Adolescent alcohol use and school disengagement: Investigating alcohol use patterns in adolescence and pathways to being NEET (Not in Employment, Education or Training).

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CONTENTS

EXECUTIVE SUMMARY

We know that for some, adolescent alcohol use can have long-term negative consequences including poor educational attainment and employment outcomes in the future. This (small research/pilot) study, drawing on ten years of longitudinal cohort data from the Belfast Youth Development Study (BYDS) aimed to investigate in a more nuanced way, how differing patterns of alcohol use in adolescence, are associated with disengagement from school (from 11-15 years); and pathways to being NEET at 20/21 years old. The BYDS followed a cohort of approx. 4,500 young people from 11 to 21 years of age over 7 sweeps of data collection. Pupils were in their first year of post primary school (11-12) at the start of the study (2000/2001), were surveyed annually until 2006/2007 (16-17) on whether they still attended school, were in a further education, or in employment and were surveyed again around ten years later (20-21 years). Participants responded to items on substance use and other risky behaviours, family, school and neighbourhood characteristics. BYDS data is novel in that compared to cross sectional or one off studies it has the capacity to shed light on the order of events for young people.

This study reported incidence of alcohol use among BYDS participants disengaged from school (via attitudes in years 1-5) (compared to those who were not) from 11-15 years of age and pathways to being NEET in early adulthood (at 20/21 years) (via alcohol use). We also investigated associations between alcohol use, disengagement, drug use and family.

<u>The objectives of this study were:</u>

- To test different causal hypotheses explaining the longitudinal relationship between alcohol use trajectories and being NEET (Not in Education, Employment or Training).
- To test the role of disengagement in influencing individual drinking trajectories and of being NEET at age 20/21.
- To investigate how other factors (e.g. parental monitoring, drug use) influence and are associated with alcohol use.

Methods

This study used data from the Belfast Youth Development Study (BYDS), the BYDS began in 2000 in Northern Ireland, followed a cohort of young people entering their first year of secondary school (11/12 years of age), surveyed them annually for the following five years of compulsory schooling as well as in the successive year (2007) whether at school or not, and again in 2010/11 (aged 21/22 years). To date over 4,500 respondents have provided data across the survey. Each year respondents answered questions on several topics: such as substance use habits, family attachment and parental monitoring (Kerr & Stattin, 2010), school attitudes, behaviour and educational aspirations. As there was a very low rate of absentees and refusals in each wave of data collection (Mc Crystal, Percy, & Higgins, 2007), measures collected from all pupils captured information not only on relationships with their parents and school, but also data on how their friends in school behave and interact with their families. Thus, in comparison with other studies, the strengths of BYDS are: (a) the collection of closely-paced longitudinal information, which allows for more precise descriptions of developmental processes and mechanisms. This report is based on data from the seven years of the study with a particular focus on parental monitoring, school and individual characteristics and information on frequency of alcohol use (never, rarely, monthly, weekly or more often) across each year.

Analyses:

We used Latent Class Growth Analysis (LCGA) to investigate individual differences in the trajectories of alcohol use. LCGA is part of the "mixture model" family: the assumption of this method is that there are different groups of individuals that display different trajectories in the variable considered: individuals within one group display similar trajectories to other individuals in the same group, but they differ in their trajectories compared to individuals in other groups. The groups considered are mutually exclusive (one individual belong to one group only) and exhaustive (all individuals are in one of the groups estimated). LCGA also assumes that all individuals in the same group behave in the same way (i.e. show the same trajectories, have the same growth parameters: therefore, no individual variability

within groups is allowed). These different groups with different trajectories are not directly observable, but their group membership could be inferred by observing their behaviour across time and using probabilistic methods (Muthen & Muthen, 2000).

Results

- We found that the course of drinking over a five year period is variable and influenced by a range of factors. In the early years of the study, very few respondents drank frequently. In later years, a greater proportion reported drinking alcohol every week or more often; from years one to five. Our results suggested that young people's alcohol usage amplifies over the course of their teenage years.
- We found that young people's attitudes towards school (a proxy for disengagement) increased over the course of the study. The results suggested that young people's attitude became more positive over time and particularly in the latter two years of school.
- We found that a large proportion of respondents had achieved GCSE grades A-C, with approximately three quarters having achieved AS/A-levels, and the majority being in part-time employment at age 16/17. We further established that around two thirds of the sample achieved third level education at age 20/21 and a considerable proportion of the sample were in education with a smaller proportion being in either part-time or full-time employment.
- We found that 227, 20/21 year olds reported they were NEET (i.e. not a student and unemployed), with the majority of those who were NEET being female.
- We used Latent Class Growth Analysis to estimate the number of alcohol use trajectories and found three profiles of drinkers could be used to represent their longitudinal course of alcohol consumption: 'Late Onsetters', 'Steady Increasers' and 'Minimal Users', with each displaying different levels of alcohol use throughout the school years.
- We found that the estimated mean growth parameters for each class indicated significant variation in the initial levels of the three drinking profiles established, however, this pattern indicated a significant linear trend. Overall, our results suggested that individuals belonging to the 'Late Onsetters', the largest group in the study, may be particularly vulnerable to the negative

outcomes associated with adolescent alcohol use and disengagement in school.

- We investigated the association between group membership and school disengagement and found that disengagement was predictive of being in the 'Late Onsetters' and 'Steady Increasers' groups while school engagement predicted being in the 'Minimal Users' group and this effect was particularly salient in year 5 of school.
- We investigated the association between group membership and being NEET at age 20/21 and found those in both the 'Late Onsetters' and 'Steady Increasers' groups to be significantly more likely to be NEET in the future.
- We investigated the relationship between school disengagement and being NEET at age 20/21 and found a significant effect of school attitude in each year of formal education and the likelihood of being NEET in the future.
- We found that there were bi-directional causal mechanisms operating between alcohol use and parental monitoring. In particular, higher levels of alcohol were associated with lower rates of parental monitoring in the subsequent year and greater parental monitoring was associated with a lower rate of alcohol use in the subsequent years.
- Finally, we found that young people in the latter years of formal education were also regularly taking illegal substances such as cannabis alongside using alcohol. Overall, we found that males were more likely to report weekly cannabis use and they were more likely to be in receipt of free school meals. We also found that parental monitoring was a protective factor as was good teacher-student relationships. We also found that school disengagement was only associated with cannabis use in the last year of school and only among females.

CONCLUSIONS

This study made a novel and valuable contribution to the extant literature via use of longitudinal data, allowing us to shed light on the order of events for young people, compared to cross-sectional studies. In this study we investigated how disengagement from school (via negative attitudes towards school) from 11-15 influenced the development of both alcohol use trajectories and pathways to being

NEET at age 20/21 years. The results revealed differences in alcohol use patterns across the five years of compulsory schooling. Typologies of drinking trajectories were predicted by disengagement which was further associated and predictive of being NEET at age 20/21. The study revealed the pervasiveness of drinking by mid-adolescence, a result consistent with an extensive range of studies on the variability of drinking in the teenage years (Mirza- Davies, 2015).

The presence of the diversity found in our developmental trajectories of alcohol use has important implications for both theory and practice. Conceptually, the diversity of the pathways underscores the importance of targeting interventions that promote school engagement particularly in year 5 of formal education. Increasing school engagement will require individualised needs assessment, careful program design, implementation and integration both within and out of school between educators and practitioners to effectively tackle the problem. Given that young people perceive relatively little risk with regular drinking, campaigns both in and out of school should focus on the consequences of alcohol-related problems that both appeal and are relevant to the young person.

Our analyses underscore the importance of policies to address the protective nature of the educational attainment of young people. Current debate in the UK is also considering extending the compulsory schooling age to relate to educational outcomes, to ensure that those children at risk of failure are not allowed to drop out with little or no qualifications. This should also be considered in context of the demise of the Education Maintenance Allowance and the impact this has had on staying on in education. The current rise in youth unemployment makes this an opportune time to act.

The conclusions of this study also highlight some of the important processes within the school context, which may act as influencing factors on both alcohol use and the likelihood of being NEET in the future. We have identified disengagement as a risk factor for both alcohol use and of being NEET, with those in years 4 and 5 being particularly susceptible. Lack of school engagement could be addressed through both school and community interventions. In particular, teaching social, emotional, and cognitive skills and addressing appropriate problem solving, anger

management and emotive language have all been shown to be more effective than practice based on strategies of control, coercion or exclusion. Schools may promote engagement through practise that emphasises participation, shared values, and discipline and that result in promotion of student involvement. A positive school climate that emphasises commitment and investment in school activities may therefore set a template that eventually protects against initiation and involvement in alcohol use where the drive towards future academic achievement may not be generally present. In addition, school based programmes that aim to change the school environment as opposed to interventions that focus solely upon changing the individual have been shown to be particularly beneficial in changing perceptions and enhancing school cohesion subsequently improving later educational outcomes.

The findings of this study are of importance to the academic understanding of adolescent development and alcohol use, and to the field of alcohol harm reduction, family support, and youth alcohol policy. The research conclusions of this study demonstrate the need to go beyond conceptualising adolescent alcohol use in isolation and to examine in more detail how other mediating variables may contribute to the overall relationship. This study has identified mechanisms specific to the differing alcohol trajectories across a large sample of young people. Our findings uniquely highlight the importance of understanding the complex interplay of individual, school, family and environmental factors. Consistent with the findings from Fergusson et al., (2001), adolescent alcohol use cannot be regarded as an isolated factor but rather seen in a context of a large number of intervening variables that individually create small contributions to the risk of negative outcomes but in combination crucially impact upon individual adjustment and later likelihood of being NEET.

BACKGROUND

Alcohol use during the teenage years is a persistent and growing public health concern both at a national and international level. Findings from the 2011 European School Survey Project on Alcohol and Other Drugs (ESPAD) (Hibell, Guttormsson & Ahlstom, 2012)reported high prevalence rates for alcohol use in the UK with as many as 90% of pupils reporting lifetime alcohol use. Rates of use in the previous 12 months and last 30 days were 85% and 65%, respectively, which were notably higher than ESPAD averages (87%, 79% and 57% respectively). We know that for some, adolescent alcohol use has been linked to a range of health and social problems (both short and long-term) including anti-social behaviour and delinquency (Felson, Teasdale & Burchfield, 2008; MacArthur et al., 2012), poor mental health outcomes including self-harm and depression (MacArthur et al., 2012) and hospital admissions (by children under 18 years) for alcohol poisoning and/or acute intoxication (Institute of Alcohol Studies UK, 2013). However, alcohol use has also been associated with school disengagement and academic achievements which may impact on educational and employment outcomes or being NEET later in life, having wide implications for policy and practice.

EU policy makers are increasingly using the concept of NEET – 'not in employment, education or training' as a measure of disengagement from the labour market and perhaps from society in general (Eurofound, 2012). The European Commission Employment Committee (EMCO) defines NEET as including young people aged 15-24 years who are unemployed or inactive and who are not attending education or training courses (Eurofound, 2013). In 2011, approx. 12.9% of 15-24 years olds in the EU were in the NEET group, equating to 7.5 million young people (Eurofound, 2015). Recent estimates for the UK report 963,000 people aged 16-24 were NEET in the fourth quarter of 2014, equating to 13.1 per cent of this age group (Mirza- Davies, 2015). The proportion of 15-19 year olds and 20-24 year olds who are NEET in the UK is above the OECD average (Mirza- Davies, 2015). The economic cost of not integrating NEETs is estimated at over €150 billion (EMCC, 2015). Spending time as NEET may lead to a wide range of social disadvantages, such as disaffection/alienation, insecure and poor employment prospects, delinquency, youth offending, and mental and physical health problems (Eurofound, 2012, 2013).

This report, drawing on ten years of longitudinal data from the Belfast Youth Development Study (BYDS), investigates adolescent alcohol use patterns and school disengagement and pathways to being NEET (in early adulthood).

Alcohol use, school disengagement and academic achievement

The school environment is one of the most important social institutions for adolescents and can have both positive and negative influences throughout this developmental stage. Teenage alcohol use is a well-known correlate of reduced educational attainment (Balsa, Giuliano, & French, 2011; Staff et al., 2008; Green & Ross, 2010). For example, Ross & Green (2010) found that drinking was associated with a number of negative educational outcomes such as lower GCSE scores and not remaining in full-time education beyond the age of 16. However, it is unclear whether this relationship is causal or spurious (Staff et al., 2008). Similarly, disengagement from school, including truancy and exclusion, has been linked to drug and alcohol use and other health-compromising behaviours (Mentor, 2013; Higgins et al., 2013; Fuller, 2011). Fuller et al (2012) reported that pupils who truanted from school (in the previous year) were over twice as likely to have drunk alcohol in the past week. Furthermore, previous research on poor school attendance, truancy and school exclusion has reliably established strong associations with low educational attainment (Department for Children, Schools and Families, 2008). A range of factors may impact on links between school engagement and educational attainment. Children from poorer backgrounds are at greater risk of disengagement (Mentor, 2013). Staff et al (2008) reported heavy teenage alcohol use and disadvantaged social origins combined to diminish male educational attainment; in contrast heavy alcohol use had little effect on female educational attainment.

Disengagement manifesting in bad behaviour within school can ultimately result in removal through fixed-term or permanent exclusion: In England, in 2010/11, boys were three times more likely to be excluded than girls; pupils with statements of special educational needs (SEN) were nine times more likely to be permanently excluded than those with no SEN and; children who were eligible for free school meals were around three times more likely to receive a fixed period exclusion and

nearly four times as likely to be permanently excluded (Department for Education, 2012) (cited Mentor, 2013). Recent figures from the Department of Education in Northern Ireland (2012-2013) indicate that around 3.3% of Key Stage 4 students had been suspended from school that year. This figure increases substantially when observing the differences between those suspended from a secondary controlled school (1,194) and those suspended from a grammar school (97). Additionally, of those suspended within this school year, substance abuse was found to account for 1.5% of the reasons for suspension, while alcohol abuse accounted for 0.4%. The expulsion findings from the report were of particular significance, with 19 reported expulsions overall in Northern Ireland that year and alarmingly, 47.4% of those excluded were Key Stage 4 pupils. Truancy figures were also reported for the year 2012-2013 and it was found that unauthorised attendance accounted for 1.4% for those at primary, 2.6% for those at post-primary and 3.4% for those attending special schools. Pupils who had truanted from school in the past year were around three times more likely to smoke regularly, over twice as likely to have drunk alcohol in the past week and were 1.85 times as likely to have taken drugs in the past year. The report also revealed pupils who had been excluded from school in the last year were almost three times as likely to smoke regularly and over three times as likely to have taken drugs or consumed alcohol in the past year.

Disengagement from school has been measured in a variety of ways, across a range of studies. For example, Ross (2009), using three measures to define disengagement (motivations, behaviour and attitudes), and identified four general types of engaged or disengaged young people: engaged; disengaged from school not education; engaged with school not higher education and; disengaged young people. Disengaged young people had much lower aspirations, had more negative attitudes towards school and were more likely to play truant. Those most at risk of being disengaged from school were white, males and young people from more disadvantaged backgrounds. Others have demonstrated young people who are NEET have similar aspirations to others (Yates et al., 2010). Problems occur when aspirations are not matched by educational achievement, when young people do not recognise the link between schoolwork and realising their aspirations until it's too late (Mentor, 2013).

Longitudinal studies have investigated developmental trajectories of school achievement and explored different risk factors and outcomes of these pathways. Li and Lerner (2011) found four distinct trajectories of emotional (e.g. students emotional reactions to the school, teachers and peers) and behavioural (e.g. involvement in school activities academic and social and positive conduct) engagement in school and examined differential developmental outcomes. The results found that youth in lower trajectories of engagement performed less well academically and had higher rates of delinquency, substance misuse and depression. Overall evidence suggests disruptions in educational trajectories may delay or restrict the achievement of milestones such as finishing school or completing a further education course and these have also been linked to an increase in deviant behaviour including drinking and drug use. (Department for Children, Schools and Families, 2008).

Alcohol use and pathways to being NEET

NEETs are often involved in alcohol and drug misuse (Mentor, 2013; Coles et al., 2002; Fergusson et al., 2001; Mossakowski, 2008). Those who disclose substance abuse are 2.1 times more likely to be NEET for six months or more (Audit Commission, 2010). Furthermore, evidence suggests underage drinking may lead to poor labour market outcomes in the future (Mundt & French, 2013). A study by Benjet et al. (2012) reported NEET youth as well as those who work only or study and work simultaneously have greater odds of substance use compared to those who study exclusively even after controlling for social disadvantage. Alcohol and drug abuse can lead to problems in obtaining and holding a job, with a consequent loss of earnings; they run the risk of being drawn into drug dealing and crime to support their addiction; and they may become homeless which can impact on employment potential (no permanent address) (Eurofound, 2012). Redonnet et al (2012) investigated substance use in the socioeconomic context of young adults. Socioeconomic position was defined by educational attainment, occupational grade, employment stability and unemployment. Substance use (including alcohol) was common among young adults, particularly those experiencing socioeconomic disadvantage. Ross & Green (2010) also found associations between drinking and the likelihood of being NEET. In the case of being NEET (and leaving full-time education), the

relationship was almost entirely explained by the link between drinking and other negative behaviours, particularly truancy and being suspended from school. These behaviours are more likely to be a consequence rather than an antecedent of drinking. Therefore drinking may be an important factor in levels of other risky behaviours which are associated with leaving fulltime education. Reduction of alcohol consumption among young people may therefore help to reduce young people's chances of becoming NEET indirectly through a reduction in their risk of participating in other risky behaviours.

Those who have been excluded or suspended from school are more likely to be NEET (Mirza- Davies, 2015) than those who have not. Persistent absentees are seven times more likely to be recorded as NEET at the age of 16 than other young people leading to protracted outcomes in terms of long-term educational achievement and subsequent employment (Department for Children, Schools and Families, 2008). Findings reported by Mentor (2013) indicated among a sample of young people who failed to gain any GCSE passes, 39% were recorded as being NEET subsequently, compared to only 2% of those who attained five or more GCSEs at Grade A* to C (Department for Children, Schools and Families, 2008). Similarly, Mirza-Davies (2015) reported young people who have achieved five or more GCSEs grade A to C are less likely to be NEET than those who have not. Leaving school at the age of 16 with few or no qualifications makes it much more likely that a young person will find themselves NEET (Mentor, 2013); some suggest those with fewer than three months post-16 education are 2.3 times more likely to become NEET for six months or more (Audit Commission, 2010). Overall, those with low levels of education are three times more likely to be NEET than those with third-level education (EMCC, 2015; Eurofound, 2012).

Additional risk factors associated with being NEET at age 16-18 include: having parents who are poor and unemployed; living in a deprived neighbourhood; being in care or having been in care; becoming a parent in their mid-teenage years (see Coles et al., 2002); having a learning disability, special educational need or learning disability; being a young carer; being homeless; having a mental illness; and being involved in offending (Mentor, 2013).

The overall risk of NEET is 70% higher for young people from an immigrant background than nationals while having a disability or health issue is also a strong risk factor (EMCC, 2015; Eurofound, 2012). Other risk factors include experiencing divorce of parents (30% more likely to be NEET), having parents who experienced unemployment (17%), a low household income, living in a remote area (increases the probability of becoming NEET by 1.5 times) (EMCC, 2015) and having a disability or health issue (40%). Research suggests that the risk of becoming NEET is differentiated by gender (Stadler, Akister, & Burch, 2014).

While we know that these associations exist to date there remains more limited knowledge on the complex interplay, including the temporal order, between alcohol use during adolescence and other factors like school disengagement, poor educational outcomes and longer term negative trajectories. It is also not clear if it is possible to even theoretically identify those at heightened risk at an earlier time point based on these patterns of alcohol use and concomitant problems.

AIMS OF THE PROJECT

This study will report incidence of alcohol use among BYDS participants disengaged from school (via attitudes in years 1-5) (compared to those who were not) from 11-15 years of age and pathways to being NEET in early adulthood (at 20/21 years) (via alcohol use). We will also investigate associations between alcohol use, disengagement, drug use and family.

RESEARCH OBJECTIVES

- To test different causal hypotheses explaining the longitudinal relationship between alcohol use trajectories and being NEET (Not in Education, Employment or Training).

- To test the role of disengagement in influencing individual drinking trajectories and of being NEET at age 20/21

- To investigate how other factors (e.g. parental monitoring, drug use) influence and are associated with alcohol use.

METHOD

This study used data from the Belfast Youth Development Study, a longitudinal study of substance use during adolescence. The participants were young people who attended the target school year in post-primary schools in three sites across Northern Ireland. Schools were located in the Belfast conurbation, Ballymena and Downpatrick. The latter two townlands included rural catchment areas. The first data collection wave took place in spring 2001, during the second part of the 2000-2001 academic years: all pupils attending school year 8 in the schools that were taking part were invited to participate in the study. Letters were sent to parents explaining the study and they were given the option to remove their child from the study. In the following year, 2002, data collection was repeated with the same methods for all pupils attending the successive school year 9 in participating schools. Data collection was repeated yearly until 2005 or school year 12 (age of participants 15/16).

The sampling strategy was to survey all pupils in participating institutions from the targeted year group: therefore cohort members entered and left the study as they moved to or from participating schools. A number of schools participated in industrial action in year four and year five, and this led to a reduction in completion rates. Two further sweeps were carried out, one between year 2006 and 2007: at this stage some cohort members had left school, therefore the sampling strategy was to survey all participants for whom valid contact details had been provided. Nonetheless, a number of schools and other educational institutions (including FE colleges and government training programmes which were anticipated as destinations for school leavers from the original BYDS cohort) were invited to take part and all pupils in these institutions were also surveyed. A seventh sweep of data collection was conducted between 2010 and 2011: all cohort members for whom contact details were available (over 4,000) were invited to participate through letters, emails, text message or face-to-face contact. Cohort members were about 21 years old by this stage. For more information on the Belfast Youth Development Study (BYDS) see (www.QUB.ac.uk/BYDS).

Study Variables

Alcohol Use

In order to prepare our data it was necessary to categorise frequency of alcohol into discrete categories of use. The alcohol question asked participants to indicate which statement best described them from the following: 1) "I have only drank alcohol once" 2) "I have only drank alcohol between 2 and 5 times/or on special occasions" 3) "I drink alcohol about once a month" 4) "I drink alcohol about once a week" 5) "I drink alcohol every day". For the purposes of this study and of parsimony, usage was classified under four categories. Those who only drank alcohol once and those who drank alcohol between 2-5 times/special occasion were considered to use alcohol "Rarely" (coded 1); those who drank alcohol about once a month were considered to use alcohol "Monthly" (coded 2); those who drank alcohol about once a week were considered to use alcohol "Weekly" (coded 3); and those who drank alcohol more than once a week were considered to use alcohol "More than Weekly" (coded 4).

School Disengagement

In years 1-5, participants responded to a range of items eliciting information on their attitudes, motivations and behaviour in school. In these analyses, we focused on attitudes towards school as an indicator of disengagement (see Ross, 2009). In sweeps 1-5, participants completed 7 items on their attitude to school. Items included 'I like school,' 'I am fed up with school' and 'I think going to school is a waste of time.' Participants responded to items using a 5 point Likert scale (1=almost never or never true- 5 = Almost always or always true). Negatively worded items were reverse scored and items summed giving a total score for attitudes towards school, whereby higher scores indicate more positive attitudes towards school.

(NEET) Not in education training or employment

Participants responded to a range of items on employment and education in years 6 (aged 16/17 years) & 7 (aged 20/21 years) of the study. When aged 16, they completed items on whether they received money from part-time work, full-time

work or education maintenance allowance (yes/no). They were also requested to indicate whether they were currently receiving any vocational or job training (yes/no). Aged 20/21 years, they reported whether they had a full-time job, part-time job, any other part-time job, were self-employed, unemployed at present or a student (either full-time or part-time). Drawing on the EMCO definition of NEET (Eurofound, 2013), we constructed a NEET variable based on participant's responses to two of the above variables: 'are you unemployed at present?' (yes/no) and 'are you a student (either full-time or part-time)? (Yes/no). Participants also reported on other aspects relating to their experience of education including whether they were ever excluded from school, age when they left or finished school and whether they had left a university course they had started.

Parental Monitoring

Stattin & Kerr's (2000) measures of parental monitoring were asked in each year. Four sets of questions were asked; overall parental monitoring, and three methods of monitoring children's behaviour, child disclosure of information, parental solicitation of information, and parental control of child activity. For the purpose of this report we focused solely on the parental monitoring component which included questions such as 'do your parents know what you do with your free time' and 'do your parents know who you have as friends during your free time?' The response scale for each set of questions was 'almost never or never', 'not very often', 'sometimes', 'often' and 'almost always or always'.

Ever use of tobacco and other drugs

Information on a wide range of substances was obtained in every year of the study (from tobacco to cannabis, ecstasy, inhalants, cocaine, LSD, and others). For the purpose of this report we focused solely on cannabis use and associations with alcohol use and disengagement.

RESULTS

Descriptive Statistics - Alcohol Use

We begin by examining males and females across the first five sweeps of data collection who report use of alcohol. Table 1 shows the rates of alcohol use across the five years of the study. In the early years of the study, very few respondents drank frequently, although a large proportion reported having tried alcohol. In later years, a greater proportion of the cohort reported drinking alcohol every week or more often; from years one to five, the respective proportions drinking weekly were 4%, 11%, 21%, 27% and 34%.

Table 1. Frequency of alcohol use across five years for 4,775 respondents

Alcohol use	Male	Female	Total
Year 1			
None	493 (22%)	547 (22%)	1,040 (22%)
Rarely	1,103 (49%)	874 (35%)	1,977 (41%)
Monthly	92 (4%)	63 (3%)	155 (3%)
Weekly or more	135 (6%)	45 (2%)	180 (4%)
Missing	434 (19%)	989 (39%)	1,423 (30%)
Year 2			
None	607 (27%)	764 (30%)	1,371 (29%)
Rarely	749 (33%)	809 (32%)	1,558 (33%)
Monthly	224 (10%)	265 (11%)	489 (10%)
Weekly or more	270 (12%)	267 (11%)	537 (11%)
Missing	407 (18%)	413 (16%)	820 (17%)
Year 3			
None	505 (22%)	513 (20%)	1,018 (21%)
Rarely	707 (31%)	863 (34%)	1,570 (33%)
Monthly	352 (16%)	392 (16%)	744 (16%)
Weekly or more	471 (21%)	521 (21%)	992 (21%)
Missing	222 (10%)	229 (9%)	451 (9%)
Year 4			
None	155 (8%)	147 (6%)	322 (7%)
Rarely	545 (24%)	606 (24%)	1,151 (24%)
Monthly	362 (16%)	404 (16%)	766 (16%)
Weekly or more	552 (24%)	745 (30%)	1,297 (27%)
Missing	623 (28%)	616 (24%)	1,239 (26%)
Year 5			
None	121 (5%)	120 (5%)	241 (5%)
Rarely	370 (16%)	415 (16%)	785 (16%)
Monthly	365 (16%)	419 (16%)	784 (16%)
Weekly or more	736 (33%)	875 (35%)	1,611 (34%)
Missing	665 (29%)	689 (27%)	1,354 (28%)
Total	2,257	2,518	4,775

The results in Table 2 indicate a considerable proportion of the sample rarely used alcohol in the first waves of data when they were aged 11-12 in comparison to wave 5 when they were aged 15-16 (84% vs 22%). It can also be observed that the proportion of young people drinking both weekly and more than weekly increased dramatically across the five years of compulsory schooling (e.g. 3% - 35%). Overall these figures suggest that young people's alcohol usage amplifies over the course of their teenage years.

School Disengagement

Table 2. School disengagement: attitude sub-scale

Attitude *(7 items)*	n	Mean	SD	Min	Max
Sweep 1	**3,633**	**15.35**	**3.39**	**7**	**21**
Sweep 2	**4,068**	**21.93**	**5.98**	**7**	**35**
Sweep 3	**4,288**	**22.08**	**5.85**	**7**	**35**
Sweep 4	**3,780**	**22.22**	**5.81**	**7**	**35**
Sweep 5	**3,605**	**22.92**	**5.55**	**7**	**35**

We found that mean values for attitudes towards school increased over the course of the study. We also found that 3 per cent of the sample (n=57) reported they had been excluded from school in their lifetime.

Table 3. Age left or finished school

Age	n	%
13	**2**	**0.10**
14	**3**	**0.15**
15	**20**	**0.98**
16	**361**	**17.69**
17	**175**	**8.57**
18	**1323**	**64.82**
19	**157**	**7.69**

Educational Achievement and Working/Training Status

We then examined educational achievement and working/training status in year 6 (16-17 years) and year 7 (20-21 years) in males and females. Table 4 shows the frequency of qualifications achieved and working and/or training status of respondents in year 6. It can be observed that a large proportion of respondents achieved GCSE grades A-C with approximately three quarters of respondents having achieved AS/A-levels. In terms of working status of respondents it can be seen that the largest proportion reported being in part-time employment constituting approximately two thirds of the sample. In addition, it can be observed that approximately two fifths of the sample also reported being in receipt of educational maintenance allowance (indicating continuing education).

Table 4: Frequency of educational achievement and work/training status in year 6 (16-17 years)

	Male	Female	Total
Year 6 - Qualifications			
GCSE (Grade D-G)	419 (46%)	483 (54%)	902 (39%)
GCSE (Grade A-C)	911 (41%)	1287 (59%)	2198 (94%)
AS Levels/A-Levels	689 (40%)	1032 (60%)	1721 (74%)
Level 1/Foundation NVQ/GNVQ	50 (49%)	52 (51%)	102 (4%)
Level 2/Intermediate NVQ/GNVQ	101 (51%)	95 (49%)	196 (8%)
Level 3/Advanced NVQ/GNVQ	23 (44%)	29 (56%)	52 (2%)
Other GNVQ/NVQ	19 (42%)	26 (58%)	45 (2%)
Year 6 – Working/Training Status			
Part-time work	527 (37%)	870 (63%)	1397 (60%)
Full-time work	99 (58%)	73 (42%)	172 (7%)
Receipt of educational maintenance	408 (42%)	564 (58%)	972 (41%)
Receipt of benefits/other grants	35 (26%)	99 (74%)	134 (6%)
Vocational/job training	136 (50%)	137 (50%)	273 (12%)

We examined educational achievement and working/training status in year 7 (20-21 years) in males and females. Table 5 shows the frequency of qualifications achieved and working and/or training status of respondents in the final year of data collection. We were able to establish that a large proportion achieved GCSEs grades A-C with around three quarters of the sample also achieving A-levels. We

were further able to establish that around two thirds of the sample had achieved third level education. In terms of working status of respondents it can be observed from Table 3 that a considerable proportion of the sample were in education with a smaller proportion being in either part-time or full-time employment.

Table 5: Frequency of educational achievement and work/training status in year 7 (20-21 years)

	Male	Female	Total
Year 7 - Qualifications			
GCSE (Grade D-G)	408 (46%)	472 (54%)	880 (43%)
GCSE (Grade A-C)	758 (40%)	1128 (60%)	1886 (93%)
AS Levels	494 (37%)	841 (63%)	1335 (67%)
A-Levels	533 (37%)	901 (63%)	1434 (71%)
Level 1/2 NVQ/GNVQ	222 (49%)	229 (51%)	451 (22%)
Level 3/4 NVQ/GNVQ	106 (57%)	77 (42%)	183 (9%)
Other Academic Certificates/Diplomas	255 (39%)	396 (61%)	651 (32%)
HND/Studying for HND	54 (47%)	62 (53%)	116 (6%)
Degree/Studying for Degree	434 (38%)	716 (62%)	1150 (57%)
Post Graduate Qualification	62 (41%)	90 (59%)	152 (8%)
Year 7 – Working/Training Status			
Part-time work	310 (36%)	560 (64%)	870 (42%)
Other Part-time work	25 (33%)	50 (67%)	75 (8%)
Full-time work	271 (44%)	341 (56%)	612 (30%)
Self-employed	27 (57%)	20 (43%)	47 (2%)
Unemployed	224 (44%)	285 (56%)	509 (53%)
Ever had Job	185 (43%)	242 (57%)	427 (85%)
Student (Full-time/Part-time)	438 (40%)	652 (60%)	1090 (53%)
Part-time Student	109 (46%)	130 (54%)	239 (22%)
Full-time Student	329 (39%)	518 (61%)	847 (78%)
Receipt of benefits/grants	126 (38%)	207 (62%)	333 (16%)

We can see that 11 per cent (n=231) had started a university course but did not finish it. Age at which they left or finished school is reported in table 6 below.

As previously outlined (see study variables) we constructed a NEET variable based on participant responses to two variables: '*are you unemployed at present?*' (yes/no) and '*are you a student (either full-time or part-time)?* (yes/no). 955 participants responded to both items. Those who reported they were unemployed and not currently studying were categorised as being NEET. In total, 227, 20/21 years

olds reported they were NEET (i.e. not a student and unemployed) (almost 25% of those who responded). The majority of those who were NEET were female (n=124).

Table 6: Employment and Educational Status

Unemployed at present	Student (FT or PT)	
	YES	**NO**
YES	**282**	227
Males	**122**	101
Females	**160**	124
NO	**212**	**234**
Males	**93**	**97**
Females	**118**	**136**

Analytical Strategy

Latent Class Growth Analysis (LCGA) will be used to investigate the individual differences in the trajectories of the variable considered. LCGA is part of the "mixture model" family: the assumption of this method is that there are different groups of individuals that display different trajectories in the variable considered: individuals within one group display similar trajectories to other individuals in the same group, but they differ in their trajectories compared to individuals in other groups. The groups considered are mutually exclusive (one individual belong to one group only) and exhaustive (all individuals are in one of the groups estimated). LCGA also assumes that all individuals in the same group behave in the same way (i.e. show the same trajectories, have the same growth parameters: therefore, no individual variability within groups is allowed). These different groups with different trajectories are not directly observable, but their group membership could be inferred by observing their behaviour across time and using probabilistic methods (Muthén & Muthén, 2000).

Analyses:

The LCGA method allows firstly to estimate the number of classes (i.e. groups) that are necessary to account for observed heterogeneity of alcohol use. Mplus 7 was used to estimate models (Muthén & Muthén, 2012). The methods used in estimating

models allow estimation of missing values through the Full Information Maximum Likelihood estimator (Muthén & Muthén, 2012).

Group membership is probabilistic: posterior probabilities are calculated by the model and indicate the probability that each individual belongs to each of the classes estimated by the model. This estimated probability is based on the individual's observed behaviour. Each individual is assigned to one of the groups according to the higher value of the posterior probability. In other words, there is an element of uncertainty in assigning group membership: group membership is not an exact observed variable, and therefore ignoring differences in group membership probability in further analyses may bias conclusions to some extent (Clark & Muthén, 2009). To avoid this bias, when using the latent alcohol use trajectory group as a predictor of outcomes, we weighted class membership by individuals' probability of being in each estimated trajectory group.

The steps of the analyses therefore were:

(1) Estimation of the number of trajectory groups necessary to describe the data. In this step, our decision on a specific solution was guided by statistical and substantive criteria (e.g. interpretability, consistency with theory and previous literature).

(2) Investigate associations between estimated groups and covariates by re-estimating the selected model in step 1 while entering covariates as predictors of class membership in a regression. Re-estimation of the model avoids considering class membership as a given observed variable (i.e. takes into account uncertainty regarding class membership). This step is also important because it allows further checks on the specification of the model in step 1: covariates may influence the parameters in the model and the resulting classification of individuals. If stability in group prevalence and class parameters is observed when introducing covariates as predictors of group-membership, this corroborates reliability and robustness of the models estimated.

(3) The associations between group membership (affiliation to an alcohol use category) and being NEET were investigated by using group membership as a nominal covariate. To account for probabilistic group affiliation,

individuals' group membership was weighted by their posterior probability of being in each estimated group (following a procedure recommended by Clark & Muthén, 2009). In this way, uncertainty of group membership is controlled for and the results concerning associations between alcohol use group membership and distal outcomes are not biased by discarding information conveyed by posterior group membership probabilities.

Two components of alcohol use will be initially modelled in the growth analysis: the 'starting point' frequency of alcohol use (intercept) and the change in alcohol use per year (slope). The latent class component of the analysis will assess if, and how many, distinct patterns of alcohol use occurred in the sample. It will do this by identifying if there are distinct groupings of intercept and slope parameters – the statistical indicators of alcohol use change over time. The models will assess from two up to ten separate groups of alcohol usage patterns. Individuals within each group are assumed to behave in the same way, hence display the same trajectories and share the same growth parameters: in this approach, no variability around these parameters is assumed. In other words, the different trajectory group may be seen as representing "prototypical" alcohol trajectories.

We firstly estimated the number of alcohol use trajectory groups without considering the effects of covariates on the class formation (unconditional models). Once we established the number of sub-groups in the population, we investigated the association between membership within these classes and how the covariate of school disengagement contributes to and how membership predicts being NEET at 20/21 (see figure 1.)

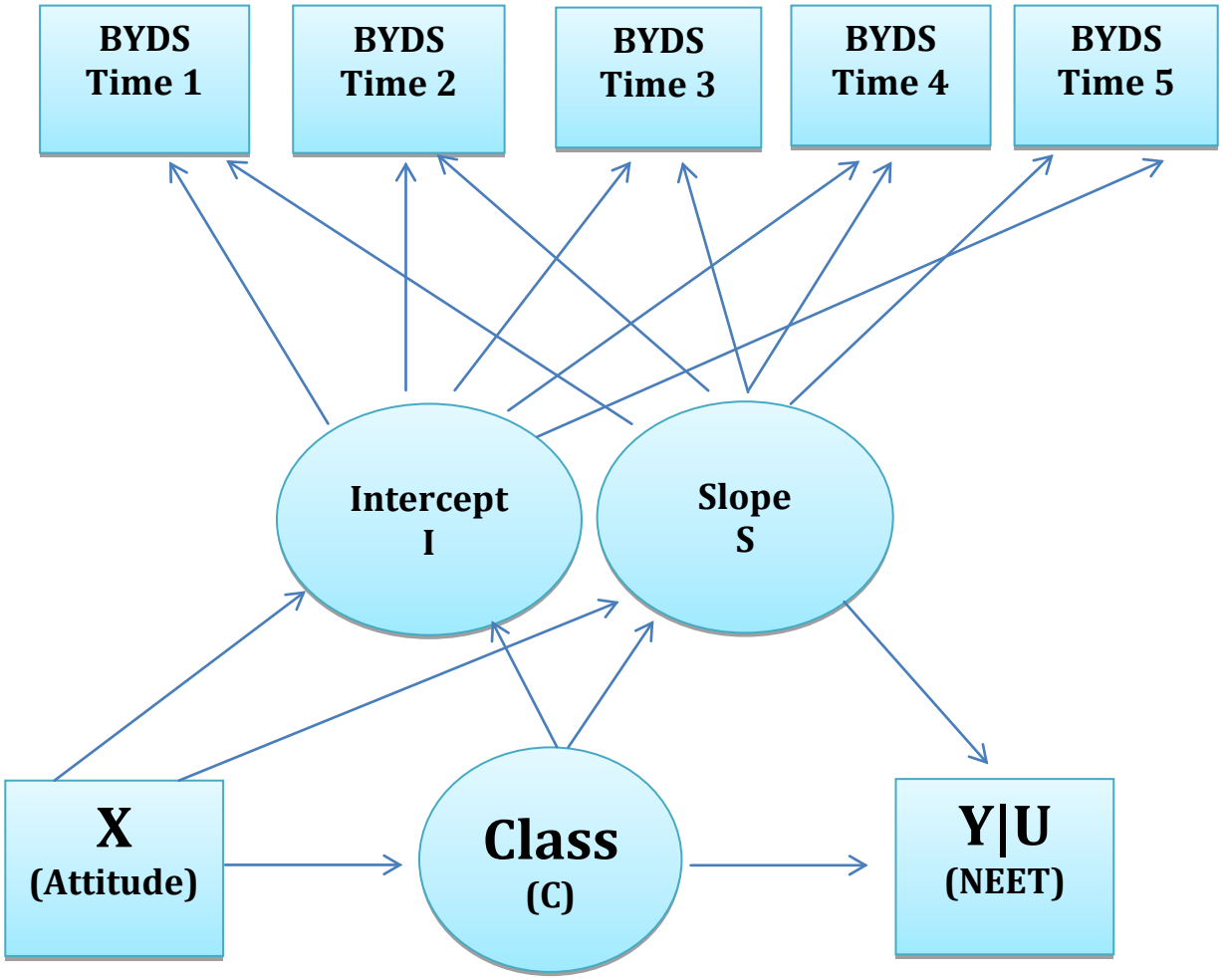

Fig 1. Representation of Latent Class Growth Analysis with Covariates and Outcomes.

The results of the unconditional LCGA did not give conclusive findings as to the number of alcohol use trajectory groups. Different statistics need to be taken into account when deciding upon the number of classes necessary for describing the phenomenon of interest. Information criteria (BIC and AIC) are statistics that take into account the fit of the model to the data and parsimony (more parsimonious models are favoured): lower values of these criteria indicate better solutions, which provide a better fit to the data. The Vu-Lo-Mendell-Rubin (VLMR) test compares a model with *n* estimated groups against a model with *n-1* groups. If the test is significant, this indicates that the model with a higher number of groups (*n*) provides a better fit to the data compared to the model with fewer (*n-1*) groups. Another

issue that may be taken into account in deciding on a solution is the quality of classification of individuals, which is indexed by the entropy statistic: Entropy represents how precise is the classification of individuals across different groups. Entropy ranges from 0 to 1, with one representing a solution where each individual has a 100% probability of being assigned to one group and a 0 probability of being assigned to any other group estimated (i.e. there is certainty concerning individuals group membership).

As planned we first fit LGCA models of two to ten classes using alcohol use frequency as the target variable. Model fit statistics for the two to ten class solutions based on the categorical measure without any covariates are presented in table 7. The best fitting classification model was chosen according to the fit indices aforementioned.

Table 7. Fit Statistics of LCGA models by number of classes estimated.

N of classes estimated	LL	AIC	BIC	aBIC	Entropy	VLMR p Value
2	-16316.69	32647.37	32692.85	32670.60	0.56	<0.0001
3	-16083.67	32187.34	32252.31	32220.53	0.60	<0.005
4	-15992.57	32011.14	32095.60	32054.29	0.58	0.09
5	-15937.87	31907.74	32011.69	31960.84	0.58	<0.0001
6	-15923.73	31885.46	32008.90	31948.52	0.62	0.11
7	-15915.71	31875.42	32018.34	31948.44	0.63	<0.005
8	-15915.36	31880.71	32043.13	31963.69	0.59	0.44
9	-15904.82	31865.63	32047.54	31958.57	0.63	0.00
10	-15904.37	31870.73	32072.13	31973.63	0.59	0.19

LL = Log-Likelihood; AIC= Akaike Information Criterion; BIC= Bayesian Information Criterion; aBIC= Sample-Size Adjusted BIC; VMLR p Value = p value associated with the Vuong-Mendell-Lo-Rubin test.

The VLMR test indicated the model with five categories as the better-fitting model initially. The classification derived from this model also displayed a moderate level of entropy, indicating a reliable classification of individuals in sub-groups. It can be seen from examination of the fit statistics (see table 7) that the BIC was slightly lower for a 6-class solution (32008), than for the 5-classs solution (32011), increasing upwards when a seven-class solution was fitted (32018). It appeared from the BIC tests that a six-class solution would be the best fitting model in terms of the

decreasing estimates, however, examination of the VLMR test was not significant and the class (n-1) was selected. However, on inspection of the profile plot and of the average Latent Class Probabilities for Most Likely Latent Class Membership (see below) we can observe that the probability of being in that class is not as near to 1 as we would anticipated. The probabilities of being in each class are highlighted below and demonstrate that on average, individuals have around a 0.6-0.7 chance of being in the right class. This is adequate. However, on inspection of earlier models, we observe our fit statistics and plots to see if a better model solution can be applied.

Table 8. Latent Class Probabilities for Most Likely Latent Class Membership (Row) by Latent Class (Column) for a five-class LCGA Model

	Class 1	Class 2	Class 3	Class 4	Class 5	N
Class 1	**0.726**	0.000	0.070	0.173	0.031	262
Class 2	0.001.	**0.699**	0.000	0.015	0.285	942
Class 3	0.109	0.000	**0.677**	0.203	0.012	163
Class 4	0.069	0.000	0.054	**0.674**	0.203	1430
Class 5	0.006	0.101	0.004	0.182	**0.706**	2102

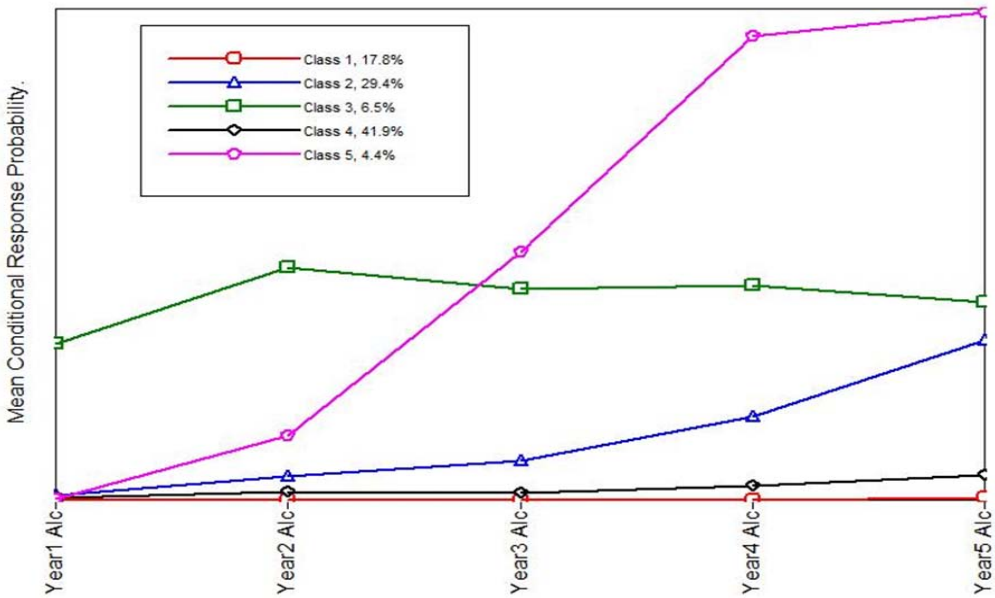

Fig 2. Mean Response Probability of Alcohol Use over Five years by Alcohol Use Class.

We can see from the figure above that there appears to be little variation between class 1 and class 4. This tells us that two of the profiles do not differ significantly or yield clearly distinct and interpretable trajectories. On re-inspection of our model fit statistics, we observe that the VLMR test indicated the model with three categories as a better-fitting model. The classification derived from this model also displayed a higher level of entropy to that of the five-class, indicating a reliable but moderate classification of individuals in sub-groups. It can be seen from examination of the fit statistics that the BIC was slightly lower for a 4-class solution (32095), than for the 3-classs solution (32252) however, the 4-category model had a non-significant VLMR (p=0.09), increasing upwards again when a seven-class solution was fitted (32018). However, on inspection of the profile plot and of the average latent class probabilities for most likely latent class membership (see below) we can observe that the probability of being in these classes is significantly nearer to 1 than the initial 5-class model. The probabilities of being in each class are highlighted below and demonstrate that on average, individuals have around a 0.8 chance of being in the right class or rather there is an 80% probability that individuals have been assigned to the most appropriate class.

Table 9. Latent Class Probabilities for Most Likely Latent Class Membership (Row) by Latent Class (Column) for a three-class LCGA Model.

	Class 1	Class 2	Class 3	N
Class 1	**0.801**	0.082	0.118	2776
Class 2	0.209	**0.789**	0.002	604
Class 3	0.194	0.002	**0.804**	1519

We can observe from the profile plot (see figure 3) that the 3-class solution appeared most appropriate, yielding clearly distinct and interpretable trajectories with substantial class sizes. As expected, given the study participants age at first endorsement, all profiles begin at a very low level of alcohol use and follow a linear pattern.

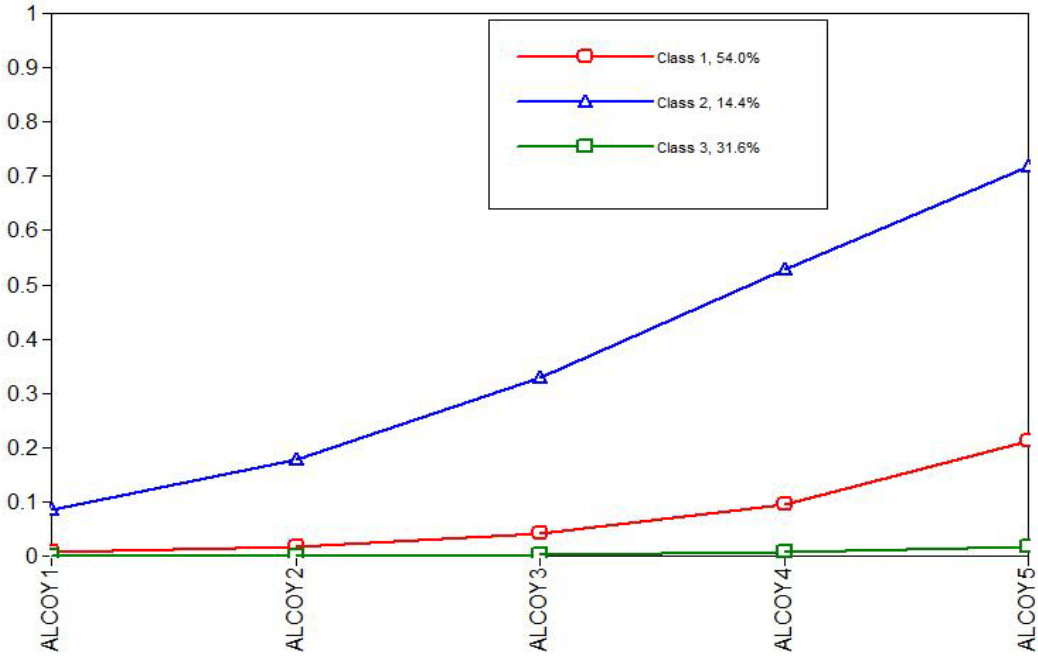

Fig 3. Mean Response Probability of Alcohol Use over Five years by Alcohol Use Class.

The three trajectory groups estimated displayed different levels of alcohol use throughout the school years: a group of individuals displayed rare to no use of alcohol (minimal users), class 3 (31.6%), with the other two groups differing for levels of alcohol use at each time point throughout the study. The different trajectories of alcohol use could therefore be described as: class 1 – late onsetters (54%), class 2 – steady increasers (14.4%) and class 3 – minimal users (31.6%). Hence, these three classes differentiate clearly between different alcohol groups, from age 11 up to age 16.

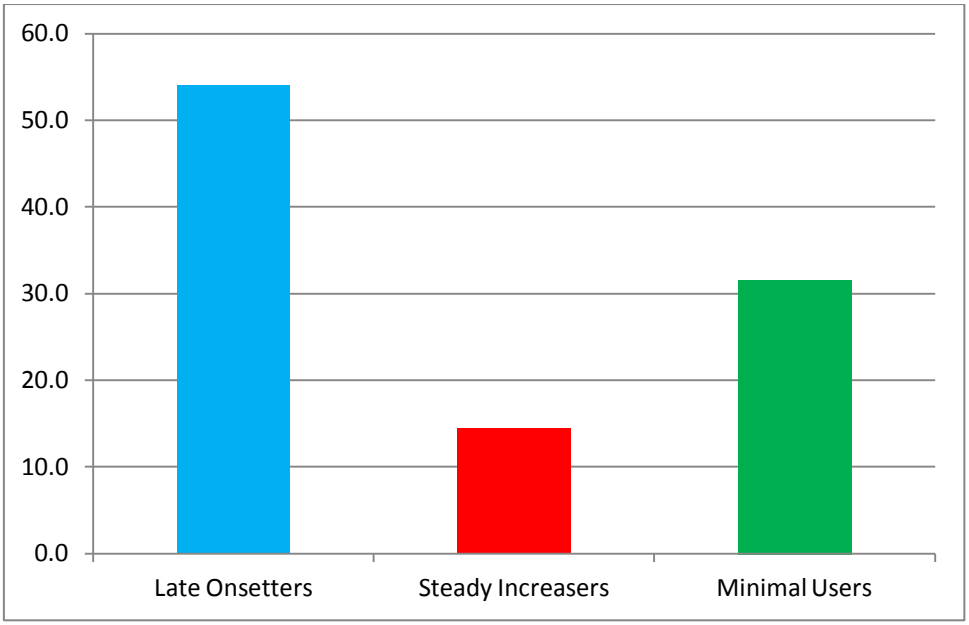

Fig 4. Percentage of Adolescent drinkers by drinking trajectory class.

Figure 4 shows the percentage of the three alcohol use trajectories. We can clearly see the differences in the proportions of the late onsetters, steady increasers and the minimal users.

Table 10. Mean latent class posterior probabilities[a] of alcohol use over five years across latent drinking class (3-class model)

	Late Onsetters (Class 1)	Steady Increasers (Class 2)	Minimal users (Class 3)
Alcohol Y1			
Rarely	**0.781**	0.199	**0.987**
Monthly	0.161	**0.330**	0.010
Weekly	0.052	**0.385**	0.003
Weekly/More	0.007	0.086	0.000
Alcohol Y2			
Rarely	**0.585**	0.098	**0.966**
Monthly	0.279	**0.232**	0.026
Weekly	0.119	**0.493**	0.007
Weekly/More	0.016	0.177	0.001
Alcohol Y3			
Rarely	**0.359**	0.046	**0.911**
Monthly	0.358	0.132	0.068
Weekly	0.243	**0.494**	0.019
Weekly/More	0.040	**0.329**	0.002
Alcohol Y4			
Rarely	0.181	0.021	**0.788**
Monthly	**0.319**	0.066	0.156
Weekly	**0.404**	**0.386**	0.050
Weekly/More	0.096	**0.528**	0.006
Alcohol Y5			
Rarely	0.081	0.009	**0.573**
Monthly	0.203	0.031	0.285
Weekly	**0.506**	**0.242**	0.124
Weekly/More	**0.211**	**0.718**	0.017

[a]Posterior probabilities classify observations during the estimation of model parameters, as well as after the estimation when observations are assigned to the most likely class.

Adolescents were classified into trajectory classes according to their posterior probability. Posterior probabilities express the degree to which adolescents belong to their trajectory class and are determined after the model (with a specific number of trajectory classes) is estimated (Nagin, 1999). High-posterior probabilities indicate that the model is well able to assign each adolescent to one particular class. The posterior probabilities illustrated above highlight the trends of each of the classes by year and level of alcohol use. We can clearly delineate the pattern of late onsetters, steady increasers and minimal users by observing the highlighted probabilities in the table. We can see the pattern of late onsetters by observing the higher "rarely"

probabilities in years 1-3, however, in years 4 and 5 this pattern changes and is evident by observing the cumulative probabilities of “weekly/more than weekly”. In observing the steady increasers, again, the trend can be established by looking at the cumulative probabilities in years 1 and 2 of “monthly/weekly”, this trend then escalates in years 3, 4 and 5 where the pattern of use becomes more frequent and the cumulative probabilities of “weekly/more than weekly” can be observed. Finally, we can clearly observe the pattern of the minimal user group by observing the high probabilities of “rarely” across years 1-3 with years 4 and 5 having a higher cumulative probability of “rarely/monthly” use as would be expected for minimal use in the later years of school. A graphical representation of the probabilities and percentages can be seen below (figure 5 and figure 6).

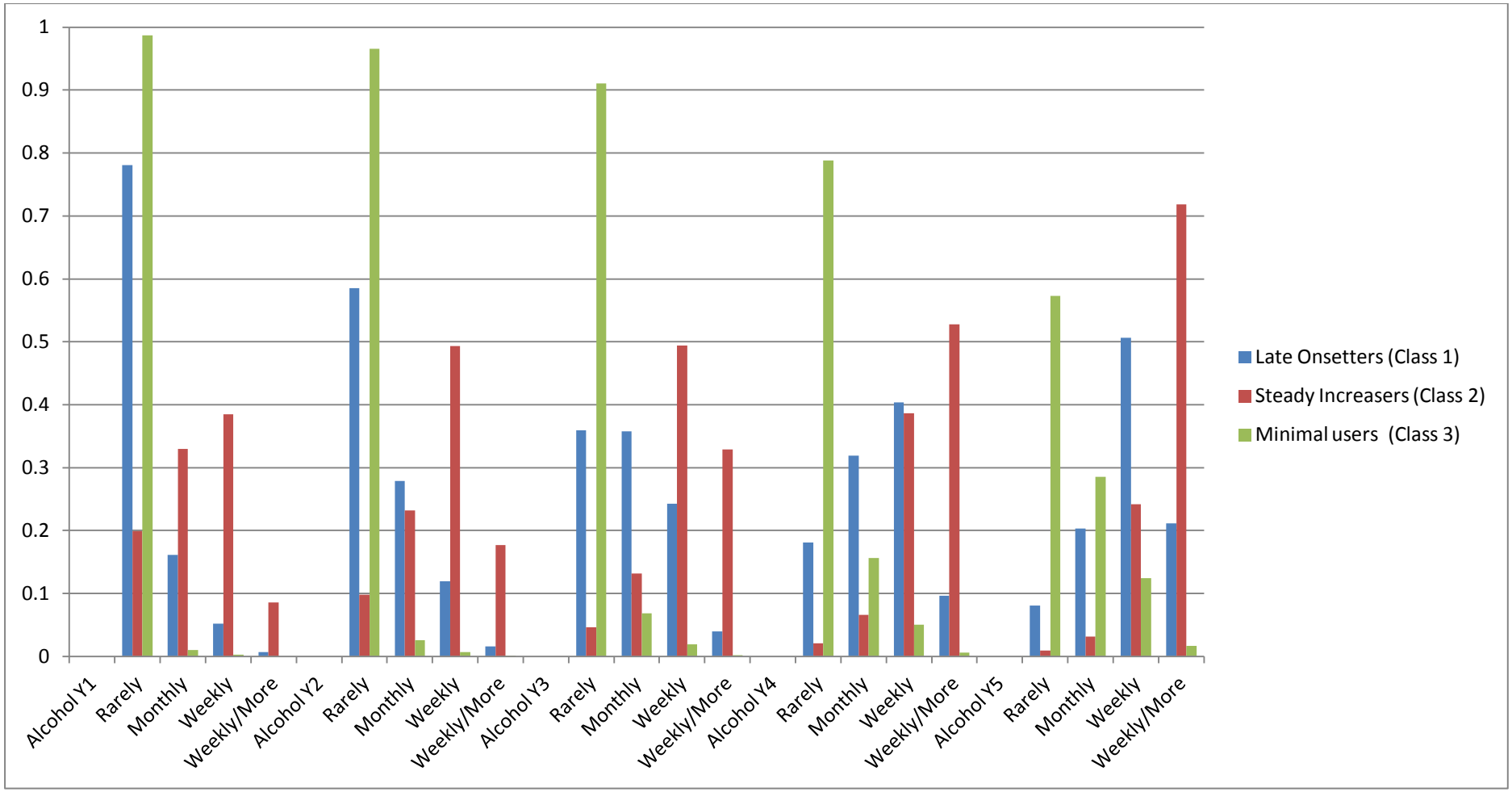

Figure 5. Conditional probability of alcohol use frequency in each year by latent profiles of drinking trajectories.

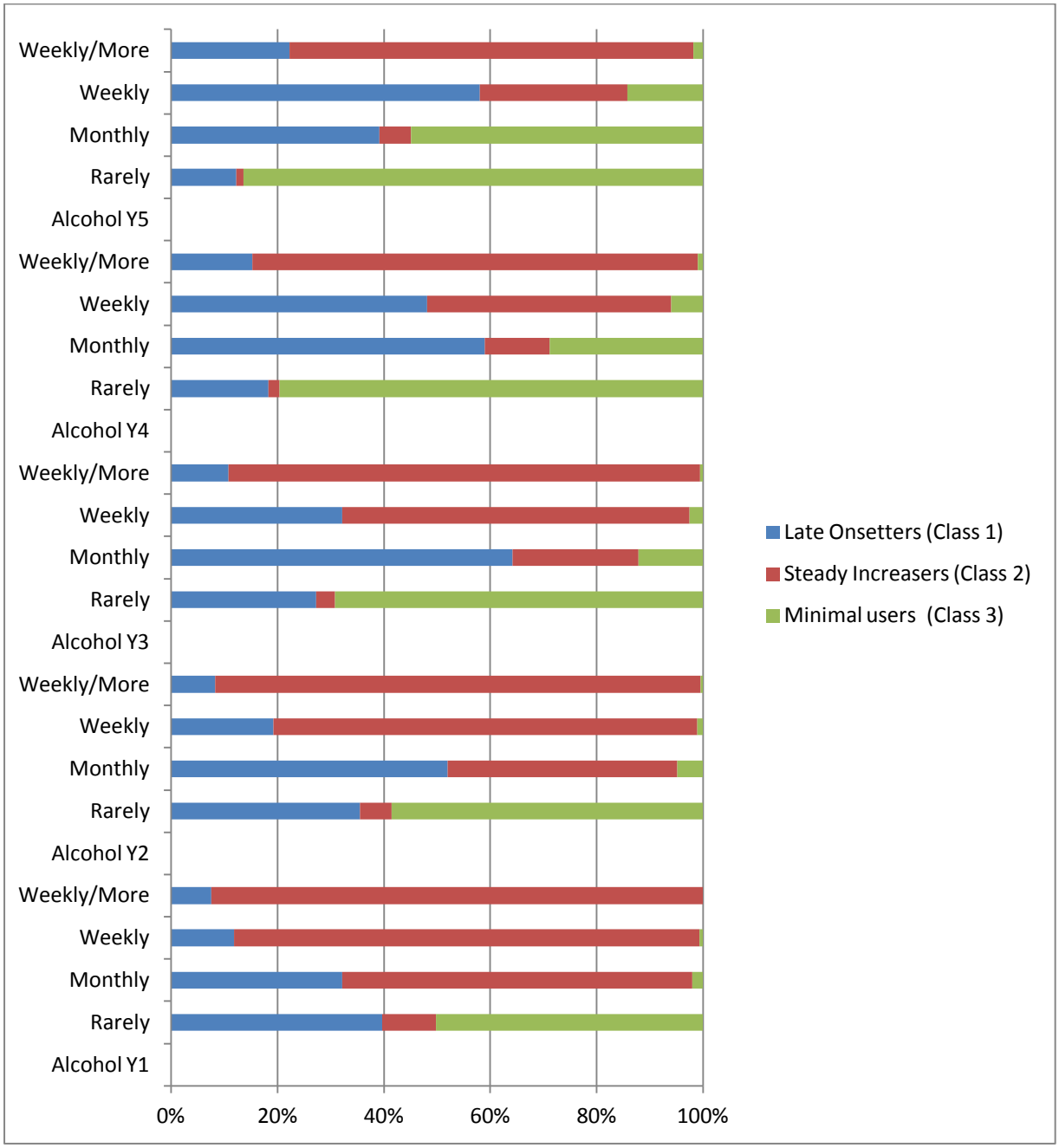

Figure 6. Percentage of alcohol use frequency in each year by latent profiles of drinking trajectories.

Figure 6 above shows the percentage of alcohol use frequency in each year by late onsetters, steady increasers and minimal users. The pattern of use can be clearly seen by observing the proportions for each year. As expected given the study recruitment methods, all profiles begin at a low level and the earlier years are characterised by relatively little drinking, however, we can see as most young people enter the later years of schooling these profiles maintain a steady increase or delayed onset.

Table 11. – Summary of model parameters (means) of alcohol trajectories for latent class growth intercept and slope

	Estimate	S.E	p
Late Onsetters			
Intercept	3.09	0.64	<.001
Slope	0.93	0.04	<.001
Steady Increasers			
Intercept	5.76	0.45	<.001
Slope	0.82	0.13	<.001
Minimal Users			
Intercept	0.00	0.00	>.001
Slope	1.02	0.15	<.001

Two components of alcohol use were initially modelled in the growth analysis: the 'starting point 'of alcohol use (intercept) and the change in frequency of alcohol use per year (slope). On the basis of our estimated mean growth parameters for each class, we can observe a significant amount of variation in the initial levels (intercept) of the three drinking profiles established. In particular, we can observe that the intercept or the initial starting point for late onset drinkers= 3.09, z =4.81; p<.001, this suggests that the linear trend for late onsetters goes up by .93 each year (z=25.19, p<.001). The initial level intercept for steady increasers is much higher than for late onsetters, steady increasers = 5.76, z= 12.83; p<.001, therefore the linear trend for steady increasers goes up .82 each year (z=6.31, p<.001).Finally, we can observe from table 11 that the intercept or the initial starting point for minimal users= 0.00, p>.001, this suggests a very low starting off effect, however minimal users still demonstrated a significant linear trend going up by 1.02 each year (z =6.92, p<.001). The slope of the minimal user class differed significantly with the slopes of the other classes. This implies that the minimal users were less likely to initiate drinking early in comparison to the steady increasers and the late onsetters. The intercept of the minimal user group also differed significantly from the intercepts of the steady increasers and late onsetters. This implies the minimal users were more likely to be abstainers at baseline measurement. These results suggest that both late onsetters and steady increasers demonstrated significant linear increases over time, while minimal users demonstrated that the linear increase may have levelled off during the course of the study.

Predictors of Trajectory Membership

How does the time-varying covariate of disengagement influence alcohol use growth

A series of multiple linear regressions were conducted to predict group membership. We used the combined disengagement variable (attitudes year 1-5) to predict membership of the late onset drinking class (class 1). A significant regression equation was found ($F(5, 840) = 9.68$; $p<0.05$) with an R^2 of 0.23. Therefore disengagement explained a significant amount of variation in late onset drinking. These initial analyses demonstrated the combined contribution of all variables (attitudes 1-5) explained around 23% of the variation in late onset drinking. Further analyses examined the unique contribution of each variable separately and found that attitudes in years 1-4 did not significantly predict membership of the late onset drinking class with betas ranging from (β = -.000 to -.074). However, attitude in year 5 was found to significantly predict membership of the late onset drinking class (β = -.125, $t(845) = -2.56$, $p <.05$).

A further multiple linear regression was conducted to predict membership of the steady increasing drinking class (class 2) from the combined disengagement variable (attitudes year 1-5). We found a significant regression equation for steady increasing drinking and the combined contribution of disengagement ($F(5. 840) = 8.36$, $p<.05$) with an R^2 of 0.21. However, on examination of the unique contribution made by the individual predictor variables we found a non-significant trend. That is, attitudes in years 1-5 did not predict membership of the steady increasing drinking class.

Finally, we entered minimal users as the dependent variable in order to observe both the combined contribution and unique contribution made by the disengagement variable (s) to class membership. We found a highly significant regression equation for the contribution of all predictors on class membership ($F(5, 840) = 18.10$, $p<.05$) with an R^2 of 0.31. Therefore, the combined contribution of disengagement explained around 31% of the variation in minimal use drinking. Further the analyses demonstrated once again that when looking at the unique contribution made by the predictors/covariates only attitude in year 5 significantly predicted membership (β =.135, $t(845) = 2.83$, $p <.05$).

The results of the multiple regressions illustrate that overall; disengagement was predictive of membership of the late onsetters class and the minimal use class but did not significantly predict membership of the steady increasers' class. The results demonstrated a distinct inverse relationship whereby the negative beta coefficients found between attitude in year 5 and late onset drinking suggests individuals with a negative attitude in year 5 are

significantly more likely to be a member of the late onset trajectory class. In contrast the positive beta coefficients found between attitudes in year 5 and minimal use drinking suggests individuals with a positive attitude in year 5 are significantly more likely to be a member of the minimal use trajectory class.

How does the time-varying covariate of disengagement influence being NEET at age 20/21.

In order to assess the relationship between disengagement in years 1-5 and being NEET at age 20/21 we ran a series of regressions to elucidate the significance of attitudes in the specific years and being NEET in later years. Regression analyses were used to test if young people's attitudes in years 1-5 significantly predicted being NEET at age 20/21. The results of the combined regression indicated the five predictors explained 26% of the variance (R^2=.26, F(5, 404) =5.56, p<.01) however, the overall model illustrated a non-significant trend when all predictors were entered at the same time. We therefore examined individual year attitudes and found that attitudes in year 1 significantly predicted being NEET at age 20/21 (β= -.62, t(638) = -2.06, p<.05), as did attitudes in year 2 (β= -1.20, t(738) =-2.42, p<.05), attitudes in year 3(β= -2.09, t(761) =-4.36, p<.01), attitudes in year 4(β= -2.99, t(714) = -6.24, p<.01) and finally attitudes in year 5(β= -2.26, t(773) =-4.96, p<.01) were all predictive of being NEET at age 20/21. Therefore, the results suggest that disengagement was indeed predictive of being NEET in later years. We can see that the magnitude of effect increases year on year, with the highest effect being in year 4. In addition, each of the betas found for attitudes years 1-5 were negative in nature, thus confirming that a negative attitude at school and particularly in the later years significantly increases the likelihood of being NEET at age 20/21.

Can the outcome of being NEET at 20/21 years be predicted by alcohol use trajectory?

Next using class membership as a predictor of being NEET, a second series of multi-level regressions were run to predict if being in the late onsetters, steady increasers or minimal use classes could predict being NEET at age 20/21. Firstly we entered late onsetters (class 1) as a predictor of being NEET at age 20/21 and found a significant regression equation (F(1, 801) =6.09, p<.05) with an R^2 of 0.09. Therefore, membership of the late onsetters trajectory group explained around 9% of the variation in being NEET at age 20/21. Further, the analyses revealed that membership of the late onsetters trajectory class significantly predicted being NEET at age 20/21 (β = .087, t(802) = 2.47, p <.05). We then ran the same regression model, replacing the late onsetters trajectory group with the steady increasers group to predict being NEET. Again, we found a significant regression equation (F(1, 801)

=6.77, p<.05) with an R^2 of 0.09. Therefore, membership of the steady increasers' trajectory group explained around 9% of the variation in being NEET at age 20/21. Further analyses also confirmed that membership of the steady increasers class significantly predicted being NEET at age 20/21 (β = .087, t(802) = 2.60, p <.05). In our final regression model, we entered the minimal use trajectory class and found a highly significant regression equation (F(1, 801) =13.42, p<.001) with an R^2 of 0.13. Therefore, membership of the minimal use trajectory group explained around 13% of the variation. On examination of the beta coefficients for the minimal use trajectory class we found a highly significant negative association between membership and being NEET at 20/21 (β = -.145, t(802) = -3.66, p <.001), that is, those who are members of the minimal use trajectory class are significantly less likely to be NEET at age 20/21. Overall, using class membership as a predictor of being NEET at 20/21, we can observe that membership in either the late onsetters or steady increasers' trajectory class significantly increases the likelihood of being NEET at age 20/21. In contrast belonging to the minimal use trajectory class significantly decreases the likelihood of being NEET at age 20/21.

We drew upon our previous findings and report entitled "Investigating parental monitoring, school and family influences on adolescent alcohol use" (Higgins, Mc Cann, Mc Laughlin, Mc Cartan & Perra, 2013) published by ARUK to both highlight and underscore the importance of other mediating factors in the complex and multifaceted outcomes associated with adolescent alcohol use.

Our findings show correlations between monitoring scales over time. The difference in correlation comparing year 1 and year 5 shows the extent to which monitoring levels change with increasing age, it is these changes in monitoring levels, and the explanations for the changes, that we are most interested in.

Monitoring, alcohol use, and paths of causation

In previous path analyses (not shown here) we demonstrated the results of fully adjusted models investigating the association between overall levels of parental monitoring and alcohol use across the first five years of data collection. As expected, the strongest associations in the model were the time-trend associations. Levels of alcohol use in one year were highly predictive of use in the subsequent year. Similarly, prior and subsequent levels of monitoring were closely associated. The overall reading of the model suggests that there are bi-directional causal mechanisms operating between alcohol and monitoring, however these mechanisms are dependent on the age at which each occurs.

Alcohol use and Monitoring

Higher levels of alcohol use in any given year are associated with slightly lower rates of parental monitoring in the subsequent survey year, suggesting that teenagers who drink may change their relationship with their parents to exert greater autonomy, or provide their parents with less information on their day to day lives. In addition, monitoring tends to decrease with age, the older adolescent is more difficult to monitor and therefore their parents tend to give up. The magnitude of this effect is rather small, with each step up in drinking rate (none to infrequently, infrequently to monthly, monthly to weekly or more), monitoring decreased in the following year by around 0.05 of a standard deviation in years 2, 3 and 4. However, a step up in drinking in year 1 was associated with a reduction in monitoring on 0.16 s.d. units, an effect three times larger than that in any subsequent year.

Monitoring and Alcohol use

Greater parental monitoring was associated with a lower rate of alcohol use in the subsequent years. The magnitude and time-lag for the effects of monitoring on alcohol use are of interest, in that they are somewhat at odds with the findings for the effect of alcohol use on monitoring. A one unit increase in parental monitoring is associated with around a 20% lower rate of alcohol use in the subsequent year: this 20% reduction appears in all years, with perhaps a slightly greater reduction at the youngest age, as appeared for the alcohol use → monitoring paths. The main difference is that high levels of parental monitoring at a young age are directly associated with lower rates of drinking up to four years later. That is, parental monitoring at a young age tends to encourage less frequent drinking, even after taking into account natural changes in levels of autonomy and monitoring, and the effect of monitoring at older ages.

Adolescent drug use

At age 15/16, 'last year use 'of cannabis was reported by 37% of the sample, with 11% reporting weekly use. After adjusting for students' prior substance use, and family and neighbourhood factors, there was no significant difference in cannabis use in the last year according to gender or socio-economic disadvantage, although males were more likely to report weekly cannabis use (OR 1.94) as were those students receiving free school meals

(OR 1.63). Parental knowledge was a protective factor and neighbourhood deprivation a risk factor for both outcome measures relating to cannabis use. As expected, a strong association was observed with prior use, with those reporting last year use in year 3 of secondary-school being 9 times more likely to report last year use in year 5 (OR 8.98), and those that reported weekly cannabis use in year 3 being almost 6 times more likely to report weekly use in year 5 (OR 5.96). All the school-related variables were associated with cannabis use in the last year in model 1, and retained a significant association in model 2. Reporting being in a fight at school increased the likelihood of last year cannabis use (OR 1.40), while having a positive relationship with your teachers acted as a protective factor (OR 0.65), as did reporting lower school aspirations (OR 0.71). A one-point increase in the school disengagement scale was associated with a 4% increase in the odds of using cannabis in the last year (OR 1.04), although gender significantly mediated this outcome: school disengagement was only associated with cannabis use in the last year among females (OR 1.09; $p<0.001$). Reporting being in a fight at school was significantly associated with weekly cannabis use in model 1 (OR 1.45), and having a positive relationship with your teachers was a strong protective factor (OR 0.47). This pattern remained after entering the other school-related variables, with students that reported being in a fight at school 43% more likely to smoke cannabis on a weekly basis, and students who had a positive relationship 52% less likely to. Those that reported lower school aspirations were more likely to report weekly cannabis use but this association was not significant after controlling for other factors. The interaction effect of gender was again significant for school disengagement ($P<0.1$): disengagement in year 3 increased the risk of weekly cannabis use in year 5 among females.

DISCUSSION

This study makes a novel and valuable contribution to the extant literature via use of longitudinal data which allowed us to shed light on the order of events for young people, compared to cross-sectional studies. In this study we investigated how disengagement from school (via negative attitudes towards school) from 11-15 affect the development of both alcohol use trajectories and pathways to being NEET at age 20/21 years. These analyses were conducted on data from a large sample of adolescents surveyed annually between ages 12 and 21 years. The results revealed differences in alcohol use patterns across the five years of compulsory schooling. Typologies of drinking trajectories were predicted by disengagement which was further associated and predictive of being NEET at age 20/21.

Understanding the enduring course of adolescent drinking is a crucial concern for health and social services and to researchers within the alcohol field. Of particular relevance is the stability of, or change in, the course of adolescent drinking (Kerr, Fillmore & Bostrom, 2002) especially heavy/regular drinking and how these may lead to negative outcomes. With this in mind, a finite mixture model, Latent Class Growth Analysis (LCGA), was used to identify common patterns of alcohol use over the five years of data collection in schools. Three different typologies were identified. All profiles of drinkers showed increases over time in the frequency of drinking, although the rate of this increase varied dramatically across alcohol

use profiles. Overall, most adolescents in the final sample belonged to the 'Late Onsetters' and 'Minimal Users' group, with a smaller proportion making up the 'Steady Increasers' group. Each of these groups started at different points, with the 'Late Onsetters' group drinking rarely in early adolescence but drinking weekly or more by mid-adolescence. Adolescents in the 'Steady Increasers' group maintained a consistent pattern throughout the study of drinking weekly or more than weekly. Both groups had similar end-points in the last year of the study in so far as they were both likely to drink between monthly/weekly/more than weekly. A considerable percentage of adolescents were also included in the group with the least hazardous drinking pattern, the 'Minimal Users' group, who continued on a pattern of rarely drinking throughout, only increasing to rarely/monthly by year 5. Overall, the results revealed the pervasiveness of drinking by mid-adolescence in the BYDS sample, a result consistent with an extensive range of studies on the variability of drinking in adolescence (Mirza- Davies, 2015). Furthermore, the presence of the diversity found in our developmental trajectories of alcohol use has important implications for both theory and practice.

Using LCGA we identified three distinct profiles of adolescent alcohol use, all of which showed stable and linear patterns of alcohol growth over time. These results are consistent with an extensive range of studies that identified three discrete groups of adolescent drinking. We found trajectories similar to those found in previous studies based on shorter follow-up times (Maggs & Schulenberg, 2005). At the population level adolescent experimenters have been seen to 'naturally recover' from regular drinking (Muthen & Muthen, 2000). The late onset trajectory, the most prevalent trajectory in our study, in part may reflect this phenomenon. This study, however, shows that many do not mature out of regular drinking and this can lead to differential academic, employment, social and personal outcomes (Viner & Taylor, 2007). Our findings illustrate and may offer support to those found and interpreted within a developmental framework of adolescent alcohol use/misuse. In particular, the proposition that drinking typically accelerates during adolescence, reaches its highest peak during young/emerging adulthood and then decelerates to more moderate levels (Muthen & Muthen, 2000). Overall, our findings reveal substantial evidence that there is heterogeneity in the development of early and mid-adolescents' alcohol consumption. This underscores the importance of focusing on drinking trajectories in research on adolescents' drinking instead of studying adolescents as a single, homogeneous group. That is, our findings show not only that some factors are more important for certain trajectories, such as disengagement and attitudes for late onset drinking, but also that the influence of factors can differ by age periods or the change in the influence of parental monitoring.

The findings of the current study indicate that the course of drinking over a five year period is variable and influenced by a range of factors. We found a number of noteworthy findings in relation to adolescent alcohol trajectories, drug use, parental monitoring, attitudes towards school and later likelihood of being NEET at age 20/21. Firstly, our findings indicated a greater proportion of female were NEET compared to males in line with NEET/national statistics. For example, Mirza- Davies (2015) reported 57% of those who were classified as NEET (aged 16-24 years) were female. However, it may be these females were unavailable or not looking for work due to family and home commitments. Our results suggest that both late onset drinking adolescents and steady increasing drinking adolescents are at a higher risk of being NEET in the future. Our findings are in line with those of Balsa, Giuliano and French (2011) and Green and Ross, (2010) who found that teenage alcohol use is a well-known correlate of reduced educational attainment. In addition, consistent with Ross & Green (2010) we found that drinking was associated with a number of negative educational outcomes such as lower GCSE scores and not remaining in full-time education beyond the age of 16. However, it is unclear whether this relationship is causal or spurious (Staff et al., 2008). Young people who are members of these trajectories may have not achieved highly at school which may have initiated the sequence of disadvantage. Our findings support the extant literature surrounding problem drinking in adolescence and the developmental trajectories of use and outcomes (Windle et al, 2008). In particular, our results are consistent with, and substantiate an extensive range of studies that found regular drinking by late adolescence had the potential to determine life trajectories e.g. by adversely affecting the success in transitions between social roles and statuses (Staff et al, 2010) such as gaining employment or commencing training after leaving school (Oesterle, Hawkins & Hill, 2011). Indeed, regular problem drinking in adolescence and early adulthood (Chassing, Pitts & Prost, 2002; Pitkänen, Kokko, Lyyra & Pulkkinen, 2008) has been found to be associated with low educational (Chatterji, 2006) and occupational attainment (Sloan, Malone, Kertesz, Wang & Costanzo, 2009), and unemployment (Henkel, 2011). These different patterns suggest that late onset drinking in adolescence may represent a distinct behavioural pattern given that it was uniquely influenced by a young person's attitude in year 5. In addition, the pattern observed for the minimal user trajectory was also predicted by attitudes in year 5. This is a noteworthy finding as it clearly delineates the bi-directionality of the relationship. These findings in particular have important ramifications for targeting interventions at this age/stage of compulsory schooling.

Gaining sufficient education and qualifications at school is usually a precondition for beginning on the employment pathway. Our findings suggest that individuals displaying late onset drinking may be particularly vulnerable to the later negative outcomes associated with problem drinking. Moreover, we found that regular, steady and late onset drinking in adolescence disrupted some of the young people's educational pathway, increasing the likelihood of being NEET at age 20/21 (Hicks et al, 2010). Our findings suggest there are two distinct pathways to being NEET, however, individuals displaying late onset drinking may be particularly vulnerable to the later negative outcomes associated with problem drinking. Our findings suggests that the transition from formal education to post compulsory education, employment or training was markedly less successful among both late onset drinkers and steady increasers compared to minimal users. Our results thus corroborate and extend understanding on two important aspects of the typical life course of adolescent drinkers who are at risk of being NEET at age 20/21. It may be that low educational achievement in year 5 of compulsory education meant that these young people left school with low educational attainment, inevitably limiting their opportunities in terms of gaining employment or having the qualifications necessary to enter training courses. Secondly, their late disengagement and attitudes towards school directly affected alcohol use and the likelihood of being NEET at age 20/21. These interrelated factors (i.e. low educational attainment and youth unemployment, are major determinants of labour market disadvantage later in life (Henkel, 2011), and can thus potentially explain a considerable part of the employment disadvantage accumulated over the life course of problem drinkers (Mossakowski, 2008).

Many young people with early onset regular drinking are found to experience a range of symptoms of problem drinking by their early twenties (Stone, Becker, Huber & Catalano, 2012), however research also indicates that the vast majority are likely to recover by adulthood (Meier et al, 2013). Some research suggest however, (i.e. Hicks, Iacono & McGue, 2010) that individuals who progress rapidly to problem drinking after drinking initiation and who present a persistent problem drinking pattern usually have a number of co-occurring and interacting adversities which therefore hinder their success in employment or training. Among those deemed vulnerable, the experience of unemployment and diminished job prospects may act as a catalyst to engage in further drinking (Strandh, Winefield , Nilsson & Hammarström, 2014) which may lead to reduced physical health and difficulties in both gaining and maintain employment (Dieckhoff, 2011). Therefore, our results substantiate those within the literature on the negative long term outcomes in terms of education, employment or training and regular/persistent drinking.

Having an understanding of the complex interplay between regular and persistent drinking and employment marginalisation among young adults is crucial in developing targeted interventions aimed to reduce the public health burden related to socioeconomic adversity and in reducing health inequalities across a range of populations (Haan & Myck, 2009).

We found that collectively, disengagement was predictive of each of the trajectory classes. That is, on the whole disengagement predicted membership of the late onsetters, minimal users and to a lesser extent the steady increasers. However, when we examined this relationship further, we found that it was only the young person's attitude in year 5 that was fully predictive of being in the late onsetters and minimal users' class. In particular, we found that disengagement in the early years of school (11-14) did not significantly predict class membership. However, it was found that those with a negative attitude were more likely to be those in the delayed onset consumption group, whilst those with a positive attitude in year 5 were more likely to be in the minimal users group. In particular, given that year 5 is associated with an emphasis on application and motivation for forthcoming exams the differences between having a positive attitude and therefore engagement in school versus a negative attitude and disengagement in school can be clearly elucidated from our results. These attitudes will affect behaviour and a represent a behavioural pattern that increases or decreases the risk of later social, educational and socioeconomic adversity (Li & Lerner, 2011). Our results suggest the behavioural pattern and attitude of young people in year 5 of compulsory schooling has a significant impact upon both their alcohol use and the likelihood of transitioning to education, employment or training in the future.

We found no significant effects when we examined combined disengagement simultaneously over the five year study period and being NEET at age 20/21. However, when we examined the independent effect of each year individually we found that each of the years made a significant contribution to the likelihood of being NEET at age 20/21. We found this effect to be particularly salient in the latter two years of formal education (year 4 and 5) which, suggests a young person's attitude and engagement in school has a unique influence on later outcomes independent of other factors including alcohol use. This is a particularly relevant finding given that disengagement has been shown to predict both alcohol use and being NEET in the current study and is consistent with a number of hypotheses highlighting disengagement as a key component for later negative outcomes. In particular, our findings suggest that disengagement is crucial to later outcomes and is

consistent with research by Cunha and Heckman (2009) whereby school engagement is important since it has been found to independently influence academic and cognitive outcomes. Similarly, research has further shown that disengagement from school, including truancy and exclusion, has been linked to drug and alcohol use and other health-compromising behaviours (Higgins et al., 2013; Fuller, 2011). Fuller et al (2012) reported that pupils who were disengaged from school were over twice as likely to have drunk alcohol in the past week. Previous research on poor school attendance, truancy and school exclusion has reliably established strong associations with low educational attainment; persistent absentees are seven times more likely to be recorded as NEET at the age of 16 than other young people leading to protracted outcomes in terms of long-term educational achievement and subsequent employment (Department for Children, Schools and Families, 2008). This research suggests that we need to improve our understanding of the determinants of school engagement, including the role of prior achievement in influencing young people's attitudes toward school and the role of the school in determining student engagement, all of which can determine the future prospects of the young person.

Given that we found young people's attitude in year 5 to be the unique variable that both predicted alcohol use trajectory and being NEET at 20/21 is a significant one. In particular, it has to be acknowledged that the attitudes in the final years of school do not happen in a vacuum; rather they are the combined attitudes and engagement at school over the previous 3-4 years. Our results therefore underscore and highlight that young people should be targeted in each year of compulsory schooling. Changing the young person's thinking about both school and alcohol use can inevitably affect their behaviour within school and their attitudes towards alcohol. Perhaps the young people in our study who drank regularly in school transitioned to regular drinking as a young adult, causing low productively and absenteeism which in turn affected their prospects of long-term employment and/or further training and education. In contrast, perhaps, it may have been merely adolescence-limited drinking or engaging in this behaviour in order to fit in with other friends drinking habits. Our findings unequivocally demonstrated how attitudes towards school have a profound effect on later outcomes and particularly of being NEET at 20/21. We found that disengagement led to alcohol use at differing levels which affected young people's long-term outcomes. In particular, we could assume that those who have a negative attitude and who are disengaged with their school have a higher likelihood of engaging in anti-social behaviour, drug use and being excluded from school. Many studies in this area have reported on the compelling links between school absence and smoking, drinking and drug

use (Fuller, 2011). Findings from a recent report indicated that pupils who truanted from school (in the previous year) were over twice as likely to have drunk alcohol in the past week (Fuller, 2012). Previous research on both truancy and school exclusion has reliably established strong associations with low educational attainment. Within the educational context, school exclusion and truancy has been linked to protracted outcomes in terms of long-term educational achievement and subsequent employment. Children with poor school attendance are less likely to succeed academically, and persistent absentees are seven times more likely to be recorded as NEET at the age of 16 than other young people (Department for Children, Schools and Families, 2008). Disruptions in educational trajectories may delay or restrict the achievement of milestones such as finishing school or completing a further education course and these have also been linked to an increase in deviant behaviour including drinking and drug use, all of which can lead to problems gaining and maintaining employment.

Our findings further suggested there were additional factors at play in the complex relationship between adolescent alcohol use and pathways to being NEET. Several studies have demonstrated associations between quality of parent-child relationships and young people's alcohol use, with different theories being proposed to describe the causal mechanisms and processes that explain the associations between parent-child relationships and alcohol initiation. One generally accepted explanation has been provided by social control theory (Hirschi, 1969). According to this theory, attachment to parents and good parent-child relationships may inhibit regular alcohol use because young people are wary of the repercussions that getting drunk may have on the relationship with their parents or on parents themselves. Thinking about their parents' reaction would therefore induce children that are attached to parents and in good relationships with them to limit alcohol intake or delay alcohol initiation, even in situations where the temptation arises. The findings in the current study suggested there were bi-directional causal mechanisms operating between alcohol and parental monitoring; however these mechanisms are dependent on the age at which each occurs. Given we found that the strongest association for disengagement was in the latter two years of formal education it would seem plausible to assume that age is an important factor in terms of monitoring and later positive/negative outcomes. We found overall that higher levels of alcohol use in any given year was associated with slightly lower rates of parental monitoring in the subsequent survey year, suggesting that teenagers who drink may change their relationship with their parents to exert greater autonomy, or provide their parents with less information on their day to day lives. In addition, monitoring tends to

decrease with age, the older adolescent is more difficult to monitor and therefore their parents tend to give up. This is consistent with an extensive body of research that highlights parental monitoring as a key element in the young person's behaviour and attitude. In particular, the seminal work conducted by Stattin and Kerr (Kerr & Stattin, 2000; Stattin & Kerr, 2010) has highlighted that much of parental knowledge regarding their children's unsupervised activities is the result of children's own disclosure to their parents. During adolescence, when young people become increasingly involved in unsupervised activities with peers and when direct parental control and supervision relents, how much parents know about their adolescent children's activities is, to a great extent, known through adolescent's spontaneous communication with parents concerning these activities. The results of studies by Stattin and Kerr confirmed that young people's disclosure explained much of the knowledge that parents' had about their children's activities (Stattin & Kerr, 2000) and, on the other hand, young people's disclosure to their parents is hardly the result of parental attempts at gaining information concerning their children's activities (for example, by soliciting disclosure) (Kerr et al., 2010). The fact that levels of adolescent disclosure are associated, both cross-sectionally (Stattin & Kerr, 2000) and longitudinally (Kerr et al., 2010) to young people's alcohol use and a range of other factors is confirmation of the pivotal role that young people's disclosure plays. Overall, we found that greater parental monitoring was associated with a lower rate of alcohol use in the subsequent years. The main difference is that high levels of parental monitoring at a young age are directly associated with lower rates of drinking up to four years later. That is, parental monitoring at a young age tends to encourage less frequent drinking, even after taking into account natural changes in levels of autonomy and monitoring, and the effect of monitoring at older ages. These results in particular are suggestive that the minimal users group may have been those whose parents exerted a greater level of monitoring as adolescents were growing up. However, not all adolescents are compelled to engage in risky behaviours such as early alcohol use. Some research suggests that adolescents who have more problematic relationships with their families during early adolescence, such as those who feel that their parents either are too controlling or are not involved enough, are likely to become more focused on peers and their behaviours. (Strandh, Winefield , Nilsson & Hammarström, 2014). However, as our results suggest not all adolescents are involved in alcohol use or are disengaged, so it is therefore important to acknowledge the great diversity and individual differences associated with adolescent alcohol use. A key developmental issue for both research and intervention is to identify the individuals who show the greatest risk for becoming involved in peer groups that may encourage risky behaviours such as regular drinking. Interventions that develop young people's social and

emotional capabilities can improve academic achievement and protect against risky behaviour (Mentor, 2013).

Our findings further suggested that young people in the latter years of formal education were also regularly taking illegal substances such as cannabis alongside using alcohol. We found that males were more likely to report weekly cannabis use and they were more likely to be in receipt as of free school meals. Our findings suggested however, that parental monitoring was a protective factor as was good teacher-student relationships and that deprivation was a risk factor for both outcome measures relating to cannabis use. Interestingly we found that school disengagement was only associated with cannabis use in the last year of school and only among females. Those that reported lower school aspirations were more likely to report weekly cannabis use but this association was not significant after controlling for other factors. The interaction effect of gender was again significant for school disengagement, whereby disengagement in year 3 increased the risk of weekly cannabis use in year 5 among females. Our findings are consistent with a range of studies (i.e. Fletcher, Bonell, Sorhaindo, & Strange, 2009) which demonstrated the potential importance of the school environment on young people's drug use. In addition, we found that lower school aspirations also acted as a protective factor for occasional cannabis use, a finding that was unexpected. One possible interpretation of this finding is that cannabis use is higher among students with higher aspirations, seeking to manage school stress and anxieties via 'self-medication' (Fletcher, Bonell, Sorhaindo, & Strange, 2009).

The outcome for this study was frequency of alcohol use, ranging from minimal users to late onsetters to steady increasers. This outcome measure may not serve as a useful indicator of problematic alcohol use. There is no indication of drunkenness, amount consumed when drinking, or other indications of problematic alcohol use, even for those who stated they are drinking weekly or more frequently. As such, there is a limitation on the extent to which these results demonstrate school variation, or protective family level factors in terms of 'risky' or harmful alcohol use. Further studies should assess the extent to which the parenting and family characteristics identified here are related to longer term indicators of harmful drinking and particularly of late onset adolescent drinking. Therefore, and because we lack information about their problems with alcohol, it is difficult to conclude whether this group meets criteria for alcohol abuse or just problem drinking. However, drinking on a weekly basis at this age appears to put these adolescents at risk for future problems (e.g., Fergusson et al., 2001). The major strength of the approach used in the current study is that

the measure of alcohol use, while less indicative of longer term problems, was equally applicable at all ages in the study. Measure such as expenditure on alcohol, or Alcohol Use Disorders Identification Test scores would not be applicable to 11 year olds in the same way as they are for 18 year olds. By using a less specific measure of alcohol problems, the study was more sensitive to less dramatic changes in the development of alcohol behaviours; the results were able to demonstrate the relationship between disengagement and alcohol use and monitoring and alcohol use throughout the early teenage years when behaviours are changing and the likelihood of becoming NEET in the future is greater. Previous studies including Ross (2009) used a range of measures to identify disengaged youth including motivation, attitudes and behaviours. In the current analyses we focused on attitudes only (as Fergusson, Horwood & Woodward, 2001, indicate attitudes can predict future behaviour). Future, analyses (using the BYDS data or other longitudinal datasets) would benefit from investigating all three constructs/indicators.

Due to limitations of the data, we could only ascertain if respondents were currently in employment or currently students to construct a NEET variable (at 20/21 years). We did not have any underlying information as to why they were NEET or in employment/education. We did not collect any information that may suggest young people were economically inactive-not seeking work and/or not available to start work. In addition, we did not have information on whether those who were NEET were full-time parents/carers or unable to work due to a disability/ill-health. The BYDs did contain one question on benefits or grants received. However, this simply asked if participants received any of the following: job seekers allowance, carers allowance, child benefits, disability benefit or housing benefit; and so it was not possible to infer which of these categories applied to which participant. It was also not possible to ascertain how long young people had been NEET or if they had been NEET over a number of occasions in their lifetime. Our sample were also homogenous (e.g. white British/Irish) and contained limited immigrants etc.(who according to the literature are at risk of being NEET). Other non-vulnerable sub-groups include those simply taking time out and those constructively engaged in other activities such as art, music and self-directed learning (Eurofound, 2012). Finally, we used a broad definition of NEET. Furlong (2006) argues that to represent vulnerable youth effectively, we must either use a set of definitions that are narrower than that represented by NEET, or adopt a much broader definition that provides a basis for more far-reaching interventions.

IMPLICATIONS FOR RESEARCH, POLICY AND PRACTICE

Our findings may be of policy importance for interventions around drinking and being NEET at age 20/21, especially targeted in year 5 of formal education. Public health initiatives have centred on reducing overall alcohol intake amongst adolescents and young adults through community education programmes that focus on safe drinking, school based interventions or higher level measures such as increasing the price of alcohol and reducing access to alcohol for young people (Murgaff, Abraham & Mc Dermott, 2007). However, what is known and acknowledged within the literature is that young people perceive relatively little risk associated with such weekly drinking which may reduce the efficacy and effectiveness of these targeted interventions to reduce harmful drinking.

The presence of the diversity found in our developmental trajectories of alcohol use has important implications for both theory and practice. Conceptually, the diversity of the pathways underscores the importance of targeting interventions that promote school engagement particularly in year 5 of formal education. Increasing school engagement will require individualised needs assessment, careful program design, implementation and integration both within and out of school between educators and practitioners to effectively tackle the problem. Given that young people perceive relatively little risk with regular drinking, campaigns both in and out of school should focus on the consequences of alcohol-related problems that both appeal and are relevant to the young person. For example a leaflet campaign outlining the physical and or psychological dangers of alcohol in young people in all probability is not going to make a significant impact. Therefore, campaigns should focus on current issues within the young person's life and the

associated consequences of drinking (i.e. images of them drunk on Facebook, STDs whilst drunk, teenage pregnancy, anti-social behaviour and involvement with the police). Although hard-hitting, initiatives such as these may have the potential to substantially impact upon a young person's thinking about alcohol which in turn could affect their behaviour.

Furthermore, these results can be meaningful for alcohol prevention programs. Alcohol prevention programs should not focus on adolescents as a single group, but should provide programs for specific groups. Increasers and the late onsetters might be at particular risk for later alcohol related problems (Fergusson et al., 2001). Therefore, treatment programs should particularly target adolescents in these trajectories. It also seems that increasers and late onset drinkers could benefit from programs designed to help them resist peer pressure, whereas for abstainers and light drinkers parental involvement in the treatment appears more important.

Our analyses underscore the importance of policies to address the protective nature of the educational attainment of young people. Current debate in the UK is also considering extending the compulsory schooling age to relate to educational outcomes, to ensure that those children at risk of failure are not allowed to drop out with little or no qualifications. This should also be considered in context of the demise of the Education Maintenance Allowance and the impact this has had on staying on in education. The current rise in youth unemployment makes this an opportune time to act. Viswanathan (2010) suggested interventions to prevent young people from becoming NEET should focus on four key areas: tackling poor material circumstances; improving young people's experiences of school; raising young people's expectations and aspirations for the future and; use of management information to target support to vulnerable young people.

The European Monitoring Centre for Drugs and Drug Addition (EMCDDA) has outlined a number of best practice interventions for alcohol abuse specifically targeting school students. Research has shown that prevention targeting schools offers a systematic and efficient way of reaching large numbers of young people. In particular, multicomponent interventions delivered at school and based on social influence and/or on learning social skills have been shown to be effective for reducing alcohol and drug use, especially cannabis. In addition, schools also offer interactive interventions targeted at problem students which have been shown to help reduce substance use and 'drink-driving' behaviour. Overall, school based interventions based on social influence and/or on skill-

based interventions have been proven to be effective in reducing licit and illicit drug use; interventions aimed at disadvantaged students and interventions that are peer-lead have all shown promising results. In particular, such school-based prevention programs have shown to be effective in a systematic review (Foxcroft et al., 2011a) of 53 RCTs in: reducing alcohol misuse in adolescents (statistically significant outcomes in 6 out of 11 alcohol-specific trials). In addition, Faggiano et al, (2010) reported that school-based programmes that implement the concepts of social influence and life skills were found to be effective in: reducing overall drunkenness and drunkenness in 3 or more episodes. The EMCDDA have also reported on the benefits of multi-component prevention programs (intervention delivered in more than one setting) and have shown in a systematic review (Foxcroft et al., 2011b) of 20 RCTs to be effective in: reducing alcohol misuse in adolescents (12 of the 20 trials showed some evidence of effectiveness).

The conclusions of this study also highlight some of the important processes within the school context, which may act as influencing factors on both alcohol use and the likelihood of being NEET in the future. We have identified disengagement as a risk factor for both alcohol use and of being NEET, with those in years 4 and 5 being particularly susceptible. Lack of school engagement could be addressed through both school and community interventions. In particular, teaching social, emotional, and cognitive skills and addressing appropriate problem solving, anger management and emotive language have all been shown to be more effective than practice based on strategies of control, coercion or exclusion. Schools may promote engagement through practise that emphasises participation, shared values, and discipline and that result in promotion of student involvement. A positive school climate that emphasises commitment and investment in school activities may therefore set a template that eventually protects against initiation and involvement in alcohol use where the drive towards future academic achievement may not be generally present. In addition, school based programmes that aim to change the school environment as opposed to interventions that focus solely upon changing the individual have been shown to be particularly beneficial in changing perceptions and enhancing school cohesion subsequently improving later educational outcomes.

The findings of this study are of importance to the academic understanding of adolescent development and alcohol use, and to the field of alcohol harm reduction, family support, and youth alcohol policy. The research conclusions of this study demonstrate the need to go beyond conceptualising adolescent alcohol use in isolation and to examine in more detail how other mediating variables may contribute to the overall relationship. This study has identified mechanisms specific to the differing alcohol trajectories across a large

sample of young people. Our findings uniquely highlight the importance of understanding the complex interplay of individual, school, family and environmental factors. Consistent with the findings from Fergusson et al., (2001), adolescent alcohol use cannot be regarded as an isolated factor but rather seen in a context of a large number of intervening variables that individually create small contributions to the risk of negative outcomes but in combination crucially impact upon individual adjustment and later likelihood of being NEET.

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