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Intelligence in early adulthood and subsequent risk of assault: cohort study of 1,120,998 Swedish men

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Abstract

Objective—There is growing evidence of an association between low intelligence (IQ) and increased risk of assault. However, previous studies are relatively small, do not adjust for socioeconomic status, and have not examined method-specific assaults.

Method—Cox proportional hazards regression was used to explore IQ associations with assault by any means and by four specific methods in a large prospective cohort of 1,120,988 Swedish men. Study members had IQ measured in early adulthood and were well characterised for socioeconomic status in childhood and adulthood. Men were followed-up for an average of 24 years and hospital admissions for injury due to assault were recorded.

Results—16,512 (1.5%) men had at least one hospital admission for injury due to assault by any means during follow-up. The most common assault was during a fight (N=13,144), followed by stabbing (N=1,211), blunt instrument (N=352), and firearms assaults (N=51). After adjusting for confounding variables, lower IQ scores were associated with an elevated risk of hospitalisation for assaults by any means (Hazard ratio (95% confidence interval) per standard deviation decrease in IQ: 1.51 (1.49, 1.54)), and for each of the cause-specific assaults (fight: 1.48 (1.45, 1.51); stabbing: 1.68 (1.58, 1.79); blunt instrument: 1.65 (1.47, 1.85); and firearms: 1.34 (1.00, 1.80)). These gradients were stepwise across the full IQ range.

Conclusions—Low IQ scores in early adulthood were associated with a subsequently increased risk of assault. A greater understanding of mechanisms underlying these associations may provide opportunities and strategies for prevention.

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Keywords

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INTRODUCTION

There is evidence from longitudinal studies that lower intelligence (denoted IQ) in early life is associated with increased mortality.⁽¹⁾ Some cohorts⁽¹⁻³⁾ have only been followed into middle age, before chronic disease becomes prevalent, and many of the deaths are therefore due to external causes such as intentional (suicide) and non-intentional injuries (e.g. road accidents, falls, assaults).

Recent reports suggest that low IQ may be associated with an increased risk of homicide.^(4;5) These studies were based on large cohorts of men (968,846 men included in the current analyses⁽⁴⁾ and 14,537 men from the Vietnam Experience Study⁽⁵⁾); however, homicide is not a common cause of mortality and analyses were based on small numbers of deaths (191 and 21 respectively). Non-fatal assault injuries are more common and two studies have specifically looked at the role of IQ in determining assault risk. The first of these⁽⁶⁾ examined assault injuries in a cohort of 411 British males, recruited at age eight. Assault injuries between the ages of 16 and 18 were more than three times more common in males with a low non-verbal IQ at aged 8-10. The second study⁽⁷⁾ was based on 713 American males and females with IQ measured at age six and incidents of assaultive violence (n=161) recorded up to age 17, and reported a decrease in assaultive violence with increasing IQ. However, these studies were relatively small and were unable to examine method-specific assaults, which would offer more potential for aetiological insights. In addition, no adjustments were made for socioeconomic status (SES), an important candidate confounder given its correlation with IQ⁽⁸⁾ and its predictive capacity for homicide.⁽⁹⁾⁻⁽¹²⁾

The present study examines associations of IQ with hospital admissions for assault using a longitudinal cohort comprising an entire population of over one million Swedish men which is well characterised for SES. Study members were followed-up for an average 24 years and experienced more than 1,600 hospital admissions for assault. Owing to the superior statistical power offered by these data, we are uniquely able to examine the association of IQ with method-specific assaults (i.e. those due to fighting, stabbing, blunt instruments, or firearms).

MATERIALS AND METHODS

Study participants and record-linkage

The record linkage methods used to generate this cohort have been reported previously.^(13;14) Briefly, the cohort comprised all non-adopted men born in Sweden from 1950 to 1976 for whom both biological parents could be identified in the Multi-Generation Register. Using unique personal identification numbers we linked the Multi-Generation Register with the Military Service Conscription Register, Population and Housing Censuses records (1960, 1970, 1980 and 1990), the Longitudinal Database on Education, Income and Occupation

(1990-2004), the Cause of Death Register (1961-2006), and the National Hospital Discharge Register (1964-2006). This resulted in 1,379,531 successful matches. Study approval was obtained from the Regional Ethics Committee, Stockholm.

Conscription examination

The military service conscription examination involves a structured, standard medical assessment of physical and mental health, and cognitive function. During the years covered by this study, the law required this examination; only men of foreign citizenship or those with severe disability were excused. This dataset covers examinations from 15 September 1969 to 31 December 1994; procedures for measuring IQ started to change in September 1994 and were finalised in December of the same year. Average age at examination was 18.3 years (range: 16 to 25).

IQ was measured by four 40-item written subtests representing verbal, logical, spatial, and technical abilities.⁽¹⁵⁾ The verbal test measures knowledge of synonyms; respondents were required to determine the synonym of a given word from four alternatives. The logical test measures capacity to understand and apply instructions; verbally formulated instructions were given and respondents made markings on an answer sheet that fulfilled the conditions given by the instructions. Items from the spatial test depicted a plan drawing of an object in its pre-assembled, two-dimensional state; respondents were required to identify, from a series of drawings of fully-assembled, three-dimensional objects, which it represented. The technical test measures knowledge of chemistry and physics and implies the assessment of a component of general knowledge. All test scores, including a total IQ score derived from summing the subtest results, were standardized to give a Gaussian-distributed score between 1 and 9, with higher values indicating greater intellectual capacity. Despite the use of dissimilar methods, correlation coefficients between the subtest scores are high, and this reliability is supported by Cronbach's alpha values for the four subtests, derived from a separate study,⁽¹⁶⁾ of between 0.79 and 0.91. Moreover, in common with other studies, global IQ scores are associated with educational level,⁽¹⁷⁾ SES,^(18;19) height,⁽²⁰⁾ and risky alcohol use⁽²¹⁾ in the expected directions (Table 1), which provides confidence in the validity of these measures.

Childhood SES was based on the highest occupation of either parent, using census assessments in the 1960/70s in seven categories (non-manual (high); non-manual (intermediate); non-manual (low); farmers; skilled manual; unskilled manual; and other). Highest educational level (1990-2004) was also based on seven categories (<9 years of primary school; 9-10 years of primary school; secondary school (12 years); full secondary education; university (<3 years); university (3+ years); and PhD studies). We used the Population and Housing censuses records (1990) to ascertain adult SES coded as for childhood SES. Adult SES was based on own occupation for those men who had an occupational code and otherwise on household SES. Family disposable income in 1990 was obtained from the Longitudinal Database on Education, Income and Occupation. Questionnaire data on smoking and alcohol consumption were collected at conscription in 1969-70 for a subgroup (3%) of men. "Risky" use of alcohol was identified⁽²²⁾ from at least

one of: (i) consumption of 250+g 100% alcohol per week; (ii) ever consumed alcohol during a hangover; (iii) ever been apprehended for drunkenness; (iv) often been drunk.

Hospital admissions data

Hospital admissions data from 1969 to 2006 were based on the Swedish Hospital Discharge Register, which covered around a third of the Swedish population in 1970, rising to 71% in 1977, and 100% from 1987. The shortfall in the 1970s and 1980s was in counties of varying population density and socio-economic composition, and we have no reason to suppose that there was any systematic difference in the IQ-assault association between counties included and not included in the register during these early years. Admissions were coded according to the *International Classification of Disease* (ICD) versions 8, 9, and 10. We identified assaults by any means using ICD 8/9 codes(23;24) E960-E969 and ICD 10 codes(25) X85-Y09, Y87.1. We also examined assaults by specified means where there were 50 or more events. Four method-specific assaults were identified: (i) fight or brawl (ICD 8/9: E960 (excluding E960.1), ICD 10: Y04); (ii) stabbing (ICD 8/9: E966, ICD 10: X99); (iii) assault with a blunt instrument (ICD 8/9: E968.2, ICD 10: Y00); and (iv) firearms assault (ICD 8/9: E965.0-965.4, ICD 10: X93-95). Analyses are restricted to hospital admissions occurring after conscription.

Statistical methods

Associations between IQ and assaults were explored using Cox proportional hazards (survival) regression,(26) based on the timing of any assaults, having first confirmed that proportional hazards assumptions weren't violated. As all hospital admissions were included, men could have more than one assault recorded. The main analyses were based on the first incident of assault by any means or of method-specific assault. Thus, a man with two admissions for stabbing and one for firearms would contribute to (i) all assaults (first event), (ii) stabbing assaults (first stabbing event), and (iii) firearms assaults (only firearms event). Follow-up began on the date of conscription and ended on the earliest of: date of event, death, emigration, or 31st December 2006. Hazard ratios (HR) and 95% confidence intervals (CI) for assault by any means were calculated based on: (i) IQ in 9 categories; and (ii) a standard deviation (SD) decrease in IQ. Analyses of method-specific assaults were based on fewer events and HRs (95% CI) were computed for IQ in four groups (1-2, 3-4, 5-6, 7-9) to preserve statistical power. Associations of assault risk with the four IQ subtest scores were very similar. For brevity, the results presented here are based on the total IQ score.

All analyses were adjusted for age at conscription with additional analyses adjusting for potential confounding/mediating factors. Separate models were used to adjust for childhood circumstances, based on childhood SES and adult height (although under a large degree of genetic control, adult stature is an indicator of pre-adult sub-optimal nutrition, socioeconomic adversity and, possibly, psychosocial stress(27)), and adult SES. Multiply adjusted models also included conscription centre and year of birth. The effects of adjusting for education were examined separately, owing to its close correlation with IQ. Analyses are based on men with complete data.

It is possible that psychiatric illness at conscription might have impacted on performance in the IQ tests and on subsequent assault risk. The main analyses were therefore repeated excluding men with any pre-conscription hospital admission for psychiatric illness (ICD 8/9 codes: 290-319). Analyses were also repeated (a) excluding men with a hospital admission for assault or any injury prior to conscription and (b) in the subgroup with data on smoking and alcohol intake, with and without adjustment for smoking (smoker vs. non-smoker) and alcohol (risky use vs. not). Finally, our main analyses were based on the first assault during follow-up. However, among men who had a hospital admission for assault, 86% had only one admission, 11% had two admissions and 3% had three or more. We therefore repeated the analyses based on the total number of admissions for each type of assault using Poisson regression(26) for assault rates during follow-up. All analyses were carried out using Stata 8.2.(28)

RESULTS

Of 1,379,531 men in the original cohort, 1,120,988 (81.3%) had complete data on IQ, childhood and adult SES, and education and are included in the main analyses. The most common reason for exclusion was missing IQ (N= 213,861). Men with missing data had lower SES and educational attainment than those with complete data. The characteristics of the men included in our analyses are presented in Table 1. Men with lower IQ scores were shorter, less likely to have parents in a non-manual SES, less likely themselves to be in a non-manual SES or university educated, and more likely to be a smoker or to report risky alcohol use.

During an average follow-up of 24.2 years, 16,512 (1.5%) men had at least one hospital admission for assault compared with 1,557 (0.6%) of men excluded from the analyses. The most common form of assault was during a fight (N=13,144 (1.2%)), followed by stabbing assaults (N=1,211 (0.1%)). Blunt instrument and firearms assaults were comparatively uncommon (N=352 and 51 respectively) and there were fewer than 50 admissions for all other means of assault. The majority (85.7%) of men with an admission for assault by any means had only one, a further 11.0% had two admissions, and the remainder had three or more. The maximum number of assault admissions for an individual was 14.

HRs (95% CI) for assault by any means across 9 categories of IQ score are presented in Table 2 and Figure 1a. There was a marked stepwise gradient of increasing hazard with decreasing IQ score, with men in the lowest IQ group experiencing an eight-fold increase in assault risk compared to men in the highest IQ group. This corresponded to a 63% (95% CI: 61%, 66%) increase in hazard associated with a 1 SD (1.9 points) decrease in IQ score. Adjustments for childhood circumstances, adult SES, year of birth and conscription centre led to a small attenuation of effect (HR (95% CI) for 1 SD decrease in IQ: 1.51 (1.49, 1.54)). Adjustment for education had a rather larger effect (HR (95% CI) for 1 SD decrease in IQ: 1.44 (1.41, 1.46)). However, even after full adjustment for all potential confounding/mediating factors, evidence of an association remained, with a 1 SD decrease in IQ associated with a 33% (31%, 36%) increase in risk. The gradient of increasing hazard across all categories of IQ also remained marked, with a greater than three-fold increase in risk of assault by any means in men with lowest vs. highest IQ. Additional adjustment for family

income in men with available data (93.5% of those included in the main analysis) had no appreciable effect (HR (95% CI) for 1 SD decrease in IQ in men with family income data adjusted for SES and education vs. SES, education and income: 1.36 (1.33, 1.38) vs. 1.34 (1.31, 1.36)).

Table 3 shows associations of IQ in four categories with method-specific assaults. As before, individual adjustments for childhood circumstances and adult SES had a limited impact and results are presented (i) adjusted for age, (ii) multiply adjusted for all factors other than education, and (iii) multiply adjusted for all factors including education. In age-adjusted models, there were strong associations of increasing hazard with decreasing IQ for all method-specific assaults. The strongest associations were those with stabbing (HR (95% CI) for 1 SD decrease in IQ: 1.87 (1.76, 1.98)) and blunt instrument (1.86 (1.67, 2.07)) assaults and the weakest was with firearms assaults (1.42 (1.07, 1.86)), which was based on only 51 events. Adjustment for factors other than education somewhat attenuated these associations (e.g. HR (95% CI) for fighting associated with 1 SD decrease in IQ adjusted for age vs. all factors other than education: 1.60 (1.58, 1.63) vs. 1.48 (1.45, 1.51)). However, again, it was adjustment for educational achievement that had the greatest impact. After adjustment for all factors including education, HRs for fighting, stabbing and blunt instrument assaults were very similar with a 30-40% increase in hazard for each SD decrease in IQ and a more than two-fold increase in hazard in men with lowest vs. highest IQs (Figures 1b-1d). No conventionally statistically significant association remained for firearms assault after full adjustment, which is not unexpected given the small numbers on which the analysis was based.

Prior to conscription 8,646 (0.8%) men had a hospital admission for psychiatric illness, 2,406 (0.2%) had an admission for assault and 92,186 (8.2%) for injury from another external cause. Analyses restricted to men with no pre-conscription hospital admissions for psychiatric illness, assault or any external injury were almost identical to those based on the full cohort. Results from analyses based on the total number of hospital admissions for assault were very similar to those presented in Tables 2 and 3.

In a subgroup of 34,057 men with information on smoking and alcohol use, adjustment for these factors led to a small attenuation of IQ-assault associations (HR (95% CI) for assault by any means due to 1 SD decrease in IQ adjusted for age only: 1.67 (1.52, 1.82); adjusted for age and alcohol: 1.55 (1.42, 1.70); and adjusted for age and smoking: 1.59 (1.45, 1.74)). Similar attenuations were observed for associations with fighting and stabbing assaults; there were insufficient numbers of events to examine blunt instrument or firearms assaults.

DISCUSSION

In an analysis involving far larger numbers of subjects and events than any previous study, we observed strong, robust-to-attenuation, step-wise associations of increasing hospital admissions for assault with decreasing IQ score. The analysis of method-specific assault is novel and the strongest associations were those for stabbing and blunt instrument assault. Associations were somewhat attenuated by adjustment for childhood and adult SES but strong gradients remained across all categories of IQ score. Adding education to

multivariable models led to pronounced attenuation of all IQ-assault associations. However, in this dataset and others,(29) education and IQ are moderately to highly positively correlated. Adjustment for education is therefore debateable. On the one hand, substantial attenuation by education may signal a pathway through which IQ might operate to influence assault risk; on the other, IQ-education correlations raise issues of co-linearity and inclusion of education in multivariable models may result in over-adjustment.

Strengths and limitations

Our analyses are based on a cohort of over 1 million men, followed for an average of 24 years, and with IQ measured in early adulthood. The large sample size and long follow-up provide good statistical power and allow investigation of method-specific assaults. Assaults were identified from routinely collected hospital discharge data, meaning that only those severe enough to require admission are included. However, these injuries are likely to have the greatest impact in terms of morbidity, disability, and premature mortality. An additional potential problem with the use of hospital admissions data, is the possibility of bias if men with high or low IQ are less likely to seek medical help after an attack; however, as hospital treatment in Sweden is free of charge, we have no reason to suppose that there was any systematic bias of this type. Analyses were restricted to assaults occurring after conscription and it is possible that existing psychiatric illness or a head injury arising from a pre-conscription assault or injury might affect performance on IQ tests. If men with existing psychiatric illness or injuries prior to conscription were also more likely have subsequent assault injuries, this might explain the observed associations. In fact, analyses restricted to men with no pre-conscription admissions for psychiatric illness, assault or injury were almost identical to those based on the whole cohort, making these explanations highly unlikely. Finally, results are limited to men and provide no information on the effect of IQ on assault risk in women. There are known gender differences in assault risk, particularly with respect to method-specific assaults, but we have no reason to suppose that IQ-assault associations will differ between men and women.

Interpretation of observed associations

There are a number of plausible explanations(4), both artefactual and mechanistic, that may account for the observed associations, although these have yet to be investigated directly. One important factor is that higher IQ tends to correlate with higher SES and income, which is likely to result in a more favourable area of residence. Living in a poor area with higher crime rates and lower social cohesion may lead to a higher risk of assault and Cubbin et al(30) have suggested that these neighbourhood effects may be independent of individual circumstances. Although we adjusted for individual SES and educational achievement we had no information on neighbourhood characteristics.

It has also been hypothesised that low IQ is associated with a reduced perception of risk(4;31;32) meaning that individuals with low cognitive ability may be more likely to make risky decisions and place themselves in hazardous circumstances. In men with complete data, adjustment for smoking and risky alcohol use (proxy measures for risk-taking behaviour) somewhat attenuated associations, which provides some support for this view. Moreover, verbal skills are a strongly-associated domain of general intelligence(33) so that

lower IQ individuals may be less able to negotiate themselves out of potentially violent situations. We found no evidence that the verbal component of IQ was more strongly associated with assault risk than the other three subtests, although this does not necessarily preclude the explanation, as all four tests are strongly correlated. Direct investigation of this idea would require knowledge of the assault events and interactions that took place within them but these data were unavailable.

Another possible explanation is that the IQ of the assault victim is correlated with that of their attacker. In cases of homicide, the perpetrator is often known to the victim(34) and, in general, people tend to spend more time with individuals who are similar to themselves in IQ. There is evidence that the perpetrators of violent crimes have lower IQ scores than the general population(35;36) and perpetrators of non-violent crime.(37) We have no information on the assailants involved in the assaults and cannot investigate this hypothesis directly. However, the majority (80%) of our assaults occurred during a fight in which circumstance the roles of victim and assailant may overlap. In this case, the IQ-assault association may be a function of increased aggression or violent behaviour in the “victim” themselves.

Alcohol intoxication and illicit drug use may also have an important role in these associations. A recent study of 495 homicide autopsies in Australia(38) found evidence of alcohol or drugs in almost two thirds of all victims and in over 80% of those killed in a fight, the most common type of assault in our data. Lower IQ has previously been associated with higher levels of alcohol-induced hangovers (a proxy for binge drinking)(39) and with higher alcohol intake and drinking problems.(21) It has also been suggested(40) that low IQ and high alcohol intake may combine synergistically with respect to violent behaviour, the hypothesised mechanism being that, if alcohol induces violence by disrupting cognitive functioning, lower IQ individuals may be more vulnerable to this disruption. If this is so, then it could influence IQ-assault associations, particularly given the uncertainty around victim/assailant status. Alcohol intake was only available in a subgroup of men; in this group, adjustment for alcohol reduced the strength of IQ-assault associations but did not completely explain them.

An additional potential mediating factor is early exposure to violence in childhood. It has been hypothesised that children exposed to violence early in life, either directly as victims or indirectly as witnesses, have reduced cognitive function.(41;42) One explanation that has been mooted for this association is that childrens’ low IQ is inherited from lower IQ parents who are, in turn, more likely to behave violently. However, studies of community violence(43) and those that attempt to control for genetic influences(43;44) suggest that suppression of IQ in exposed children may be independent of parental IQ. Exposure to violence in childhood also increases the likelihood of aggression and violent behaviour later in life.(41;42) Although speculative, it is possible that these relationships may contribute to IQ-assault associations, and the hypothesis may be worthy of further investigation.

Conclusion

We have observed strong, step-wise associations of increased injuries from assault with decreasing IQ score and, although attenuated, these associations remain after adjustment for

childhood and adult SES and education. There are a number of plausible explanations for these associations, and different research designs will be required to investigate these directly. Similar results have been observed in only a few distinct populations and there is a need for further evidence of these associations and exploration of the specific mechanisms underlying them. Understanding such mechanisms may provide information to prevent some of these personal injuries.

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Abbreviations

IQ	Intelligence
SES	Socioeconomic Status
ICD	International Classification of Diseases
HR	Hazard Ratio
CI	Confidence Interval
SD	Standard Deviation

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Figure 1.

- a: Hazard ratio (95% CI) for assault by any means by IQ adjusted for (a) age (■) and (b) all factors including education (◆)
- b: Hazard ratio (95% CI) for fight or brawl by IQ adjusted for (a) age (■) and (b) all factors including education (◆)
- c: Hazard ratio (95% CI) for stabbing assault by IQ adjusted for (a) age (■) and (b) all factors including education (◆)
- d: Hazard ratio (95% CI) for blunt instrument assault by IQ adjusted for (a) age (■) and (b) all factors including education (◆)

Table 1
Characteristics of 1,120,988 men with complete data

	IQ score			
	1 or 2	3 or 4	5 or 6	7, 8 or 9
N with complete data on main confounders	105,455	277,427	448,394	289,712
Mean (SD) age at conscription	18.3 (0.6)	18.2 (0.6)	18.3 (0.6)	18.4 (0.6)
Mean (SD) height (mm) at conscription	177.3 (6.7)	178.4 (6.5)	179.4 (6.4)	180.4 (6.4)
N (%) parent in non-manual occupation	21,163 (20.1)	83,169 (30.0)	199,626 (44.5)	179,041 (61.8)
N (%) subject in non-manual occupation	7,839 (7.4)	42,475 (15.3)	116,381 (26.0)	118,439 (40.9)
N (%) university educated	3,598 (3.4)	31,953 (11.5)	147,592 (32.9)	195,064 (67.3)
N with data on smoking and alcohol ^I	3,568	9,264	12,212	9,013
N (%) non-smoker	1,126 (31.6)	3,131 (33.8)	4,893 (40.1)	4,826 (53.5)
N (%) no risky alcohol use	2,910 (81.6)	7,814 (84.4)	10,873 (89.0)	8,399 (93.2)

^I Smoking and alcohol data were only collected in a subgroup (3%) of men

Table 2

HR (95% CI) for the relation of IQ with assault by any means

IQ score ¹	N (assault / no assault)	Adjusted for age	Adjusted for age and childhood circumstances ²	Adjusted for age and adult SES	Multiple adjustment excluding education ³	Multiple adjustment including education ⁴
9	214 / 49,817	1.00	1.00	1.00	1.00	1.00
8	549 / 90,976	1.39 (1.19, 1.63)	1.37 (1.17, 1.60)	1.39 (1.19, 1.63)	1.35 (1.16, 1.59)	1.21 (1.03, 1.42)
7	1,159 / 146,997	1.81 (1.56, 2.09)	1.76 (1.52, 2.03)	1.78 (1.54, 2.06)	1.69 (1.46, 1.96)	1.36 (1.17, 1.57)
6	2,089 / 194,250	2.47 (2.14, 2.84)	2.36 (2.05, 2.72)	2.36 (2.05, 2.72)	2.20 (1.91, 2.54)	1.59 (1.38, 1.84)
5	3,571 / 248,484	3.46 (3.02, 3.97)	3.25 (2.83, 3.74)	3.17 (2.76, 3.64)	2.82 (2.45, 3.24)	1.86 (1.61, 2.14)
4	3,041 / 161,211	4.24 (3.69, 4.87)	3.94 (3.42, 4.53)	3.85 (3.35, 4.43)	3.49 (3.03, 4.02)	2.14 (1.86, 2.48)
3	2,607 / 110,568	5.33 (4.63, 6.12)	4.90 (4.26, 5.64)	4.71 (4.09, 5.42)	4.21 (3.65, 4.85)	2.49 (2.15, 2.87)
2	2,138 / 71,328	6.79 (5.90, 7.81)	6.18 (5.36, 7.13)	5.77 (5.01, 6.65)	5.11 (4.43, 5.89)	2.92 (2.52, 3.38)
1	1,144 / 30,845	8.15 (7.04, 9.43)	7.34 (6.33, 8.51)	6.61 (5.71, 7.66)	5.94 (5.12, 6.89)	3.30 (2.83, 3.84)
<i>P</i> ⁵		<0.001	<0.001	<0.001	<0.001	<0.001
SD decrease	16,512 / 1,104,476	1.63 (1.61, 1.66)	1.59 (1.57, 1.62)	1.55 (1.52, 1.57)	1.51 (1.49, 1.54)	1.33 (1.31, 1.36)
<i>P</i>		<0.001	<0.001	<0.001	<0.001	<0.001

¹ IQ scores are listed from high (9) to low (1)² Childhood SES and adult height³ Adjusted for age, conscription centre, year of birth, childhood SES, adult height, and adult SES⁴ Adjusted for age, conscription centre, year of birth, childhood SES, adult height, adult SES, and educational achievement⁵ *p* for trend across 9 categories of IQ

Table 3
HR (95% CI) for the relation of IQ with method-specific assault

IQ score¹	N (assault / no assault)	Adjusted for age	Multiple adjustment excluding education²	Multiple adjustment including education³
Fight or brawl				
7-9	1,569 / 288,143	1.00	1.00	1.00
5-6	4,543 / 443,851	1.93 (1.82, 2.04)	1.69 (1.59, 1.79)	1.36 (1.28, 1.45)
3-4	4,503 / 272,924	2.95 (2.79, 3.13)	2.45 (2.30, 2.60)	1.76 (1.65, 1.88)
1-2	2,529 / 102,926	4.40 (4.13, 4.69)	3.35 (3.13, 3.58)	2.27 (2.12, 2.44)
<i>p</i> ⁴		<0.001	<0.001	<0.001
SD decrease	13,144 / 1,107,844	1.60 (1.58, 1.63)	1.48 (1.45, 1.51)	1.32 (1.29, 1.35)
<i>P</i>		<0.001	<0.001	<0.001
Stabbing assault				
7-9	112 / 289,600	1.00	1.00	1.00
5-6	372 / 448,022	2.22 (1.80, 2.75)	1.94 (1.57, 2.40)	1.31 (1.05, 1.64)
3-4	435 / 276,992	4.08 (3.31, 5.02)	3.27 (2.63, 4.05)	1.79 (1.43, 2.24)
1-2	292 / 105,163	7.16 (5.76, 8.91)	5.09 (4.04, 6.40)	2.47 (1.94, 3.15)
<i>p</i> ⁴		<0.001	<0.001	<0.001
SD decrease	1,211 / 1,119,777	1.87 (1.76, 1.98)	1.68 (1.58, 1.79)	1.36 (1.28, 1.46)
<i>P</i>		<0.001	<0.001	<0.001
Blunt instrument assault				
7-9	33 / 289,679	1.00	1.00	1.00
5-6	112 / 448,282	2.18 (1.48, 3.21)	1.91 (1.28, 2.83)	1.35 (0.90, 2.03)
3-4	121 / 277,306	3.79 (2.58, 5.57)	3.03 (2.03, 4.52)	1.77 (1.16, 2.70)
1-2	86 / 105,369	7.05 (4.72, 10.53)	4.87 (3.19, 7.43)	2.54 (1.62, 3.99)
<i>p</i> ⁴		<0.001	<0.001	<0.001
SD decrease	352 / 1,120,636	1.86 (1.67, 2.07)	1.65 (1.47, 1.85)	1.37 (1.20, 1.55)
<i>P</i>		<0.001	<0.001	<0.001
Firearms assault				
7-9	5 / 289,707	1.00	1.00	1.00
5-6	20 / 448,374	2.60 (0.98, 6.94)	2.45 (0.91, 6.64)	1.56 (0.56, 4.34)
3-4	19 / 277,408	3.98 (1.48, 10.66)	3.67 (1.32, 10.22)	1.83 (0.63, 5.29)
1-2	7 / 105,448	3.82 (1.21, 12.03)	3.32 (1.00, 10.96)	1.46 (0.42, 5.06)
<i>p</i> ⁴		0.01	0.02	0.54
SD decrease	51 / 1,120,937	1.42 (1.07, 1.86)	1.34 (1.00, 1.80)	1.01 (0.73, 1.40)
<i>P</i>		0.01	0.05	0.94

¹ IQ scores are listed from high (7-9) to low (1-2)

² Adjusted for age, conscription centre, year of birth, childhood SES, adult height, and adult SES

³ Adjusted for age, conscription centre, year of birth, childhood SES, adult height, adult SES, and educational achievement

⁴ *p* for trend across 4 categories of IQ