Stuttering, Alcohol Consumption and Smoking

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Abstract

Purpose Limited research has been published regarding the association between stuttering and substance use. An earlier study provided no evidence for such an association, but the authors called for further research to be conducted using a community sample. The present study used data from a community sample to investigate whether an association between stuttering and alcohol consumption or regular smoking exists in late adolescence and adulthood.

Methods Regression analyses were carried out on data from a birth cohort study, the National Child Development Study (NCDS), whose initial cohort included 18,558 participants who have since been followed up until age 55. In the analyses, the main predictor variable was parent-reported stuttering at age 16. Parental socio-economic group, cohort member's sex and childhood behavioural problems were also included. The outcome variables related to alcohol consumption and smoking habits at ages 16, 23, 33, 41, 46, 50 and 55.

Results No significant association was found between stuttering and alcohol consumption or stuttering and smoking at any of the ages. It was speculated that the absence of significant associations might be due to avoidance of social situations on the part of many of the participants who stutter, or adoption of alternative coping strategies.

Conclusion Because of the association between anxiety and substance use, individuals who stutter and are anxious might be found to drink or smoke excessively, but as a group, people who stutter are not more likely than those who do not to have high levels of consumption of alcohol or nicotine.

Keywords: stuttering; alcohol; smoking; birth cohort

1. Introduction

The association between developmental stuttering and diminished psychological well-being has been extensively documented (Craig, Blumgart and Tran, 2009; Craig and Hancock, 1995; Craig and Tran, 2014; Iverach, O'Brian, Jones, Block, Lincoln, Harrison, Hewat, Menzies, Packman and Onslow, 2009; Iverach and Rapee, 2014; McAllister, Collier and Shepstone, 2013; McAllister, Kelman and Millard, 2015; Menzies, O'Brian, Onslow, Packman, St Clare, and Block, 2008). In particular, social anxiety disorder, an excessive and persistent fear or expectancy of negative evaluation in situations involving social interaction (American Psychiatric Association, 1994; Beck, Emery, & Greenberg, 1985) has been shown in several studies to be much more prevalent in adults who stutter than in the general population (Blumgart, Tran and Craig, 2010; Iverach and Rapee, 2014; Iverach et al, 2009; Menzies et al, 2008).

Within the general population there is a strong association between elevated levels of anxiety and substance use disorders (Bolton, Cox, Clara and Sareen, 2006). According to the self-medication hypothesis (Blume, Schmaling, and Marlatt, 2000; Khantzian, 1997; Thomas, Randall and Carrigan, 2003) individuals use alcohol or other mood-altering substances in the belief that they will alleviate symptoms of anxiety and facilitate social interactions; further repeated use can lead to dependency for reducing psychiatric symptoms.

Studies in the general population have revealed a complex pattern around the association between anxiety and increased consumption of alcohol and nicotine. A large epidemiological study by Lampe, Slade, Issakidid & Andrews (2003) showed that

social anxiety disorder was likely to precede habitual elevated levels of alcohol use, but not clinically-diagnosed alcohol use disorders. Crum & Pratt (2001) found that adults who met the criteria for social anxiety disorder, but were not clinically diagnosed, were more likely to develop heavy drinking. Sonntag, Wittchen, Hofler, Kessler and Stein (2000) investigated the relationship between social anxiety and smoking behaviours in 3,021 adults and adolescents in the general population, using a longitudinal community study. Results showed a consistent and significant association between high levels of social anxiety and dependent regular smoking. There was no significant difference between participants with specific speaking fears as opposed to those with generalised social fears. Goodwin, Zvolensky, Keyes & Hasin (2013) confirmed these results, adding that initiation of cigarette use in adolescents who are socially anxious was delayed, due to limited peer social interactions. However, in later adulthood, symptoms of social anxiety were closely linked with nicotine dependence.

Taking this previous research into account, it is reasonable to hypothesise that people who stutter may use alcohol or nicotine to reduce feelings of anxiety and fear of negative evaluation by others. To date, the literature on the use of substances in the stuttering population is limited. Ardila, Bateman, Nifio, Pulido, Rivera and Vanegas (1994) investigated the association between stuttering and disorders associated with the central nervous system, including drug abuse and smoking, and found that 40% of those who stuttered were smokers, compared with 25% of the control sample of people who did not stutter. However, the population of adults who stuttered was limited to 37 participants, and participants were recruited from a restricted social class and age range.

More recently, Iverach, Jones, O'Brian, Black, Lincoln, Harrison, Hewat, Menzies, Packman, and Onslow (2010) investigated the relationship between rate of mood disorders and substance use disorders among 94 adults seeking treatment for stuttering and 10,641 age and gender matched controls. Adults who stuttered had significantly higher prevalence of mood disorders than matched controls, but were not significantly more likely to report any substance use disorder or alcohol dependence. The authors acknowledged that because they recruited their participants who stuttered from clinical caseloads, their results might be biased; for example, Craig et al (2003) found that people seeking treatment for stuttering had higher levels of anxiety than those not attending clinic. Furthermore, treatment seekers might be more highly motivated to use alternative coping strategies and less likely to consume substances in excess to self-medicate. They therefore suggested that it would be desirable to validate their findings using data from a community sample.

Additionally, the study reported by Iverach et al (2010) only investigated the association between stuttering and substance use disorders. Previous studies have highlighted a relationship between elevated anxiety levels and excessive drinking or regular smoking that did not necessarily attain the diagnostic threshold for a disorder (Lampe et al, 2003). It might be the case that people who stutter use higher level of substances when faced with anxiety-provoking situations, but are not necessarily dependent upon them.

The present study used secondary analysis of data from large British community sample, the National Child Development Study (NCDS) (see http://cls.ioe.ac.uk/ ,

accessed 28.2.16), to investigate the association between persistent developmental stuttering and levels of self-reported alcohol and cigarette use.

2. Methods

2.1 Sample

NCDS is a longitudinal study of 18,558 boys and girls who were born in Britain in a particular week in March 1958 or who were born overseas in the same week and subsequently immigrated to Britain before age 16 (Power and Elliott, 2006). Data collection has so far occurred at the time of cohort members' birth and when they were 7, 11, 16, 23, 33, 41, 46, 50 and 55 years old. During each sweep, data were collected on health and development, health-related behaviour, socio-economic status and family and educational variables. The analysis below uses data collected at birth (sex, parental socio-economic group), 7 and 11 (behavioural variables), 16 (stuttering and cigarette and alcohol consumption) and at all of the ages from 23 onwards (cigarette and alcohol consumption). The analytic sample consists of 10,491 participants who had complete data for the stuttering variable, sex, parental socio-economic group and the behavioural variables used, plus at least one smoking or alcohol variable at 16-plus. Plewis et al (2004) examined response bias and demonstrated that the actual adult samples obtained did not differ from the target sample for several key variables (gender, socio-economic group, parental education) in spite of a small under-representation of the most disadvantaged groups.

Ethical review was conducted at the Centre of Longitudinal Studies, by the South East MREC and London MREC (Shepherd, 2012). Data were collected by the Centre of Longitudinal Studies (Institute of Education). Information remained anonymous and

was collated in a confidential manner by the UK data service to ensure it was safeguarded (http://www.esds.ac.uk/).

The original ethics approval states that registered users of the UK data service are permitted to access the data for secondary analysis, providing they accept the terms and conditions of the service. All of the research data used in this project abided by the conditions set above.

2.2 Measures

Stuttering. Information on stuttering was collected when cohort members were 16 years old, when the mother was asked “Does he/she stammer or stutter?” and the answers were classified as “No”, ”Yes, mildly” and “Yes, severely”. The last two were combined for analysis into a single answer, “Yes”.

Family socio-economic status. Parental socio-economic group at birth was measured by the Registrar General’s measure of social class (RGSC). RGSC is defined according to occupational status and the associated education, prestige or lifestyle and is assessed by the current or last held job. RGSC was coded on the job of the male “head of household” on a four-point scale: I professional; II managerial/ technical; IIIN skilled non-manual; IIIM skilled manual; IV semi-skilled; and V unskilled occupations, plus the group where there was no male head of household.

Childhood behavioural problems. The Bristol Social Adjustment Guide (BSAG), completed by teachers at ages 7 and 11, was used to define the behavioural problems variable. The BSAG can be used to identify behaviours that are symptomatic of emotional disturbance or social maladjustment and, by summing these, obtain a score, higher values of which indicate a greater number of problem

behaviours. We classified a cohort member as having had behavioural problem in childhood if their score at 7 and/or 11 fell into the top quintile for their age group.

Alcohol consumption. Self-reports of alcohol consumption (the number of pints of beer, glasses of wine, etc) in the previous seven days at ages 16, 23, 33, 41 and 50 were recoded to give the total number of standard units of alcohol consumed in that week for each age. The questions at 46 and 55 asked for the number of units directly. The question at 50 asked for the amount of beer in units, whereas previous years had asked for beer in pints. For any age, if the respondent had answered "never" to the question on how often they drank alcohol, a value of zero was recorded.

Smoking. Smoking was recorded as cigarettes per week in range groups at the age of 16, which was converted to cigarettes per day by taking the middle value of the range and dividing by seven. Smoking was recorded at the number of cigarettes per day for later ages, coded as 0 where a participant said that they did not currently smoke.

Cigarette smoking and alcohol consumption were both recoded as binary variables for this analysis. Two codings were used: any smoking vs. no smoking and any alcohol vs. no alcohol and ≥10 cigarettes/day vs <10 cigarettes/day and ≥14 units/week vs <14 units/week.

2.3 Statistical analysis

The relationship between stuttering at 16 years and binary measures of smoking and alcohol consumption in adulthood was examined using a repeated measures logistic regression model (random effects). Results are expressed as odds ratios (ORs) and

95% confidence intervals (95% CIs) Sex, socioeconomic group and childhood behavioural problems as described above were assessed as potential confounding variables. Age 55 was used as the reference group for age, social class I for social class. All analyses were conducted using Stata, version 14.1 (StataCorp, College Station, TX).

Table 1. Characteristics of study participants

	No stutter at 16		**Stutter at 16**	
	n=10,303 (98.2%)		n=188 (1.8%)	
Sex	Percent	(n)	Percent	(n)
Male	50.5	(5,200)	80.9	(152)
Female	49.5	(5,103)	19.2	(36)
Parental socio-economic group				
I	4.0	(416)	2.1	(4)
II	12.5	(1,291)	8.5	(16)
III Non-manual	9.7	(955)	8.0	(15)
III Manual	48.3	(4,980)	51.1	(96)
IV	11.7	(1,210)	12.8	(24)
V	9.1	(935)	11.2	(21)
NA, no male head	4.6	(476)	6.4	(12)
Behavioural problems				
No	69.6	(7,172)	53.7	(101)
Yes	30.4	(3,131)	46.3	(87)

Table 2. Alcohol and cigarette consumption by age and stuttering status

Variable	No stutter at 16 n=10,303 (98.2%)		Stutter at 16 n=188 (1.8%)		Variable	No stutter at 16 n=10,303 (98.2%)		Stutter at 16 n=188 (1.8%)	
Mean units consumed / week					**Mean cigarettes smoked / day**				
	Mean	(SD)				Mean	(SD)		
Age 16	1.6	(2.8)	1.5	(3.0)	Age 16	1.6	(2.9)	1.8	(3.0)
Age 23	14.9	(21.1)	18.4	(21.9)	Age 23	9.0	(10.1)	10.1	(10.4)
Age 33	11.0	(16.7)	14.3	(20.8)	Age 33	5.4	(9.4)	5.6	(9.0)
Age 41	17.2	(23.3)	22.0	(26.7)	Age 41	4.4	(8.6)	5.6	(10.4)
Age 46	6.4	(11.2)	6.6	(13.5)	Age 46	3.7	(8.0)	3.8	(8.2)
Age 50	10.5	(14.6)	11.1	(15.6)	Age 50	3.1	(7.3)	4.1	(8.3)
Age 55	8.1	(12.0)	8.7	(12.9)	Age 55	2.1	(5.9)	3.0	(8.1)
Consumption ≥ 14 units / week					**Smoking ≥ 10 cigarettes/ day**				
	Percent	(n)				Percent	(n)		
Age 16	0.1	(9)	0.5	(1)	Age 16	5.6	(488)	5.8	(9)
Age 23	35.0	(2980)	41.7	(60)	Age 23	46.3	(2746)	54.5	(55)
Age 33	27.1	(2104)	37.3	(50)	Age 33	26.3	(2027)	28.8	(38)
Age 41	39.6	(2666)	52.6	(60)	Age 41	21.9	(1686)	26.3	(35)
Age 46	17.3	(1673)	16.0	(28)	Age 46	19.0	(1252)	18.9	(20)
Age 50	26.8	(1779)	29.9	(35)	Age 50	16.1	(1070)	21.2	(25)
Age 55	21.0	(1273)	26.0	(27)	Age 55	11.7	(729)	13.5	(14)
Any alcohol consumption					**Any cigarette smoking**				
	Percent	(n)				Percent	(n)		
Age 16	38.2	(3933)	31.4	(59)	Age 16	35.2	(3065)	37.8	(59)
Age 23	74.9	(6381)	75.0	(108)	Age 23	57.9	(3433)	63.4	(64)
Age 33	71.9	(5582)	67.2	(90)	Age 33	32.4	(2497)	33.3	(44)
Age 41	88.1	(5930)	86.0	(98)	Age 41	29.4	(2261)	33.8	(45)
Age 46	50.5	(4895)	41.7	(73)	Age 46	25.5	(1682)	25.5	(27)
Age 50	76.0	(5039)	64.1	(75)	Age 50	22.0	(1460)	24.6	(29)
Age 55	69.0	(4179)	65.4	(68)	Age 55	16.6	(1030)	19.2	(20)

3. Results

Compared with those who did not stutter, 16-year-olds who stuttered were more likely to be male, slightly likelier to be from manual social classes and at higher risk of having behavioural problems at 7 and/or 11 (Table 1). A descriptive examination of smoking and drinking by stuttering at 16 (Table 2) showed little apparent difference between those who stuttered and those who did not. This was confirmed by the main repeated measures logistic regression results in Tables 3 and 4, where there was no significant main effect of stuttering for either of the smoking or either of the drinking variables, when age, sex, social class and childhood behavioural problems were adjusted for. There were no significant interactions of stuttering with any of the ages. Little consistent pattern was seen with drinking and age, which may in part reflect the heterogeneity of the drinking questions. The odds of smoking on both measures were very large at 23 compared to 55, and declined steadily thereafter. The odds of smoking ≥10 cigarettes / day are much lower at 16 compared to 55, but for smoking any cigarette, the odds are higher at 16 than 55. Both measures of drinking showed a decline with decreasing social class, whereas smoking showed a strong increase. Behavioural problems at 7 and/or 11 produced significantly reduced odds of drinking on both measures, but significantly increased odds of smoking on both measures. Being female had a significant protective effect against drinking on either measure and on smoking ≥10 cigarettes / day, but no significant effect on smoking any cigarettes.

Table 3. Repeated measures logistic regression (random effects) modelling the risk of drinking

	Drinking ≥ 14 units / week				Drinking any alcohol			
	OR	p	95% CI		OR	p	95% CI	
			Lower	Upper			Lower	Upper
Stutter at age 16								
No	1.00				1.00			
Yes	0.78	0.438	0.41	1.48	0.64	0.100	0.37	1.09
Age								
16	<0.01	<0.001	0.00	0.00	0.21	<0.001	0.19	0.22
23	3.39	<0.001	3.05	3.75	1.79	<0.001	1.64	1.96
33	1.75	<0.001	1.57	1.94	1.36	<0.001	1.24	1.48
41	3.79	<0.001	3.41	4.22	4.20	<0.001	3.77	4.67
46	0.66	<0.001	0.59	0.73	0.39	<0.001	0.36	0.43
50	1.65	<0.001	1.49	1.84	1.66	<0.001	1.52	1.83
55	1.00				1.00			
Stutter X Age interaction								
Yes#16	5.49	0.133	0.60	50.64	0.87	0.670	0.47	1.62
Yes#23	0.96	0.906	0.47	1.97	1.17	0.636	0.60	2.28
Yes#33	1.40	0.370	0.67	2.94	1.01	0.984	0.52	1.96
Yes#41	1.55	0.258	0.72	3.33	1.03	0.946	0.47	2.27
Yes#46	0.63	0.233	0.30	1.35	0.81	0.498	0.44	1.50
Yes#50	0.91	0.805	0.43	1.94	0.63	0.182	0.32	1.24
Social class								
I	1.00				1.00			
II	0.87	0.299	0.67	1.13	0.76	0.006	0.62	0.92
III non-manual	0.83	0.186	0.63	1.09	0.64	<0.001	0.52	0.79
III manual	0.75	0.018	0.59	0.95	0.52	<0.001	0.43	0.62
IV	0.52	<0.001	0.40	0.68	0.40	<0.001	0.33	0.49
V	0.64	0.001	0.48	0.84	0.31	<0.001	0.25	0.38
NA, NMH	0.63	0.005	0.46	0.87	0.41	<0.001	0.32	0.52
Behavioural problems at 7 and/or 11								
No	1.00				1.00			
Yes	0.81	<0.001	0.73	0.90	0.58	<0.001	0.54	0.62
Sex								
Male	1.00				1.00			
Female	0.10	<0.001	0.09	0.11	0.43	<0.001	0.40	0.46

Table 4. Repeated measures logistic regression (random effects) modelling the risk of smoking

	Smoking ≥ 10 cigarettes / day				Smoking any cigarettes			
	OR	p	95% CI		OR	p	95% CI	
			Lower	Upper			Lower	Upper
Stutter at age 16								
No	1.00				1.00			
Yes	0.58	0.355	0.18	1.84	0.71	0.515	0.25	2.00
Age								
16	0.14	<0.001	0.12	0.17	7.38	<0.001	6.47	8.42
23	24.23	<0.001	20.65	28.42	22.13	<0.001	19.22	25.48
33	6.85	<0.001	5.89	7.96	5.59	<0.001	4.89	6.38
41	3.88	<0.001	3.34	4.51	4.10	<0.001	3.60	4.68
46	2.94	<0.001	2.52	3.43	2.89	<0.001	2.53	3.32
50	1.75	<0.001	1.50	2.04	1.76	<0.001	1.53	2.02
55	1.00				1.00			
Stutter X Age interaction								
Yes#16	0.94	0.938	0.23	3.95	1.71	0.326	0.59	4.96
Yes#23	2.62	0.133	0.75	9.20	1.95	0.259	0.61	6.24
Yes#33	2.02	0.248	0.61	6.66	1.40	0.545	0.47	4.11
Yes#41	2.25	0.175	0.70	7.25	1.78	0.290	0.61	5.16
Yes#46	1.39	0.605	0.40	4.77	1.16	0.798	0.38	3.52
Yes#50	2.14	0.213	0.65	7.12	1.30	0.632	0.44	3.85
Social class								
I	1.00				1.00			
II	1.01	0.972	0.61	1.68	0.89	0.623	0.57	1.40
III non-manual	2.37	0.001	1.41	3.99	1.51	0.081	0.95	2.40
III manual	3.72	<0.001	2.35	5.90	2.01	0.001	1.34	3.01
IV	4.41	<0.001	2.65	7.32	2.56	<0.001	1.63	4.02
V	8.82	<0.001	5.21	14.94	4.27	<0.001	2.67	6.85
NA, NMH	8.38	<0.001	4.64	15.16	5.32	<0.001	3.11	9.09
Behavioural problems at 7 and/or 11								
No	1.00				1.00			
Yes	3.38	<0.001	2.80	4.08	3.03	<0.001	2.54	3.61
Sex								
Male	1.00				1.00			
Female	0.85	<0.001	0.72	1.01	1.10	0.221	0.94	1.29

4. Discussion

An earlier study by Iverach et al (2010) indicated that adults above the age of 18 who were seeking treatment for stuttering were not significantly more likely to report a higher rate of substance use than control participants who did not stutter. The authors suggested that since they recruited their participants who stuttered from clinical sources, their findings might be biased because those who attend clinic are known to differ from those who do not in several important ways; they therefore suggested validating their results in a community-based sample. The present study used just such a community sample and examined the association between parent-reported stuttering at age 16 and levels of alcohol consumption and rates of regular smoking at ages 16, 23, 33, 41, 46, 50 and 55 years. Where possible the analyses controlled for variables that might have caused bias, such as the cohort member's sex. Consistent with the findings reported by Iverach et al (2010), neither alcohol consumption nor smoking was significantly associated with stuttering at any age.

There are several possible reasons why the original hypothesis was not supported in the present study. One set of reasons concerns methodological considerations. Firstly, the reliability of self-reported drinking and smoking habits must be considered. It has been reported that consistently lower levels of alcohol consumption are recorded, compared with alcohol sales (ONS, 2013), so it is possible that in the present study the participants may have under-reported their consumption, especially at the youngest age when they may have been consuming alcohol illegally. However, there is no evidence that this observation does not apply equally to those who did and did not stutter. Boniface, Kneale & Shelton (2014) used a mixed-methods study to identify factors associated with under-reporting of alcohol consumption. They found that heavy drinkers

were likely to under-report, but the binary alcohol consumption variables used in the present study revealed equal proportions of heavy drinkers among those who did and did not stutter, so there should be no discrepancy between the two groups on this basis. Caraballo, Giovino, Pechacek & Mowery (2001) concluded that self-reported smoking among adults is generally accurate, and even though younger smokers were more likely to under-report smoking, participants in both groups in the present study were matched for age; of the other factors that were associated with under-reporting, none were relevant to the comparison in the present study.

A further methodological issue to consider is sample attrition. Of the 11,656 participants with stuttering data (yes or no) at age 16, 10,491 (90.0%) were able to be included in the analysis because they provided data for all of the relevant variables. People who were reported to stutter at 16 were slightly less likely (86.6%) to be included in the analysis than people without (90.1%) but this difference was not statistically significant ($p=0.095$, χ^2 test). Thus it is unlikely that bias was introduced into this analysis through differential follow-up.

A final methodological consideration concerns the identification of stuttering at age 16, which relied on parental report rather than clinical diagnosis. It might be argued that those whose parents said they stuttered did not actually do so. However, a recent longitudinal study looking at development of early language by Reilly et al (2009) showed that 85% of parents gave accurate reports of their children stuttering at 3 years old, and it seems likely that parents of 16-year-olds would have an even more accurate perception of their child's speech. Furthermore, the male to female ratio (4:1) of participants who were reported to stutter within this study is consistent with other

research for adolescence and adulthood (Bloodstein, 1995; Craig, Hancock, Tran, Craig, & Peters, 2002). On a related note, it would have been desirable to check whether participants were still stuttering at the later ages sampled in this study, but these data were not collected. However, those who stutter in adolescence are unlikely to recover (Dworzynski, Remington, Rijsdijk, Howell and Plomin, 2007).

It might be argued that although many studies have revealed high levels of anxiety in people who stutter, the particular cohort members who stuttered in this study did not experience elevated levels of anxiety. Even though, in a study using the same dataset, McAllister, Collier and Shepstone (2013) reported poorer psychological health in those who were reported to stutter than in controls, no specific measures of anxiety were collected, so it was not possible to examine the impact of this variable directly. Determining the relationship between stuttering, anxiety and alcohol use would be a useful topic for further research.

With regard to the results for alcohol consumption, perhaps a more likely explanation concerns the interaction between alcohol use and socialising. Alcohol consumption often occurs in social situations (Hawkins, Catalano & Miller, 1992). Social anxiety disorder, which is experienced by many people who stutter, leads to avoidance of anxiety-provoking social or speaking situations. Therefore, even if those who stutter felt inclined to consume alcohol in the belief that it would alleviate their anxiety, they might expose themselves relatively infrequently to social situations where there might be the opportunity to do so. Additionally, alcohol has been shown to impact negatively on motor speech control, particularly when consumed in large quantities (Behne, Rivera and

Pisoni, 1991) and this might lead those who stuttered to consume less than they might otherwise do.

No significant correlation was identified between stuttering and regular smoking at age 16. This is consistent with research by Sonntag et al (2000), who suggested the onset of cigarette smoking is delayed among young people experiencing anxiety. This is because the initiation of cigarette smoking at age 16 can be heavily influenced by the behaviours of peers. Therefore, initiation is protected due to avoidance of social situations and limited peer interactions in people with social anxiety (Goodwin et al, 2013). However, Goodwin et al (2013) also showed that the sample of people experiencing social anxiety were more likely to become dependent on nicotine later in life, which was not indicated in the present study. The non-significant relationship found between stuttering and cigarette smoking could be because people who have received treatment for stuttering are less likely to use self-medicating substances because they have higher motivation to use alternative coping strategies. Unfortunately, the present data did not allow this possibility to be examined. Since our study involved secondary data analysis, we had no influence over the variables that were collected. Information about whether cohort members attended speech and language therapy was only provided in the age 16 survey; fewer than 9% of cohort members who stuttered were reported to have attended therapy, and no information is available about the reasons for attendance, or any therapy received.

Current clinical practice needs to take into account the possible psychosocial outcomes associated with stuttering, especially if they influence other areas of health. As no relationship was found between stuttering and high levels of alcohol consumption or

stuttering and regular smoking, the present results do not indicate that cessation is an area of particular interest within the stuttering population. Nonetheless, it may be important in individual cases.

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