

Childhood Mental Ability and Adult Alcohol Intake and Alcohol Problems: The 1970 British Cohort Study

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A widely accepted definition of intelligence (IQ) or mental ability is the ability to learn, reason, and solve problems.¹ Mental ability may influence health and related behaviors because of the potential for variable interpretation of health promotion advice by persons with differing mental ability.² If skills captured by mental ability tests (such as verbal comprehension and reasoning) are shown to be important in the successful management of a person's health behaviors, public health implications may include consideration of cognitive ability in the design of health promotion materials and in health professional–client interactions.³

In recent studies, mental ability has been linked to selected health behaviors. In extended follow-up of child cohorts, high childhood mental ability scores were associated with increased smoking cessation rates² and more health-favorable levels of smoking initiation,^{4,5} physical activity,⁶ and food intake in later life.^{6,7} With alcohol intake as the outcome of interest, mental ability has been shown to have an inverse association with age at onset of use,⁸ a U-shaped association with heavy intake (21 drinks/wk),⁹ and a null relation with hazardous levels of intake (500 g of pure alcohol/mo)¹⁰ and total amount.¹¹ These apparently discrepant findings may be partially explained by small sample sizes,^{10,11} highly selected samples,^{8,11} and differing definitions of outcomes.

Using data from the Aberdeen “Children of the 1950s” cohort, Batty et al. were able to examine, for the first time, the relation between mental ability and alcohol binge drinking, a pattern of consumption defined by peak intake on a single occasion as indexed by self-reported hangovers.³ They found that higher mental ability–scoring children had a reduced likelihood of alcohol-induced hangovers in middle age,³ an observation that is consistent with an inverse association between IQ and alcohol-related mortality seen in a group of Swedish military conscripts.¹² Given that alcohol problems are characterized by patterns of

Objectives. We examined the potential relation of mental ability test scores at age 10 years with alcohol problems and alcohol intake at age 30 years.

Methods. We used data from a prospective observational study involving 8170 members of a birth cohort from Great Britain born in 1970. Data included mental ability scores at age 10 years and responses to inquiries about alcohol intake and problems at age 30 years.

Results. After adjustment for potential mediating and confounding factors, cohort members with higher childhood mental ability scores had an increased prevalence of problem drinking in adulthood. This association was stronger among women (odds ratio [OR]_{1 SD increase in ability} = 1.38; 95% confidence interval [CI] = 1.16, 1.64) than men (OR_{1 SD increase in ability} = 1.17; CI = 1.04, 1.28; *P* for interaction = .004). Childhood mental ability was also related to a higher average intake of alcohol and to drinking more frequently. Again, these gradients were stronger among women than among men.

Conclusions. In this large-scale cohort study, higher childhood mental ability was related to alcohol problems and higher alcohol intake in adult life. These unexpected results warrant examination in other studies. (*Am J Public Health.* 2008;98:2237–2243. doi:10.2105/AJPH.2007.109488)

intense drinking,¹³ we hypothesized that higher mental ability scores would reveal a similar inverse relation with alcohol drinking problems. We used data from the 1970 British Cohort Study to test this previously unexamined hypothesis. These data also afforded us the opportunity to contribute to the sparse literature on mental ability and alcohol consumption.

METHODS

The 1970 British Cohort Study is an ongoing longitudinal study involving participants from 17 198 live births occurring to parents who resided in Great Britain between April 5 and 11, 1970.¹⁴ We used data from 1980 to 1981, when study participants completed cognitive ability tests at age 10 years,¹⁵ and from 1999 to 2000 when, at age 30 years, they responded to enquiries about their alcohol consumption and other health behaviors.¹⁶

Data Collected at the 10-Year Follow-Up

Testing of the children's mental ability took place in schools when the children were age 10 years; a teacher-adapted version of the British Ability Scales¹⁷ was used. There were

4 subscales: word definitions, word similarities, recall of digits, and matrices. A detailed description of the tests is provided elsewhere.^{6,7} Test results were scored by trained coders. Reliability of coding was monitored throughout the survey and found to be high.¹⁸ In keeping with previous reports on this data set,^{5–7} we carried out a principal components analysis of these 4 tests to establish the presence of a general cognitive ability factor (also known as *g*).¹⁹ For ease of interpretation, we transformed this score into an IQ-type score, with a mean of 100 and standard deviation of 15 (our index of mental ability). Information about current occupation and the educational attainment by both parents was collected during the interview with the child's parents. Social class of each parent was derived from current occupation using 4 categories (professional/managerial [highest], skilled nonmanual, skilled manual, and semiskilled/unskilled [lowest]), according to the 1980 Registrar General's Classification of Occupations.²⁰

Data Collected at the 30-Year Follow-Up

Information was collected by interview in the adult participant's home. As part of a

series of questions on health, enquiries were made about alcohol consumption and drinking problems. Participants were asked how frequently they had an alcoholic drink of any kind. Participants who said that they currently drank were asked to provide details of their alcohol intake during the last 7 days. All participants, apart from those who said they were

lifelong teetotalers, were asked to complete 4 items from the CAGE (cut down, annoyed, guilty, eye-opener) questionnaire about possible lifetime alcohol-related problems.²¹ These items are used to create a drinking problem scale, with each positive response given a score of 1: Have you ever felt you ought to cut down on drinking? Have people annoyed

you by criticizing your drinking? Have you ever felt bad or guilty about your drinking? Have you ever had a drink first thing in the morning (eye-opener) to steady your hands? The Cronbach α for the scale formed from these 4 items was 0.61, indicating moderate internal consistency for the CAGE questionnaire's total score. Scores of 2 or more positively endorsed items on this scale have been shown in community samples to indicate alcohol problems.^{22,23} Participants were also asked about their highest academic or vocational qualifications; these were subsequently coded into 6 categories (Table 1). Social class was derived from current occupation using the same 4 categories as for parental social class (Table 1). Participants were asked to provide information on their gross and net earnings from employment.

Statistical Analysis

Comparison of cohort members with and without complete data for potential confounding or mediating variables showed the relations of childhood mental ability score with adult alcohol intake and alcohol problems to be similar in the 2 groups. However, among men only, the association between childhood mental ability score and risk of alcohol problems tended to be somewhat stronger among those with complete social class data, both in childhood and currently, than among those with incomplete data. Therefore, to avoid the possibility of selection bias, we retained cohort members with incomplete data in the analysis by using mother's social class in place of father's social class if no father was present, and by creating an extra category for missing data within parental and current social class.

We used analysis of variance (ANOVA) and the χ^2 test to examine the relation between mental ability score and characteristics of the participants. ANOVA was also used to examine mean mental ability score according to frequency of drinking, alcohol units per week, and responses to the CAGE items. Alcohol units per week were categorized for men and women separately using cutpoints that reflected Great Britain guidelines during the period of data collection (>14 units/wk for women; >21 units/wk for men).²⁴

TABLE 1—Characteristics and Childhood Mental Ability Score of Study Participants, by Gender: 1970 British Cohort Study, 1980–1981 and 1999–2000

	Men		Women	
	No (%)	Mental Ability Score, Mean (SD)	No. (%)	Mental Ability Score, Mean (SD)
Parental social class^a				
Professional/managerial	1067 (27.0)	107.3 (14.1)	1177 (27.9)	106.0 (13.7)
Skilled nonmanual	378 (9.6)	104.6 (14.7)	373 (8.8)	101.3 (13.2)
Skilled manual	1495 (37.9)	97.7 (14.3)	1587 (37.6)	96.9 (13.9)
Semiskilled/unskilled	577 (14.6)	95.9 (14.8)	628 (14.9)	93.4 (14.1)
Unknown	431 (10.9)	98.3** (15.9)	457 (10.8)	97.3** (15.3)
Current social class				
Professional/managerial	1526 (38.6)	107.3 (14.2)	1442 (34.2)	106.1 (13.5)
Skilled nonmanual	486 (12.3)	102.5 (13.9)	1616 (38.3)	98.1 (13.1)
Skilled manual	1272 (32.2)	96.2 (13.5)	377 (8.9)	94.7 (14.6)
Semiskilled/unskilled	576 (14.6)	92.8 (14.5)	698 (16.5)	92.4 (14.3)
Unknown	88 (2.2)	96.7** (17.8)	89 (2.1)	85.6** (18.1)
Academic/vocational qualifications				
No qualifications	368 (9.3)	89.4 (14.1)	327 (7.7)	85.7 (13.7)
CSE or equivalent NVQ 1	313 (7.9)	92.0 (13.3)	334 (7.9)	90.9 (13.5)
O-level or equivalent NVQ 2	980 (24.8)	97.3 (13.7)	1340 (31.7)	96.7 (12.6)
A-level or equivalent NVQ 3	944 (23.9)	100.6 (13.7)	765 (18.1)	99.7 (13.3)
Degree or diploma or equivalent NVQ 4	1181 (29.9)	107.6 (14.1)	1312 (31.0)	105.8 (13.5)
Higher degree or NVQ 5	162 (4.1)	114.9** (12.3)	144 (3.4)	114.3** (12.3)
Annual gross earnings, £ per y, men/women				
≤14 350 / ≤7790	786 (25.3)	95.0 (15.6)	711 (24.6)	95.2 (13.6)
14 351–19 200 / 7791–13 188	758 (24.4)	100.9 (14.5)	736 (25.4)	97.9 (13.6)
19 201–26 000 / 13 189–19 200	799 (25.7)	102.8 (14.4)	746 (25.8)	101.6 (13.3)
>26 000 / >19 200	761 (24.5)	107.8** (13.8)	699 (24.2)	108.2** (12.9)
Marital status				
Married	1534 (39.2)	100.7 (14.7)	2068 (49.0)	99.6 (14.3)
Cohabiting	965 (24.6)	101.0 (14.5)	907 (21.5)	99.7 (14.4)
Single, never married	1278 (32.6)	101.0 (16.4)	1021 (28.3)	98.3 (16.0)
Separated/divorced	138 (3.5)	97.7 (15.4)	215 (5.1)	99.2 (14.1)
Widowed	7 (2.8)	105.6 (15.6)
Has children				
Yes	1293 (32.9)	98.1 (14.2)	2284 (54.0)	96.6 (14.3)
No	2637 (67.1)	102.0** (15.6)	1942 (45.9)	102.5** (14.6)

Note. CSE = Certificate of Secondary Education; NVQ = National Vocational Qualification. N = 8170 for all analyses except those including marital status (N = 8133), parenthood (N = 8156), and income (N = 5996).

^aDerived from mother's occupation if no father present, otherwise derived from father's occupation.

**P < .001, for heterogeneity between groups.

Ordinal logistic regression is a method of analyzing categorical data with more than 2 categories, where the categories are ordered in a natural way, such as “most of the time, sometimes, rarely, never.” It makes use of information about the ordering, producing a cumulative odds and assuming that the odds for each “cut-off” category are proportional (confirmed herein). We used ordinal logistic regression²⁵ to examine the relation of mental ability score at age 10 years and risk of drinking alcohol more frequently and having a higher weekly alcohol intake. We used binary logistic regression to examine the relation of childhood mental ability score and risk of ever having an alcohol problem according to the CAGE questionnaire (yes vs no). Throughout our analyses, odds ratios are expressed per 1 SD advantage (increase) in mental ability score and are shown for varying levels of adjustment. In these analyses, we conceptualized parental social class as a potential confounding variable, whereas current social class, educational attainment, being a parent by age 30 years, and income were regarded as potential mediating factors in the relation between mental ability and the alcohol outcomes. At the 30-year follow-up survey, 11 205 participants provided data on frequency of alcohol consumption, of whom 8170 (73%) also had data on mental ability score at the age of 10 years and were therefore included in our analyses.

RESULTS

Table 1 shows the characteristics of the 8170 participants (3948 men; 4222 women) according to their mental ability scores at age 10 years. As anticipated, mental ability scores at age 10 years were strongly associated with all markers of socioeconomic position across the life course. Mean IQ scores were higher in those participants whose parents were from more-advantaged social classes, in those who were currently in professional or managerial jobs themselves, in those who had attained higher-level academic or vocational qualifications, and in those with greater annual earnings. There was no statistically significant relation between mental ability score and current marital status

TABLE 2—Childhood Mental Ability Score and Adult Alcohol Outcomes (Including CAGE Questions), by Gender: 1970 British Cohort Study, 1980–1981 and 1999–2000

	Men		Women	
	No. (%)	Mental Ability Score, Mean (SD)	No. (%)	Mental Ability Score, Mean (SD)
Cut down				
No	2596 (66.6)	99.3 (15.1)	3426 (82.6)	98.5 (14.6)
Yes	1299 (33.4)	103.9 (15.0)**	722 (17.4)	104.1 (14.1)**
Annoyed				
No	3313 (85.0)	101.0 (15.2)	3878 (93.4)	99.5 (14.7)
Yes	583 (15.0)	100.2 (15.4)	271 (7.7)	99.6 (13.9)
Guilty				
No	3256 (83.6)	100.5 (15.2)	3828 (92.3)	99.1 (14.6)
Yes	640 (16.4)	102.5 (15.3)*	321 (7.7)	103.8 (14.5)**
Eye-opener				
No	3548 (91.1)	100.7 (15.2)	4074 (98.2)	99.5 (14.6)
Yes	348 (8.9)	102.2 (15.4)	75 (1.8)	100.4 (15.8)
Ever had alcohol problem (CAGE score \geq 2)				
No	3100 (79.6)	100.5 (15.1)	3814 (91.9)	99.1 (14.6)
Yes	795 (20.4)	102.2 (15.4)*	334 (8.1)	103.6 (14.3)**
Frequency of drinking				
Never had alcohol	52 (1.3)	94.3 (15.9)	73 (1.7)	90.7 (15.0)
Never nowadays	81 (2.1)	98.1 (13.4)	232 (5.5)	98.6 (14.5)
Less often	324 (8.2)	94.7 (14.7)	785 (18.6)	94.7 (14.9)
2 or 3 times per mo	442 (11.2)	98.5 (14.9)	678 (16.1)	97.9 (13.7)
Once a wk	788 (20.0)	98.2 (14.6)	986 (23.3)	98.3 (14.1)
2 or 3 days per wk	1570 (39.8)	102.8 (15.0)	1110 (26.3)	103.0 (14.0)
On most days	691 (17.5)	104.2 (15.3)**	358 (8.5)	105.7 (14.7)**
Alcohol units per wk, men/women				
None	262 (7.5)	96.7 (14.7)	437 (14.0)	98.3 (13.9)
1–10/1–7	795 (22.8)	100.8 (15.0)	1258 (40.2)	99.8 (14.3)
11–21/8–14	774 (22.2)	101.7 (15.6)	749 (23.9)	102.4 (14.1)
22–35/15–21	677 (19.4)	102.9 (15.0)	325 (10.4)	102.9 (14.6)
36–50/22–35	402 (11.5)	101.2 (14.6)	239 (7.6)	102.7 (12.7)
>50/>35	575 (16.5)	103.0 (15.1)*	122 (3.9)	99.9 (12.7)**

Note. CAGE = cut down, annoying, guilty, eye-opener. See the “Methods” section for details.
* $P < .01$; ** $P < .001$.

among men ($P = .11$) or women ($P = .13$), but participants who had children by the age of 30 years had a lower mean mental ability.

Table 2 shows mean mental ability score according to categories of the alcohol outcomes: frequency of drinking, alcohol units consumed per week, and problem drinking as indexed by CAGE. Of the 3895 men and 4148 women with a history of drinking alcohol who were asked the CAGE questions, 20.4% of men and 8.1% of women scored at least 2 points on the 4-item CAGE scale, suggesting

that they had experienced alcohol problems. Men and women who gave positive responses to the CAGE questions cut down and guilty tended to have a higher mean childhood mental ability score than those who gave negative responses to those items. Mean childhood mental ability score was higher among those whose aggregated CAGE responses were indicative of alcohol problems. A greater difference was evident among women (4.5 mental ability points) than among men (1.7 mental ability points).

In our analyses, 57.3% of men and 34.8% of women reported that they drank alcohol on at least 2 to 3 days per week. Information on weekly intake of alcohol was available for 3485 men (91% of those questioned about intake) and 3130 women (80% of those questioned). Of these, 47.4% of men and 21.9% of women were drinking in excess of recommended limits (21 units/wk for men, 14 units/wk for women). Among both men and women, frequency of drinking alcohol tended to increase with childhood mental ability scores. Men and women who said they drank on most days had the highest mean childhood mental ability score, whereas those who reported that they never had alcohol had the lowest mean mental ability score. We saw a similar pattern with alcohol intake, although, among women, IQ scores peaked in those reporting drinking 15 to 21 units in the preceding week, with a drop in mean IQ for those consuming more than 35 units. The relation of mental ability with frequency of drinking and alcohol units consumed per week was not monotonic for men and women.

Table 3 shows history of ever having alcohol problems (as indicated by CAGE score), frequency of drinking, and alcohol units consumed per week, according to current social class. Among women ($P=.005$) but not men ($P=.44$), we found a statistically significant association between current social class and alcohol problems. The proportion of women with a history of alcohol problems was highest among women from professional and managerial classes. Women and men from professional and managerial classes were more likely than were those from other social groups to report that they drank alcohol on most days. There were also statistically significant associations among both genders between current social class and the number of alcohol units consumed per week; among both men and women, the proportion of those who reported drinking no alcohol the previous week was lowest in the professional and managerial classes. The intake of more than 50 units of alcohol in the past week was somewhat more prevalent among men in unskilled or skilled manual occupations in comparison with those in professional or managerial employment. Similar patterns were evident among women. The relations

TABLE 3—Current Social Class and Adult Alcohol Outcomes, by Gender: 1970 British Cohort Study, 1980–1981 and 1999–2000

	Professional/ Managerial, No. (%)	Skilled Nonmanual, No. (%)	Skilled Manual, No. (%)	Semiskilled/ Unskilled, No. (%)	Unknown, No. (%)
Men					
Ever had alcohol problem (CAGE score ≥ 2)					
No	1215 (80.5)	379 (79.5)	1005 (79.8)	437 (77.6)	64 (74.4)
Yes	294 (19.5)	98 (20.6)	255 (20.2)	126 (22.4)	22 (25.6)
Frequency of drinking					
Never had alcohol	17 (1.1)	9 (1.9)	17 (1.3)	13 (2.3)	2 (2.3)
Never nowadays	28 (1.8)	4 (0.8)	28 (2.2)	14 (2.4)	5 (5.7)
Less often	86 (5.6)	37 (7.6)	125 (9.8)	63 (10.9)	13 (14.7)
2–3 times per mo	119 (7.8)	64 (13.2)	169 (13.3)	82 (14.2)	8 (9.0)
Once a week	270 (17.7)	104 (21.4)	278 (21.9)	118 (20.5)	18 (20.5)
2–3 days per wk	678 (44.4)	203 (41.8)	458 (36.0)	204 (35.4)	27 (30.7)
On most days	328 (21.5)	65 (13.4)	201 (15.8)	82 (14.2)	15 (17.0)**
Alcohol units per wk					
None	79 (5.7)	31 (7.1)	108 (9.8)	38 (7.8)	6 (8.8)
1–10	322 (23.1)	97 (22.3)	235 (21.3)	124 (25.6)	17 (25.0)
11–21	319 (22.9)	111 (25.5)	236 (21.4)	98 (20.2)	10 (14.7)
22–35	289 (20.8)	97 (22.3)	198 (17.9)	81 (16.7)	12 (17.7)
36–50	168 (12.1)	40 (9.2)	129 (11.7)	57 (11.8)	8 (11.8)
>50	215 (15.5)	59 (13.6)	199 (18.0)	87 (17.9)	15 (22.1)*
Women					
Ever had alcohol problem (CAGE score ≥ 2)					
No	1278 (89.8)	1480 (93.3)	347 (92.8)	631 (92.8)	78 (91.8)
Yes	145 (10.2)	106 (6.7)	27 (7.2)	49 (7.2)	7 (8.2)*
Frequency of drinking					
Never had alcohol	19 (1.3)	29 (1.8)	3 (0.8)	18 (2.6)	4 (4.5)**
Never nowadays	66 (4.6)	86 (5.3)	20 (5.3)	50 (7.2)	10 (11.2)
Less often	169 (11.7)	294 (18.2)	88 (23.3)	206 (29.5)	28 (31.5)
2 or 3 times per mo	191 (13.2)	271 (16.8)	76 (20.2)	131 (18.8)	9 (10.1)
Once a week	296 (20.5)	435 (26.9)	84 (22.3)	156 (22.4)	15 (16.9)
2 or 3 days per wk	493 (34.1)	401 (24.8)	78 (20.7)	116 (16.6)	22 (24.7)
On most days	208 (14.4)	100 (6.2)	28 (7.4)	21 (3.0)	1 (1.1)
Alcohol units per wk					
None	137 (11.5)	180 (14.9)	36 (13.6)	76 (17.9)	8 (17.0)
1–7	452 (38.0)	526 (43.6)	93 (35.2)	172 (40.6)	15 (31.9)
8–14	314 (26.4)	282 (23.4)	58 (22.0)	85 (20.1)	10 (21.3)
15–21	141 (11.9)	103 (8.5)	34 (12.9)	40 (9.4)	7 (14.9)
22–35	103 (8.7)	73 (6.1)	25 (9.5)	34 (8.0)	4 (8.5)
>35	41 (3.5)	43 (3.6)	18 (6.8)	17 (4.0)	3 (6.4)*

Note. CAGE is an acronym based on the 4 questions that comprise the inventory. See the "Methods" section for details. * $P < .01$; ** $P < .001$.

between parental social class, academic and vocational qualifications, and annual earnings and all 3 alcohol outcomes were very similar, among both men and women, to those described for current social class (data not shown).

Table 4 shows the relations between childhood mental ability score and adult drinking patterns and risk of alcohol problems; results for adult drinking patterns are presented as cumulative odds ratios across the alcohol categories. The relations between childhood

TABLE 4—Odds Ratios for the Relation of 15-Point (1 SD) Increase in Childhood Mental Ability Score With Alcohol Outcomes, by Gender: 1970 British Cohort Study, 1980–1981 and 1999–2000

	Ever Had Alcohol Problems, OR (95% CI)	Drinks Alcohol More Frequently, OR (95% CI)	Higher Weekly Alcohol Intake, OR (95% CI)
Men			
Total, No.	3070	3104	2807
Adjustments			
Unadjusted	1.13 (1.04, 1.23)	1.36 (1.29, 1.45)	1.11 (1.04, 1.19)
Parental social class	1.13 (1.03, 1.24)	1.34 (1.22, 1.40)	1.11 (1.04, 1.19)
Current social class	1.18 (1.07, 1.30)	1.27 (1.18, 1.36)	1.12 (1.05, 1.20)
Qualifications	1.13 (1.04, 1.24)	1.25 (1.16, 1.34)	1.12 (1.04, 1.20)
Has children	1.11 (1.02, 1.22)	1.33 (1.25, 1.42)	1.09 (1.02, 1.17)
Annual gross earnings	1.15 (1.03, 1.26)	1.35 (1.27, 1.44)	1.11 (1.05, 1.18)
All characteristics	1.16 (1.04, 1.28)	1.18 (1.10, 1.27)	1.12 (1.04, 1.20)
All, current drinkers only	1.16 (1.05, 1.29)	1.17 (1.08, 1.26)	...
Women			
Total, No.	2859	2896	2286
Adjustments			
Unadjusted	1.44 (1.24, 1.67)	1.54 (1.43, 1.66)	1.26 (1.16, 1.36)
Parental social class	1.42 (1.22, 1.65)	1.43 (1.32, 1.54)	1.24 (1.14, 1.35)
Current social class	1.35 (1.16, 1.59)	1.37 (1.27, 1.48)	1.23 (1.13, 1.34)
Qualifications	1.46 (1.24, 1.71)	1.38 (1.27, 1.49)	1.24 (1.14, 1.36)
Has children	1.36 (1.18, 1.58)	1.45 (1.35, 1.56)	1.21 (1.11, 1.31)
Annual net earnings	1.44 (1.24, 1.67)	1.48 (1.38, 1.58)	1.25 (1.16, 1.36)
All characteristics	1.38 (1.17, 1.64)	1.26 (1.16, 1.36)	1.21 (1.11, 1.33)
All, current drinkers only	1.38 (1.16, 1.64)	1.25 (1.15, 1.35)	...

Note. OR=odds ratio; CI=confidence interval.

mental ability score and risk of ever having alcohol problems (P for interaction term=.004) or drinking alcohol more frequently (P for interaction term=.043) differed between the genders. In univariate analyses, among both men and women, higher childhood mental ability score was associated with significantly increased risks of ever having alcohol problems (as indicated by a CAGE score of ≥ 2), drinking alcohol more frequently, and having a higher weekly alcohol intake. In general, individual control for markers of socioeconomic circumstances had little effect on the relation between childhood ability score and the 3 alcohol outcomes. Similarly, multiple controls for markers of socioeconomic position had little influence on the IQ-alcohol endpoint, with the exception of drinking alcohol frequently, where some attenuation was seen. We examined whether further adjustment for parental

education might influence the risk estimates, but it also had little effect (data not shown). We also examined whether the relation between childhood mental ability and alcohol problems varied according to strata of social class (childhood or current), educational qualifications, or earnings, but we found no statistically significant interactions. Restricting the analysis of alcohol problems and frequency of drinking to current drinkers had little effect on the multivariate-adjusted estimates of risk.

DISCUSSION

On the basis of a previous study from a different British cohort showing an apparent protective effect of high childhood mental ability scores against alcohol-induced hangovers in middle age,²⁶ we hypothesized a relation between high ability-test score in

childhood and a reduced risk of alcohol drinking problems in adulthood. The opposite relation was found: mental ability was positively associated with a history of alcohol problems, although this relation was nonlinear. In these analyses and those featuring alcohol intake as the outcomes of interest, associations with IQ were markedly stronger among women than among men.

A post hoc explanation for this effect could be that persons with greater cognitive abilities are more concerned with, and reflect more deeply upon, the potential health effect of alcohol drinking and so are more likely to respond positively to the CAGE items. The present data gave us an opportunity to investigate this. Two of the CAGE items could be regarded as capturing some aspects of self-monitoring of one's behaviors (cut down and guilty). Among women, the fully adjusted odds ratios (95% confidence intervals [CIs]) for responding positively to cut down, guilty, annoyed, and eye-opener were 1.31 (95% CI=1.16, 1.47), 1.37 (95% CI=1.16, 1.63), 1.09 (95% CI=0.90, 1.31), and 1.27 (95% CI=0.87, 1.87), respectively. Among men, the corresponding odds ratios were 1.29 (95% CI=1.18, 1.41), 1.10 (95% CI=0.99, 1.24), 1.02 (95% CI=0.91, 1.15), and 1.20 (95% CI=1.03, 1.39), respectively. There was therefore some mixed support for this suggestion of self-monitoring. Another explanation might be that success in the workplace requires, in some circumstances, a willingness to drink frequently and to excess in social situations. This obligation may particularly affect high-IQ scoring women attempting to succeed in traditionally male-dominated professions.

Previous Studies

A small number of studies have examined the relation between childhood mental ability and heavy intake of alcohol in adult life, revealing disparate findings, with inverse,⁸ U-shaped,⁹ and null^{10,11} associations reported. During revision of this article, a report appeared using data from another British cohort study that also examined the association between childhood IQ and problem drinking at age 53 years.²⁷ In this study, IQ was also positively associated with alcohol problems, although, unlike our findings based on a larger sample, this effect did not

appear to be differential according to gender. In the absence of any further studies, and mindful of the moderate-to-high correlation between mental ability and education²⁸—and indeed other markers of socioeconomic circumstances—we therefore draw on the rather modest literature linking socioeconomic position with problem drinking. When a history of alcohol problems (as indexed by CAGE) was the outcome of interest, the association with educational attainment was inconsistent: persons with more basic education have been found to be both more^{29–31} and less likely³² to report such problems.

Although we found a positive relation between mental ability and drinking problems among both genders that was stronger in women than in men, in a cohort of employed Finnish individuals, those women with higher educational attainment were more likely to report alcohol drinking problems, whereas, among men, the reverse was true.³³ It is plausible that the relation between education (or IQ) and alcohol drinking problems varies because of methodological differences across studies (in particular, measurement of IQ and alcohol intake) but also culture and epoch. In these studies, the CAGE questionnaire was typically administered to survey populations that covered a wide age range and therefore varying contextual experiences, and the question of whether the effect of education on the prevalence of problem drinking differed according to age at measurement was not examined.^{29,34} In one of the few studies to closely resemble our own, Pulkkinen and Pitkanen³⁰ found opposing results in a small-scale study (N=369) of Finnish children followed into adult life, in which poor “educational success” at age 8 years was predictive of problem drinking at age 26 years among both men and women.

By contrast, studies that utilized alcohol problems as the endpoint of interest, relations between socioeconomic position and total alcohol intake, although varying by gender, offer more-concordant findings. Among employed persons, there is a stronger positive relation between grade of employment and drinking among women than among men^{35–37}; intake was higher among the professional groups. Similarly, in the Scottish Health Survey, investigators found that the relation between socioeconomic position and

the same recommended drinking levels as used in the present analyses (21 units/wk for men, 14 units/wk for women) were again more-strongly positive among women than among men.²⁶ These results follow our own when ability, as opposed to socioeconomic position, was the “exposure” of interest.

Strengths and Limitations

Our study has some advantages over previously published work. First, the cohort was well characterized, particularly for life-course socioeconomic position, which allowed us to examine independent effects of ability on alcohol intake and drinking problems. Second, the fact that the data were drawn from participants who reside throughout Great Britain gives our findings a high degree of generalizability.

There are of course some study limitations. First, the longitudinal nature of the study has inevitably led to some attrition, raising concerns about selection bias. Thus, only 46% of the participants at the 30-year follow-up had taken part in all earlier surveys of the cohort, although 80% of the participants in the 30-year follow-up had missed none or only 1 of these earlier sweeps, and 74% of them had taken the British Ability Scales test as part of the 10-year follow-up.³⁸ The participants at the 30-year follow-up did gain significantly higher scores at age 10 for both verbal and nonverbal ability than those who did not take part, but the size of the differences was modest (0.3 of a standard deviation). Expressed differently, 27% of cohort members who were excluded from the analytic sample were in the bottom fifth of the IQ distribution at age 10, versus 17.3% who were included. Comparable figures for parents from semi- or unskilled occupational social class were 17.9% and 14.8%, respectively. It is not possible to assess if the follow-up at age 30 years disproportionately omitted individuals with the most-severe alcohol abuse. However, unless the relations of childhood mental ability with alcohol problems and alcohol intake were in the opposite direction in nonresponders to that found in our analyses—a highly unlikely scenario—little bias will have been introduced. Second, the questions pertaining to alcohol intake concerned only the preceding 7-day period, which may not have necessarily provided an indication of typical intake in all cases.

In our large-scale cohort study, mental ability at age 10 years was positively related to alcohol problems and alcohol intake 20 years later. This association essentially held after we controlled for markers of life-course socioeconomic position. Given that these findings ran counter to our expectations, and given the paucity of studies in this area, further examination of the relation between childhood IQ and adult drinking patterns, and whether these differ between men and women in different cultural and historical contexts, is needed. ■

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Contributions

G.D. Batty generated the idea for the present analyses, which was considerably developed by the coauthors. I. Deary advised on the psychometric analyses of the mental ability tests. C. Gale conducted all data analyses. C. Gale and G.D. Batty wrote the first draft of the article, to which all coauthors made substantial additional contributions.

Human Participant Protection

No protocol approval was required.

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