an insufficient measure. Maybe a similar line of reasoning could be followed for accidents. Accidents are even rarer events and are also clearly influenced by other than individual factors (bad weather, etc.; see Elander, West & French, 1993).

Within the group of respondents with accidents we investigated whether variables measuring aspects of the seriousness of the accident were related to deviant behaviour. We looked at how long ago the accident occurred, how many weeks of treatment were necessary, whether the respondent had to go to the hospital, whether he/she was still undergoing treatment for the consequences of the accident, the number of wounds, and number of treatment sessions. None of these variables was related to involvement in deviance. This finding does not correspond with results of Junger and Tremblay (1993) who, in a sample of 731 boys of low socioeconomic status in Montréal (Canada) found that the seriousness of the accident appeared to be related to the extent of involvement in delinquent behaviour. The relationship between seriousness of an accident and deviance thus remains unclear.

Background variables in relation to accidents and deviance

In a first step the analyses for all the independent variables were performed by comparing means of the continuous variable deviant behaviour (leading to *F*-tests), and by comparing percentages of involvement in the dichotomous variable accidents (through crosstabulation, leading to chi-square tests). The results (with the *n*, means and standard deviations) are reported below. The analysis was repeated for each type of accident separately. The results of these additional analyses generally confirm the findings presented here. For details we refer to Junger and Wiegersma (1994).

(1) Behaviour of family and friends

Table 3 summarises the information on the smoking habits of family and friends. The findings show that children involved in deviant behaviour are likely to come from an environment in which smoking is common. Deviant behaviour is associated positively with smoking by friends and smoking in

one's own family. This is in agreement with the well-documented fact that children exhibiting deviant behaviour tend to be associated with deviant friends. Almost every study looking at deviant children found that they tend to come disproportionately from relatively deviant families and that they tend to have relatively deviant friends (Rutter & Giller, 1983; Wilson & Herrnstein, 1985; Gottfredson & Hirschi, 1990; Junger, 1988, 1990, see also section 2). This finding can be explained by different theoretical approaches, such as the self-control theory and cultural deviance theories. To our knowledge accident researchers have not looked at this aspect of accident involvement. The present results suggest that a similar process operates to some extent for children involved in accidents. Children involved in accidents are more likely to have friends who smoke.

TABLE 3: Family and friends' behaviour related to deviant behaviour and to involvement in accidents; means and percentages

		Deviant behaviour		(high = deviant)	Accidents (yes)
Independent variables		n	Mean	SD	%
Friends smoke	No	802	0.6***	0.97	18***
	Yes	509	1.9	1.42	30
Smoking at home	Nobody	480	0.8***	1.10	21
	Someone	840	1.3	1.40	24
*P = ≤0.05; **0.01≤P≤0.05; ***P = ≤0.001					

*P = ≤0.05; **0.01≤P≤0.05; ***P = ≤0.001

(2) Leisure time

In the present study most of the leisure time variables were related to accidents and deviant behaviour. The results are presented in Table 4 and can be summarised as follows:

1. Children who *go out with friends a lot* are much more involved in deviant behaviour than children who do not go out often. These children are also more involved in accidents.
2. Having a *job* at age 13 or 15 is also related relatively strongly to deviance: the more often children work per week, the more often they are involved in deviance. Here too, the results are similar for accidents.
3. Children involved in *sports* score low on the deviant behaviour scale while children who are never involved score relatively high. There is no statistical indication that this relation might be non-linear, as is suggested by the fact that the mean score on the deviance scale is slightly higher in the category 'every day', in comparison with the next category, which is '4–6 times a week'. From the Scheffé test it appears that only the respondents who never do sports are relatively prone to deviance. Children involved in sports are also more involved in accidents. Not surprisingly, additional analyses show

that these children are relatively more involved in sports accidents, while there is no relation between sports and other types of accidents. Clearly an exposure factor influences the relationship between sports and accidents.

4. Finally, the *distance to school* is not related to deviant behaviour or to accident involvement. There seems to be a possible risk when one looks at the percentages (23% children with the shortest distance to school having accidents, compared with 32% for those with the longest distance to school), but even this non-significant trend does not apply to traffic or sports accidents. We could not find any correlate of distance to school which would enable us to explain the present findings.

TABLE 4: Diverse leisure-time activities, deviant behaviour and involvement in accidents; means and percentages

Independent variables		Deviant behaviour (high = deviant)			Accidents (yes)
		n	Mean	SD	%
Go out with friends	every day	74	2.4***	1.78	32*
	4-6 times a week	116	1.8	1.44	30
	1-3 times a week	407	1.6	1.40	26
	1-3 times a month	326	0.6	0.89	19
	never	375	0.6	0.87	19
Job	every day	79	1.7***	1.57	41***
	4-6 times a week	81	1.6	1.56	21
	1-3 times a week	235	1.4	1.38	25
	1-3 times a month	191	1.2	1.42	23
	never	687	0.8	1.10	20
Sports	every day	229	1.2**	1.36	31**
	4-6 times a week	238	1.0	1.24	28
	1-3 times a week	527	1.0	1.23	21
	1-3 times a month	84	1.3	1.37	22
	never	225	1.3	1.50	16
Bicycle distance to school and back	doesn't use bike	164	1.3 ns	1.42	19
	1-5 km	423	1.1	1.28	23
	5-15 km	349	1.1	1.30	23
	15-25 km	193	1.2	1.40	23
	25 km and more	127	1.0	1.32	32

Note: * $P \leq 0.05$; ** $0.01 \leq P \leq 0.05$; *** $P \leq 0.001$ Scheffé test sports; 3 and 5 differ

Of the three *passive forms of leisure time* two are very significantly related to involvement in deviant behaviour, namely doing nothing and listening to music (Table 5). There is a significantly weaker relationship with watching TV. The loss of power is almost certainly related to the fact that it is such a common activity – 87% of all children every day. The summary scale also

confirmed that the more children are involved in these passive forms of leisure time, the more they are involved in deviant behaviour.

Accident involvement is unrelated to passive forms of leisure time. However, when one considers the summary scale, there is a trend for children who score high on the passive forms of leisure time to be relatively more involved in accidents. Of the children scoring highest on the summary scale 27% were involved in an accident during the last year; among the children lowest on the scale this figure is only 12%. These findings suggest that the children frequently involved in passive forms of leisure time are relatively likely to be involved in an accident. This result is to some extent surprising. When one considers the importance of exposure as a cause of accidents, passive leisure-time activities might, at first glance, act as a protective factor. This finding suggests that individual characteristics related to those involved (or not involved) in passive leisure-time activities are important correlates of accident involvement, independent of exposure.

TABLE 5: Passive leisure-time activities related to deviant behaviour and involvement in accidents; means and percentages

Independent variables		Deviant behaviour		(high = deviant)	Accidents (yes)
		n	Mean	SD	%
Do nothing	every day	319	1.6***	1.59	26
	4-6 times a week	147	1.2	1.37	15
	1-3 times a week	306	0.9	1.07	23
	1-3 times a month	196	0.9	1.16	20
	never	326	0.9	1.20	24
Watch TV	every day	1140	1.1*	1.34	23
	4-6 times a week	115	0.9	1.15	17
	1-3 times a week	38	0.6	0.86	26
	1-3 times a month	3	0.3	0.58	0
	never	19	0.8	1.17	16
Listen to music	every day	1113	1.2***	1.33	24
	4-6 times a week	118	0.8	1.26	24
	1-3 times a week	40	0.5	0.91	15
	1-3 times a month	10	0.3	0.67	0
	never	31	1.1	1.27	10
Scale total passive leisure time	three every day	280	1.6***	0.81	27**
	two every day	732	1.1	1.16	23
	one every day	268	0.8	1.21	21
	none every day	46	0.5	1.61	12

Note: * Although the chi-square is not significant ($P=0.11$), the Mantel-Haenszel test for linear association was ($P=0.02$). * $P \leq 0.05$; ** $0.01 \leq P \leq 0.05$; *** $P \leq 0.001$

There is an inverse relation between involvement in more *conventional forms of leisure time* and deviant behaviour (Table 6). The more often children read, indulge in their hobbies or help their parents the less they are involved in deviant behaviour. Accident involvement, however, is unrelated to conventional activities.

In a final analysis all the dependent variables were related to deviance in a regression analysis and to accidents by using a logistic regression (Table 7). As the dependent variable 'accidents' is dichotomous, logistic regression analysis is preferable to an ordinary regression analysis (see Hosmer & Lemeshow, 1989). For reasons of comparability, a multiple correlation coefficient and the explained variance (squared multiple R) were computed for both dependent variables. Age and sex were included in the multivariate analysis in order to control for their effect on the dependent variables, as it appeared that both are related to deviance as well as to accident involvement.

TABLE 6: Conventional leisure-time activities related to deviant behaviour and involvement in accidents; means and percentages

Independent variables		Deviant behaviour (high = deviant)			Accidents (yes)
		n	Mean	SD	%
Read (book, newspaper)	every day	493	1.0***	1.28	24**
	4-6 times a week	222	0.9	1.29	20
	1-3 times a week	220	1.0	1.13	16
	1-3 times a month	163	1.2	1.34	25
	never	200	1.6	1.47	28
Hobby	every day	349	0.9***	1.22	24 P=0.06
	4-6 times a week	217	0.9	1.20	29
	1-3 times a week	268	1.0	1.17	20
	1-3 times a month	178	1.1	1.28	18
	never	273	1.6	1.54	21
Help parents	every day	545	1.0***	1.21	24
	4-6 times a week	306	1.0	1.24	23
	1-3 times a week	243	1.3	1.34	21
	1-3 times a month	102	1.3	1.44	18
	never	105	1.7	1.70	27
Scale total conventional leisure time	three every day	98	0.8***	1.07	27
	two every day	298	1.1	1.27	22
	one every day	497	1.0	1.27	24
	none every day	433	1.3	1.42	21

Note: * Mantel-Haenszel test for linear association non-significant $P > 0.38$
 * $P \leq 0.05$;
 ** $0.001 \leq P \leq 0.05$;
 *** $P \leq 0.001$

TABLE 7: Regression analysis predicting deviant behaviour and logistic regression analysis predicting accidents; B standard error

Independent variable	Regression analysis		Logistic regression*		
	Deviant behaviour (much)		Accidents (yes)		
	B	(s.e.)	B	(s.e.)	Exp (B)
Family and friends' behaviour					
1.Friends smoke (yes)	0.82	(0.07)***	0.72	(0.17)***	2.05
2.Family smokes (no)	-0.17	(0.07)**	-0.04	(0.16)	0.96
Leisure-time activities					
3.Going out (never)	-0.30	(0.03)***	-0.08	(0.07)	0.93
4.Sports (never)	0.02	(0.03)	-0.19	(0.06)**	0.82
5.Bicycle distance(>25 km)	0.06	(0.03)*	0.16	(0.06)*	1.17
6.Job (never)	-0.11	(0.03)***	-0.17	(0.06)**	0.84
Passive leisure time					
7.Watch TV (never)	-0.03	(0.05)	-0.19	(0.15)	0.83
8.Doing nothing (never)	-0.08	(0.02)***	0.02	(0.05)	1.02
9.Listening to music (never)	-0.02	(0.04)	-0.20	(0.13)	0.82
Conventional leisure time					
10.Read (book,newspaper)(never)	0.01	(0.02)	-0.02	(0.05)	0.99
11.Hobbies (tinkering,doing something pleasurable)(never)	0.08	(0.02)***	-0.08	(0.05)	0.92
12.Help your parents (never)	0.06	(0.03)*	-0.005	(0.06)	0.99
Demographic variables					
13.Age (old)	0.08	(0.02)***	-0.06	(0.06)	0.94
14.Sex (boy)	0.37	(0.07)***	0.28	(0.16)	1.32
Constant	0.60	(43)	0.96	(1.05)	
R (14 variables)(R ²)	0.61***	(0.38)	0.25***	(0.06)	
n	1120		1090		
Only leisure-time variables					
R variables (R ²)	0.51***	(0.26)	0.19***	(0.04)	
(Var 3 to Var 12 except Var 5)					
n	1195		1161		
Note: * Logistic regression results: (1) Initial log likelihood function: -2 Log likelihood: $\chi^2=1156.7$ (2) After inclusion of 14 independent variables: -2 Log likelihood: $\chi^2=1088.8$, df=1075, $P=0.38$. (3) Improvement: $\chi^2=67.9$; df=14; $P=0.000$. * $P\leq 0.05$; ** $0.001\leq P\leq 0.05$; *** $P\leq 0.001$					

The results show that, globally, the multivariate analysis confirms previous findings (Table 7). With respect to deviance, the most important difference is that, after controlling for the effect of the other dependent variables, listening to music is not a correlate any more.

For accidents too, the logistic regression generally confirms previous findings. However, there are some differences. Going out with friends is no longer

related to accidents when the effect of the other dependent variables is taken into account. On the other hand, the distance to be travelled by bicycle between home and school is related to accident involvement, which seems quite plausible but was not the case previously, in the cross-table analysis. Having to cycle a long route (more than 25 km) a day to go to school and back home increases the likelihood of accidents.

The relation between the background factors and deviance is relatively strong: the multiple R is 0.61 and the explained variance is 37%. A multiple regression analysis was also computed for accident involvement, in order to be able to compare the multiple correlations of both independent variables. The multiple correlation for accidents is 0.25 and the explained variance is 6%. It is clear that the relation between the background factors and accidents is weaker with the present variables. Reasons for this will be mentioned below.

In order to compare our results with previous research on deviance and leisure time presented by Agnew and Petersen (1989, p. 346) we also computed the multiple correlation with leisure-time variables only. As mentioned previously, Agnew and Petersen (1989) relate leisure-time variables to delinquent behaviour and find an explained variance of 6%. In the present study the prediction of deviance is much better with 26% of explained variance. For accident involvement this percentage is 4%.

SUMMARY AND CONCLUSIONS

The research addressed two questions

1. Is there a relation between deviant behaviour and involvement in accidents?
2. To what extent are the correlates of deviant behaviour also correlates of involvement in accidents?

Previously these questions had had little attention in the scientific community. The reason for this may be that each type of dependent variable belongs to different fields of research. As a result many investigators are not aware of the findings outside their own field. In addition most scientific work is organised in departments in which each study their 'own' dependent variable (crime, traffic or health). As a result it usually does not come to mind to include 'foreign' dependent variables in one's own research. Also, integration does not fit the way most of the research is funded. For the Ministry of Justice in The Netherlands it is not seen as useful to include traffic accidents in their research on crime: traffic accidents are the responsibility of another department. Similarly, other departments (such as the Departments of Traffic or Health) are usually not interested in crime. Finally it did seem to the authors that researchers outside criminology do not always like to associate 'their' variables with criminal behaviour. Although reasons for this lack of interest sometimes remain unclear (to a criminologist) they seem to think that including crime

will lead to associations of their work to politically sensitive issues (think for instance of the association between IQ and crime). In turn these associations with sensitive issues may lead to problems in the sphere of funding or questions regarding privacy rules (see also Petersen & Brown, 1994, for a similar discussion on child abuse and childhood injuries). It is interesting to note that many older studies did not stay so closely within the borders of their own disciplines as modern researchers do (for example, Tillmann & Hobbs, 1949; Glueck & Glueck 1950; Robins, 1966; West & Farrington, 1977).

With regard to the first research question the answer is affirmative. Involvement in deviant behaviour is related to accidents. The more children are involved in various forms of deviant behaviour, namely in smoking, soft-drug use, drinking, gambling, shoplifting and vandalism, the more they have been involved in accidents during the preceding year, particularly in sports and traffic accidents. Accidents were related to five of the six forms of deviance studied in this article (namely gambling, drinking, smoking, soft-drug use and vandalism). Seriousness of accidents appeared to be unrelated to deviance.

With respect to the second question, information on the following background variables has been considered: smoking by parents and friends, and various leisure activities.

A reason to investigate leisure-time activities is that the existing empirical research found relatively strong correlates of crime. However, not many studies systematically investigated their impact on accidents. For the study of the relation between crime and accidents leisure time seemed particularly relevant as it might provide indications as to how a possible relation between crime and accidents is originated, namely through exposure to similar, and probably relatively dangerous situations.

The answer to the second question is that there is an overlap among the correlates of accident involvement and deviant behaviour. For the sake of clarity it should be noted that we wished to investigate whether there are common correlates of crime and accident involvement. The theoretical relevance is that if this idea is supported by the data, this implies the possibility of a common aetiology. This line of reasoning does not imply that we think that the correlates which were studied in the present research should be considered as causes of crime or accidents. On the contrary we believe it is plausible that the dependent and the independent variables in the analyses presented above might result from a common causal factor, such as self-control (Gottfredson & Hirschi, 1990) or an antisocial personality (Robins, 1966).

The results can be summarised as follows. First, there are a number of variables which are the common correlates of deviance and accidents. They are: having friends who smoke, going out with friends, having a job at age 13 or 15 and being involved relatively often in passive leisure time. Children who have friends who smoke, go out a lot with friends, have a job which takes much time, and who are involved relatively often in passive forms of leisure time are more likely to be deviant and they are also more likely to be involved in accidents.

Second, almost all other independent variables, namely parents who smoke, reading, hobbies, helping parents, doing nothing, listening to music are related to deviance but are not related to accident involvement. Children with high levels of deviance are more likely to have parents who smoke. In addition they never read, do not engage in a hobby, do not help their parents, and they 'do nothing' relatively often.

One variable which seems unrelated to both dependent variables is watching TV, but as almost everyone does this, this in itself proved not to be a very sensitive variable. More detailed study of the length or nature of viewing might still be rewarding.

Fourth, it is noteworthy that the impact of sports on accidents is opposite to its effect on deviant behaviour. This is, however, perhaps unsurprising since sporting activities may be both a sign of commitment to a social and socialised group but also a measure of exposure to physical injury.

For jobs, a similar line of reasoning might be developed, but here the direction of the effect is in both cases the same. For children, having a job can be considered as a lack of commitment to educational and other conventional goals (Hirschi, 1969). With respect to accidents, having a job might imply more time spent in traffic. This suggests that the lifestyle associated with deviance increases the time of exposure to accidents. The question which remains to be answered is what kind of work children do. More specifically, do they perform dangerous work which increases their likelihood of accident or is it work which decreases exposure?

Exposure or differences in behaviour?

We found evidence for differences in exposure and/or opportunity, and differences in propensities for both deviance and accident liability among children.

For *deviance* the results are in line with previous work which found relatively strong relations between all kinds of measures of leisure-time activities and deviance. The results are in line with the idea that differences in exposure between children may lead to differences in crime. For example going out leads to more situations in which deviance is easier than at home (for example, gambling). On the other hand there is evidence of differences in behaviour, or, in other words, difference in the propensity to commit crimes. Participation in some activities, such as jobs, reduces the time children can spend in leisure-time activities. However, the more children work, the more they are involved in deviance.

A number of findings point to exposure effects in relation to *accidents*. As mentioned above, some aspects of leisure time do probably increase the exposure to dangerous situations.

As may be expected the more often children engage in sports and the longer the distance they have to cycle the more often they mentioned having been involved in an accident – this was the case only in the multivariate analysis.

However, there are also indications that there may be differences in accident liability between accident and non-accident children. For example: the fact that friends who smoke is the most important correlate of accidents suggests that the type of children getting involved in accidents may have other characteristics, such as a relatively dangerous behaviour in similar situations. Another finding supporting differences in accident liability is the role of passive forms of leisure-time activities. Involvement in these passive forms of leisure time might be expected, at first glance, to act as a protective factor for accidents by reducing the exposure to dangerous situations. The finding that youngsters who are strongly involved in passive forms of leisure time do not have less but more accidents suggests they have individual characteristics which may lead to accidents in other ways than through exposure, for example through relatively dangerous behaviour. As this finding was on the limit of statistical significance it should be treated with caution. However, it may have important theoretical implications. Gottfredson and Hirschi (1990) point out that delinquents are more involved in withdrawal behaviour, which, according to them, undermines the idea of sensation seeking as a cause for crime. Similarly, the fact that involvement in passive forms of leisure-time activities correlates with an increase in accidents does not support sensation seeking as a cause for differences in accident liability. All in all, there is evidence for both individual differences in the tendency to commit crimes and accident liability as well as evidence for opportunity and exposure effects.

The overall relation between the background factors and accidents is weaker than that between the background factors and mild deviance. Junger and Tremblay (1993) draw the same conclusion and mention a number of reasons for this finding which also hold true for the present research:

1. The present data do not include information on whether or not the child bears (some) responsibility for the accident. Accidents which involve a particular child can be the result of deviant behaviour of another child or an adult. Not all accidents which happen to individuals are the result of risks taken by themselves. Elander, West and French (1993, p. 282) mention that, when one considers accidents for which the individual can be held responsible (because of driving too fast or drinking alcohol), associations between individual characteristics and accident involvement become much stronger. Future research should try somehow to measure the extent of responsibility in getting involved in an accident.
2. To understand the relationship between accident and individual characteristics more detailed information is needed. For example, more information may be needed on time spent outside, the type of sports one is involved in, and on opportunity aspects related to the home situation.
3. The present study could not address specifically the separate contributions of exposure versus behavioural differences in the relation between deviant behaviour and accident involvement. Knowledge of these intermediate

processes may lead to stronger relations between the various concepts. Future studies should try to disentangle the effect of both processes.

4. The present sample had a restricted range with respect to deviant behaviour, as a result of the fact that the data were collected among school children. Future studies should certainly try to measure deviance more extensively.

These cautionary notes signify that the present analyses probably underestimate the relation between deviant behaviour and accidents and between the background factors and accidents. But, in addition to this, it is also plausible that accidents will always be more difficult to predict than involvement in deviant behaviour as many situational factors, which are in part beyond the grip of individual studies, influence the occurrence of accidents. As a result, it is not surprising that the relations between leisure time and accidents are weaker than the relations between leisure time and deviance.

The present findings do have implications for theories on crime and for accident research. These results are in line with the self-control theory (Gottfredson & Hirschi, 1990). The self-control theory predicts that lack of self-control will be associated with deviant behaviour and with the likelihood of accidents. Although the present results have an exploratory character they can be seen as supporting self-control theory.

The results also support the anti-social-personality concept of Robins (1966) and are not in contradiction with Suchman's (1970) idea that social controls are important as a way of protecting people from harming themselves. Possibly, within the same line of reasoning these results are also compatible with Hirschi's (1969) formulation of social control theory.

A question we would like to raise is whether our results are compatible with explanations which focus on risk-taking only (for example, Dahlbäck, 1990a, 1990b). This type of explanation seems to be less in line with the present results which show that passive forms of leisure increase the risk of accidents as well as deviance levels. As is the case with sensation seeking, passivity does not seem to fit with individuals whose main way to crime and accidents is risk-taking (or related concepts such as impulsivity). Our results are too tentative to say anything conclusive on this point. Future research should investigate more in depth the role of passive activities or withdrawal behaviour (see also Gottfredson & Hirschi, 1990).

Other theories on crime (subculture or strain) do not predict an association between crime and accidents. The extent to which they could accommodate this relation is unclear. In their original formulation, subculture and strain theory present an image of the offender which differs very much from the picture presented by the self-control theory (see Merton, 1967; Sutherland & Cressey, 1974). These versions might have problems in integrating the accidents-crime relation in their aetiology of crime.

Overall, it seems to us that theories which exclude the individual as a source of variation related to crime and declare that delinquents are function-

ing normally on the social and psychological level, will have difficulty in explaining a relation between accidents and crime.

Finally, the present findings may have policy implications. It could be argued that if the relations between accidents and deviant behaviour are empirically verified in other studies as well, health policies and crime prevention policies might share an interest in common background factors: crime prevention programmes and health policies will need, to a certain extent, to focus on the same youths.

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APPENDIX I: THE DEVIANCE SCALE

The mild deviance scale

The scale was formed by counting the number of items a respondent scored in category 1. It should be noted that the way the two questions on delinquency were asked is a bit unusual in the study of crime. For shoplifting and for vandalism the respondents were asked how many times per week or per month they would have committed this act. Usually, after a question which would sound approximately as follows 'have you ever stolen in a shop ...', the respondent would then be asked 'how many times this year..'. Despite this unusual wording the percentages of respondents admitting these two facts resemble the percentages obtained in other Dutch studies which use the traditional method of phrasing the question and investigated random samples: for vandalism, this study finds 11%, a random sample in The Netherlands finds 9% (Junger-Tas, Kruissink & van der Laan, 1992), an older random sample (12-24 years old) finds 14% (Rutenfrans & Terlouw, 1994). For shoplifting, this study finds 6%, a random sample in The Netherlands finds 7% (Junger-Tas, Kruissink & van der Laan, 1992), an older random sample (12-24 years old) finds 5% (Rutenfrans & Terlouw, 1994).

The variables used in the scale and their categories (and the number of respondents in each category) are listed below.

Smoking

0 =	never (541)
	once or twice in my life (333)
1 =	sometimes (152)
	used to smoke regularly (74)
	smokes regularly now (218)

Use of soft drugs

0 =	never (1143)
1 =	ever (85)
	during last month (86)

Frequency alcohol use

- 0 = *never* (551)
 less than once a month (272)
 1 = at least once a month (206)
 at least once a week (284)

Gambling

- 0 = (*almost*) *never* (1153)
 1 = each day (8)
 4–6 times a week (9)
 1–3 times a week (42)
 1–3 times a month (79)

Vandalism

- 0 = (*almost*) *never* (1154)
 1 = each day (20)
 4–6 times a week (19)
 1–3 times a week (24)
 1–3 times a month (78)

Shoplifting

- 0 = (*almost*) *never* (1211)
 1 = each day (13)
 4–6 times a week (13)
 1–3 times a week (19)
 1–3 times a month (34)
Cronbach alpha = 0.61