Sport and delinquency: an examination of the deterrence hypothesis in a longitudinal study

Dorothy J Begg, John D Langley, Terrie Moffitt, Stephen W Marshall

Abstract
Objective—To determine whether involvement in sporting activity in middle adolescence would deter delinquent behaviour in late adolescence.

Methods—Members of a longitudinal cohort study were interviewed at ages 15 and 18 years and, among other topics, were asked questions relating to involvement in physical activity and delinquent behaviour. Logistic regression models were used to examine the relation between sports involvement and delinquency at age 15 years and delinquency at age 18.

Results—After controlling for delinquent behaviour and psychosocial factors at age 15, females with moderate or high levels of sporting activity, and males with high levels of sporting activity, were significantly more likely to be delinquent at age 18 years than those with low levels of sporting activity. No significant association was found between sporting activity and aggressive behaviour, team sport participation and delinquency, and team sport participation and aggressive behaviour.

Conclusions—This study did not support the deterrence hypothesis and showed that high involvement in sporting activity, but not team sport, was associated with a subsequent increase in delinquent behaviour.

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Since the time of the ancient Greeks, sport has been an integral part of most societies. In ancient times it was believed that competitive sport provided an alternative to war as a place where "young people's aggressiveness could be channelled."1 In England in the mid-19th century sport became a form of social control in public schools, and was considered a substitute for poaching, vandalism, bullying, and drunkenness, which had previously been the main activity during boys' leisure time.2 In more recent times organised sport has been proposed as a possible panacea for juvenile delinquency.3

The notion that participation in sporting activity will moderate delinquent behaviour is often referred to as the "deterrence" hypothesis. It is considered that "sport builds character" and that by participating in organised sport, young people are exposed to strong conforming, rather than deviant, influences. They will thus internalise the norms and values of conventionality and become good citizens.4 The alternative hypothesis, which is sometimes referred to as the "athletic delinquent" hypothesis, has received much less attention. The basic premise of this hypothesis is that deviancy is the product of an individual's membership of, or contact with, certain organisational systems and that some sporting organisations may be considered examples of such systems. One example might be a team sport that exposes youth to the influence of older delinquents.5 Furthermore, it has been suggested that delinquent behaviour may actually be learned in sporting activity, because of the possibility of cheating in athletic contests.6

Over several decades the relation between sport and delinquency has generated considerable debate. Much of this debate has been conducted at a theoretical level7,8,9,10,11 but, because of the controversial nature of the subject, it has also been subjected to empirical evaluation.12 The results from empirical studies have generally supported the deterrence hypothesis and shown a negative relation between participation in sport and delinquent behaviour.12,13,14 The authors of some of these studies, however, have advised caution in the interpretation of their findings. For example, in an early study among high school students a negative relationship was reported between athletics participation and official court records of delinquency.10 While it was suggested by the author that this relation may have been due to the deterrent effect of sport activity on delinquent behaviour, it was also cautioned that it may have been due entirely to selection bias in their study. Schaefer suggested that maybe only conformers were attracted to the athletics programme and that anyone with delinquent tendencies did not participate in such programmes. A similar caution was issued by Landers and Landers13 who reported a negative relation between extracurricular activities, including sporting activities, and official court delinquency records among male high school students. Possibly the most consistent support for the deterrence hypothesis, however, has been provided by Segrave and colleagues.13,14 They conducted several studies in a variety of circumstances, and in each instance provided some further support for the deterrence hypothesis. In one study they showed that the negative relation between sport and delinquency also applied to younger (11-13 year old) adolescents.14 In a study of college students, Segrave and Hastad showed that a negative relation between sport activity and delinquency was strengthened when more...
serious offences, such as vandalism and physical assault, were examined among college students. Although the overall result in that study showed a negative relation between delinquency and sport participation, the authors also reported that the type of sport involved had more relevance to the relationship than the degree of participation. For example, participants in "highly publicised, physically aggressive team sports" were involved in more seriously antisocial delinquent acts than those who participated in relatively minor sports. In a later study Segrave et al examined the relation between delinquency and playing ice hockey and reported no significant difference between the ice hockey players and non-athletes and their involvement in total delinquent behaviour, but when more serious delinquent acts were examined, such as those of a physically violent nature, the ice hockey players reported more serious delinquency than the non-athletes. These findings suggest that involvement in physically aggressive sports may in fact increase participation in aggressive acts, rather than function as a "cathartic discharge for the aggressive impulse", as was suggested by Lorenz (cited by Segrave and Hastad, p105).

Many of the early studies of delinquency and sporting activity have been criticised because they did not include a variety of factors which may have the potential to confound this relation. These factors include age, race, gender, socioeconomic status, residential background, and the seriousness of the offence. Many of these issues were addressed by Segrave and Hastad and showed that the negative relation between sport and delinquency applied to both males and females, to white and minority students, to rural and small town youth, and to a lesser extent urban youth, and there was also a weak relation to high and low socioeconomic groups, but not the middle socioeconomic group.

In New Zealand, as in other countries, there is concern regarding the level of juvenile crime. In 1993, this situation prompted the suggestion from Mr John Banks, who was then Minister for both the police and sport portfolios, that organised sport could be the answer to this problem (Otago Daily Times, 2 July, 1993). To our knowledge no empirical studies in New Zealand have examined this question. The purpose of the present study was therefore to investigate the relation between delinquent behaviour and sporting activity in the New Zealand context, and thereby to provide empirical evidence to either support or refute the notion that involvement in sporting activity will deter delinquent behaviour.

Our study was part of a much larger study of the health, development, and behaviour of a cohort of young New Zealanders, known as Dunedin multidisciplinary health and development study (DMHDS). The members of the DMHDS have been assessed regularly since birth. Measures of delinquent behaviour and sporting activity have been included in several of the assessment phases of this study, notably when the cohort members were 15 and 18 years of age. In addition to this, a wealth of other information has been obtained from this cohort and from this information we were able to select psychosocial measures which should be included in a study such as this. An important advantage of the present study was the ability to examine longitudinally the relation between involvement in sport and delinquent behaviour. Previous studies have been mainly cross sectional and therefore have not been able to determine whether sporting involvement influenced delinquency, or vice versa. In the present study the main hypothesis we tested was that delinquents who have a high involvement in sporting activity in early adolescence will have lower delinquency rates in later adolescence compared to those who have low sporting involvement in early adolescence.

We also tested several additional hypotheses. Delinquency was examined in relation to team sport activity (a subset of all sporting activity), and aggressive behaviour (which is a subset of delinquency) was examined in relation to both sporting activity and team sport activity.

Methods
The DMHDS, of which this investigation was a part, is a longitudinal study of the health, development, attitudes, and behaviour of a cohort born at the only obstetric hospital in Dunedin, New Zealand, between 1 April 1972 and 31 March 1973. At the age of 3 years children were eligible to be included in the study if their mother still lived in the province of Otago. Of the 1139 who met this criterion, 1037 (91%) were followed up and assessed. Further assessments have been conducted at two yearly intervals through to 15 years of age, then again at 18 and 21 years. A description of the cohort and the study has been provided by Silva. The present study is based on data collected at the age 15 and age 18 assessments.

SPORTING ACTIVITY AT AGES 15 AND 18 YEARS
At the age 15 assessment, 799 cohort members were administered a modified version of the leisure time physical activity questionnaire (LTPAQ), and at the age 18 assessment 876 members of the cohort were also administered the LTPAQ. The LTPAQ was itself a modified version of the Minnesota leisure time activities questionnaire (LTA). The LTA is an interviewer administered questionnaire designed to evaluate energy expenditure in leisure time physical activity and has been validated for use in longitudinal studies. The principal modification to the LTA, for use in the present study, was related to the range of activities. These activities included school activities, competitive sports, and other activities taken for exercise or recreation. The list of sports and similar physical activities included aerobics, athletics, badminton, basketball, boating, bowls, cricket, cycling, dancing, fishing, football (Australian rules), golf, gymnastics, hang gliding, hockey, horse riding/equestrian, hunting, ice skating, jogging/running, lacrosse, martial arts, moto-cross, motor cycling, motor racing, mountaineering, netball, parachute jumping, polo, roller skating, rowing/sculling,
rugby union, rugby league, sailing, skiing (snow), soccer, softball/baseball, squash, surfing, swimming, tennis, touch rugby/sevens, trail biking, tramping (hiking), underwater diving, volleyball, walking, water skiing, weightlifting, and windsurfing. Details of the administration procedures and the results of the age 15 physical activity assessment have been presented elsewhere.14 Very briefly, details were obtained from each cohort member in respect of their involvement in sport or similar physical activities (hereafter referred to as sporting activity) in the preceding 12 months and from this information a total exposure measure in minutes of sporting activity per annum was calculated. As we were interested in comparing the effect of high levels of sporting involvement with low levels of involvement we classified those with scores in the highest tertile as the high exposure group, the middle tertile the moderate exposure group, and the lowest tertile the low exposure group. The cut off points were gender specific.

From the sporting activity information we also identified involvement in team sports. A team sport was defined as a sport which could not be played without other team members and included the following sports: Australian rules football, baseball, basketball, cricket, hockey (grass, ice, and underwater), lacrosse, netball, rugby union, rugby league, soccer, softball, volleyball, water polo, touch rugby (7’s), and North American football. The groups for team sport activity were also selected based on the gender specific tertile scores giving a high, moderate, and low exposure group.

**SELF REPORTED DELINQUENCY (SRD) AT AGES 15 AND 18 YEARS**

One of the interviews at the age 15 assessment was the SRD interview. This contained 29 items that tapped what could be considered the more serious illegal behaviours (for example, shoplifting, auto theft, burglary, fighting with a weapon), with trivial “norm violation” items not included. The reporting period was the past year, and a “variety” score was used. The variety score, which indicated how many of each of the 29 illegal acts had been committed in the past year, is less skewed than frequency counts and has been found to be a very reliable predictor of future antisocial outcomes.15 A full description of the age 15 self report delinquency assessment was given by Moffitt and Silva in 1988.20 For the present study the delinquent group was defined as those with a gender specific delinquency score in the upper quartile, and the remainder were considered the non-delinquent group. These groups were gender specific.

At age 18, self reports of delinquency were obtained for 930 cohort members using a standardised questionnaire which inquired about 43 offences, and how many times the young person had committed the offence during the past year. A detailed presentation of the age 18 self report delinquency data was provided by Moffitt et al in 1994.21 At age 18, a variety score indicated how many of 43 different illegal acts were committed at least once during the past 12 months. As for age 15, those with gender specific scores in the upper quartile were classified as delinquent, and the remainder as non-delinquent.

**AGGRESSIVE BEHAVIOUR AT AGES 15 AND 18**

Aggressive behaviour is a subset of the self report delinquency scale comprising only those behaviours which were deemed to be aggressive: set fire to a building, hit a parent/partner, fought an officer, fought on the street or in a public place, used force or threats to get money from a person, used a weapon in a fight. The aggressive behaviour score is a frequency count of the number of times each of these behaviours was performed in the previous year. Aggressive behaviour at age 15 was classified as having performed at least one aggressive act, which for the females was those in 89th percentile or above, and for the males, the upper quartile. The same cut off points were used to define the aggressive groups at age 18.

**PSYCHOSOCIAL MEASURES AT AGE 15**

At age 15, a series of questions was included in the mental health assessment from which a social competence index (SCI) was constructed.22 Two of the items in the SCI measure attachment to family and attachment to friends. Another two items measured involvement in school and involvement in spare time activities (such as belonging to clubs, groups, etc). One item measured dealing with problems and the extent of the social support network, and another item was a measure of self perceived strengths. The final item inquired about part time work. All of these items were scored as 0 for low score, 1 for medium score, or 2 for high score, except for part time work, which was scored 0 for no work, and 1 for work. For the SCI the item scores were summed giving a range of 0-13. Those individuals with scores in the 0-8 range (18%) were selected as having poor social competence and the remaining 72% with scores 9-13 were considered to have good social competence.23 At the age 15 assessment, six sociodemographic background measures were obtained from a parent and combined to form a family adversity index (FAI).24 The six measures were: family socioeconomic status (SES), family size, parental separations, solo parenting, perceived family social support, and maternal mental health. A high score on the FAI indicated an increased risk of family adversity. One further measure we included was a word recognition test which was considered to be a measure of reading ability, and an indirect measure of educational attainment.24 Those individuals with scores below the gender specific mean for the age group were classified as poor readers, while those with scores above the mean were classified as adequate/good readers.

**MISSING CASES**

In this study the sporting activity data were obtained only from the cohort members who attended the research unit for assessments,
whereas the delinquency questionnaire was administered to those who attended the unit as well as those who were unable to attend the unit for a variety of reasons (for example, lived outside New Zealand or were in prison) but still wished to participate in the assessment. The cases with incomplete data were not included in the analyses. However, a comparison of the delinquency scores for those with and those without sporting activity data was done to see if these two groups differed significantly in respect of their delinquent activity. This comparison showed no significant difference between these two groups, and therefore the missing cases do not appear to have affected our results.

### Statistical Analyses

The statistical analyses were conducted using SAS Version 6.08.28 Logistic regression models are often employed to model a binary outcome, and in this study it was used to model the risk of delinquency and aggression at age 18 years. The odds ratios produced by the model will estimate, in this case, the increase in the risk of delinquency (or aggressive behaviour) associated with each of the explanatory variables. Unadjusted odds ratios measure the effect of each of the explanatory variables on the outcome variable. Adjusted odds ratios measure the effect of each explanatory variable on the outcome variable, adjusted for all the other variables included in the model. For sporting activity and team sport activity, indicator variables were constructed with the lowest level of involvement set as the reference group. Psychosocial factors were also included in the model to control for potential confounding effects and for each of these the group considered to be at the least risk of delinquency/aggression was set as the reference group. For example, for the reading measure those with scores average or above average were the reference group. The goodness of fit for the logistical model was assessed using the test statistic proposed by Hosmer and Lemeshow.28

### Results

Because of the differences between males and females in respect of the levels of sporting activity, team sport participation, and delinquent and aggressive behaviour, the following results are presented by gender.
Table 3  The association between aggressive behaviour, sporting activity, and psychosocial measures at age 15 years, and subsequent delinquent behaviour at age 18

<table>
<thead>
<tr>
<th>Explanatory variables age 15</th>
<th>Males Unadjusted OR (95% CI)</th>
<th>'Adjusted OR (95% CI)</th>
<th>Females Unadjusted OR (95% CI)</th>
<th>'Adjusted OR (95% CI)</th>
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<tbody>
<tr>
<td><strong>Aggressive behaviour</strong></td>
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<td></td>
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<tr>
<td>Low</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
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</tr>
<tr>
<td>High</td>
<td>3.1 (1.9-4.8)*</td>
<td>2.7 (1.6-4.6)*</td>
<td>3.4 (1.7-6.7)*</td>
<td>2.7 (1.2-6.1)*</td>
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<td>Level of sporting activity</td>
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<td>1.0</td>
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<tr>
<td>Medium</td>
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<td>1.4 (0.8-2.5)</td>
<td>0.9 (0.4-1.8)</td>
<td>0.9 (0.4-1.8)</td>
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<tr>
<td>High</td>
<td>1.4 (0.8-2.5)</td>
<td>1.4 (0.8-2.5)</td>
<td>0.9 (0.4-1.8)</td>
<td>0.9 (0.4-1.9)</td>
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<tr>
<td>High</td>
<td>2.0 (1.2-3.3)*</td>
<td>1.8 (1.0-3.5)</td>
<td>1.8 (1.0-3.3)</td>
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<td>Family adversity</td>
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<tr>
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<td>0.8 (0.4-1.9)</td>
</tr>
<tr>
<td>Reading score</td>
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<td>1.0</td>
<td>1.0</td>
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<tr>
<td>High</td>
<td>1.5 (1.0-2.3)</td>
<td>1.5 (0.9-2.5)</td>
<td>1.0</td>
<td>1.1 (0.6-1.9)</td>
</tr>
</tbody>
</table>

*P < 0.05.
*Reference group.
'Adjusted for all other variables in the model.

Table 4  The association between aggressive behaviour, team sport activity, and psychosocial measures at age 15 years, and subsequent delinquent behaviour at age 18

<table>
<thead>
<tr>
<th>Explanatory variables age 15</th>
<th>Males Unadjusted OR (95% CI)</th>
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<td><strong>Aggressive behaviour</strong></td>
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<tr>
<td>Low</td>
<td>1.0</td>
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<tr>
<td>High</td>
<td>3.0 (1.9-4.8)*</td>
<td>2.8 (1.7-4.7)*</td>
<td>3.4 (1.7-6.7)*</td>
<td>2.6 (1.2-5.9)*</td>
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<tr>
<td>Level of team sport activity</td>
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<tr>
<td>Low</td>
<td>1.0</td>
<td>1.0</td>
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</tr>
<tr>
<td>Medium</td>
<td>1.2 (0.7-2.0)</td>
<td>1.3 (0.7-2.3)</td>
<td>0.5 (0.3-1.1)</td>
<td>0.6 (0.3-1.2)</td>
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<tr>
<td>High</td>
<td>0.9 (0.5-1.6)</td>
<td>1.1 (0.6-1.9)</td>
<td>0.8 (0.4-1.6)</td>
<td>0.8 (0.4-1.7)</td>
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<tr>
<td>Social competence</td>
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<td>Low</td>
<td>1.0</td>
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<tr>
<td>High</td>
<td>2.0 (1.2-3.3)*</td>
<td>1.8 (0.9-3.3)</td>
<td>1.8 (1.0-3.3)</td>
<td>1.5 (0.7-3.2)</td>
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<tr>
<td>Family adversity</td>
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<tr>
<td>Low</td>
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<tr>
<td>High</td>
<td>1.4 (0.8-2.4)</td>
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<td>0.8 (0.3-1.9)</td>
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<tr>
<td>Reading score</td>
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<tr>
<td>Low</td>
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<tr>
<td>High</td>
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<td>1.5 (0.9-2.5)</td>
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</tr>
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</table>

*P < 0.05.
*Reference group.
'Adjusted for all other variables in the model.

SPORING ACTIVITY AND DELINQUENT BEHAVIOUR

In this analysis we examined the relation between delinquent behaviour at ages 15 and 18 and the effect that sporting activity and other psychosocial variables had on this relation. Table 1 presents both the unadjusted and the adjusted odds ratios and 95% confidence intervals (CI) from this analysis. Firstly, the unadjusted results show that the odds ratio for being delinquent at 18 for males who were delinquent at 15 was 7.8 (95% CI, 5.0 to 12.22) and for females it was 4.1 (95% CI, 2.6 to 6.4). For the males, with the low sporting activity group as reference, the medium sporting activity group did not have an increased odds of delinquency at age 18, but those in the high sporting activity group at age 15 were 1.7 times more likely (95% CI, 1.0 to 2.9) to be delinquent at age 18. For the females, compared to the low sporting activity group, the unadjusted odds ratio for being delinquent at age 18 was 2.3 (95% CI, 1.3 to 4.3) for the medium sporting group, and 2.9 (95% CI, 1.6 to 5.3) for the high sporting group. Of the psychosocial factors measured at age 15, the unadjusted odds ratios show that only low social competence was significantly associated with delinquency at age 18, and this applied to both males and females.

After adjusting for the potential confounding variables, the results presented a similar pattern, with only slight increases or decreases in the magnitude of the associations. For example, the odds ratio for delinquency at age 18 decreased slightly for both males and females after adjustment for sporting activity and psychosocial factors at age 15. For sporting activity, however, the adjusted odds of delinquency at age 18 increased slightly compared to the unadjusted odds, although the pattern of statistical significance did not change, with the moderate and high levels being significant for the females but only the high level being significant for the males. After adjusting for all the other factors, none of the psychosocial factors reached a significant level of association, although low social competence came close to this.

TEAM SPORT PARTICIPATION AND DELINQUENT BEHAVIOUR

The results from the team sport participation and delinquency analysis are presented in table 2. The unadjusted odds ratios show that the level of involvement in team sport activity at
age 15 was not associated with delinquency at age 18. This finding applied to both males and females. After adjusting for all the variables in the model only delinquency at age 15 was associated with delinquency at age 18.

**SPORTING ACTIVITY AND AGGRESSIVE BEHAVIOUR**

In table 3 the unadjusted and adjusted odds ratios show that aggressive behaviour at age 18 was significantly associated with aggressive behaviour at age 15, but not with the level of sporting activity. Low social competence at 15 was also associated with aggressive behaviour at age 18, but this effect was reduced in the adjusted model.

**TEAM SPORT PARTICIPATION AND AGGRESSIVE BEHAVIOUR**

Table 4 presents the results from the examination of association between team sport participation and aggressive behaviour. These results are very similar to those presented in table 3 for sporting activity and aggressive behaviour.

**Discussion**

The results from this study do not support the deterrence hypothesis. The young people in this study who had the highest involvement in sporting activity at age 15 were more likely to be delinquent at 18, compared to those who had little involvement in sport at 15. This finding applied to both males and females and for the females the strength of this association increased as the level of sporting activity increased.

Although these results do not support the deterrence hypothesis, neither do they support the "athletic delinquent" hypothesis. The athletic delinquent hypothesis claims that deviancy is the product of an individual's membership of organisations, such as sporting organisations. It seems likely that these organisations would have a higher representation among team sports, rather than all sporting activity. Following from this, to support the athletic delinquent hypothesis we would have expected an increased involvement in delinquency for those with a higher involvement in team sport activity. Our findings, however, did not show this. We found no increase in either delinquency or aggressive behaviour for the participants in the team sports, which incidentally could also be considered the main high profile sports in New Zealand (that is, rugby union, netball, rugby league, cricket, basketball, soccer, and hockey). This finding, therefore, also appears inconsistent with that of Segrave and Hastad, who reported that participants in high profile sports had a higher involvement in delinquent behaviour, than those involved in minor sports.

The reasons as to why our findings do not support the findings from the earlier studies are not immediately apparent. The non-significant result for team sport activity may be because some of the team sports we included, which—although they are high profile sports—are not commonly perceived as "aggressive" sports (for example, cricket), whereas others are (for example, rugby union, rugby league). It may be that the inclusion of these "relaxed" non-aggressive team sports negated the effect of the more aggressive team sports, and hence the non-significant association with delinquent or aggressive behaviour. Classification of a sport as "aggressive" or "non-aggressive" is, however, subjective. For example, although cricket could be considered a non-aggressive sport, some activities observed on the cricket field, especially those of fast bowlers, are frequently referred to as aggressive acts. Furthermore, as cricket is a summer sport and rugby a winter sport, many members of our cohort - particularly males — played both sports. To separate out the individual effects of sport that may be considered aggressive from the sports that may be considered non-aggressive, and the combined effect of both, would require a larger sample than was available in the present study. Why those with a high involvement in general sporting activity at age 15 should have an increased involvement in delinquency at 18 is also not clear. The magnitude of this result was, however, quite small and clearly the best predictor of delinquent behaviour at age 18 was delinquent behaviour at age 15, irrespective of involvement in sporting activity.

In this study we chose to use self reported delinquent and aggressive behaviour rather than the court conviction records which were also available to us. The main reason for this is that conviction records indicate detection by police rather than delinquent acts, and therefore mix police behaviour with the behaviour of youth. As the vast majority of delinquent acts never result in a conviction, the official records indicate official delinquent status rather than delinquent acts. Self reported delinquency has also been shown to be both reliable and valid. Kreuger et al reported a correlation of 0.35 between self reported delinquency and court convictions at age 18 in the DMHDS. This is very high considering that court convictions only represent the tip of the delinquency iceberg. Self reports have, however, been criticised for including trivial items such as truancy from school. In this study this potential problem was addressed in two ways. First a variety score (that is, the number of different delinquent acts performed) was used and thus all delinquent acts were given equal weight. Second, to identify the individuals who could be considered at the top of the delinquency continuum, we selected only those with variety scores in the upper quartile as our delinquent group.

Other investigators have suggested that, because of differences in their psychosocial profiles, delinquents and non-delinquents differ substantially in the type of recreational pursuits they prefer. Conventional sports, which incorporate many aspects of the broader society (for example, rules, regulations, authority figures) may appeal to the non-delinquent, but for the delinquent, who by definition "violates the rules and norms of society", these activities offer little appeal. The more adven-
turous Outward Bound-type activities, which provide alternative coping strategies to problems of identity and personal adjustment, may provide a more attractive and effective means of helping the young delinquent.\textsuperscript{29}

The results from this study do not support the view that involvement in sporting activity is a panacea for delinquent behaviour; if anything they indicate that it may exacerbate the problem. However, this does not mean that sporting activity should be discouraged, as there are many other good reasons why young people should engage in such activity. To deter the young delinquent from continuing to engage in antisocial behaviour probably requires a range of strategies, and it would appear that recreational activities should take into account the specific needs and norms of the delinquent to have any chance of success.

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