School absences in secondary schooling and adolescents' post-school destinations – Evidence from the Scottish Longitudinal Study

Markus Klein[1]*, Edward Sosu[1],

[1] School of Education, University of Strathclyde, Glasgow, UK.

*Corresponding author:

markus.klein@strath.ac.uk
Lord Hope Building,
141 St James Road,
School of Education,
University of Strathclyde,
Glasgow. G4 0LT

Abstract

School absenteeism may have severe, long-lasting consequences for children's life course trajectories and outcomes. Frequent school absenteeism may lead to less favourable post-school destinations because students gain fewer skills and do not achieve the necessary educational qualifications to succeed in the labour market. School absences may also lead to a lack of behavioural dispositions needed when seeking employment in the labour market. While there is considerable evidence on the harmful consequences of school absences for children's academic achievement, few studies investigated links between school absences and post-school destinations. This literature did not examine the mediating role of educational attainment for the association between school absences and post-school destinations. In the present study, we ask whether and to what extent overall school absences and specific forms (sickness and truancy) are associated with students' post-school destinations (risk of NEET, occupational status). We further investigate the extent to which educational attainment mediates associations between school absences and post-school destinations. We used a sample of upper secondary students (n = 2,941) from the Scottish Longitudinal Study (SLS) linking 2001 and 2011 census data, administrative school records, and Scottish Qualifications Authority (SQA) data. Our findings show that overall absences and specific forms of absences (truancy and sickness) significantly increase the risk of being NEET after adjusting for covariates. Academic achievement can partly explain these associations, ranging from 28 per cent for sickness absence over 36 per cent for overall absences to 51 per cent for truancy. Statistically significant direct effects on the risk of being NEET can be found for overall absences and sickness absences but not for truancy. There were no associations between school absences and occupational status among employed school leavers.

Introduction

School absenteeism is a pervasive problem in educational systems around the world and has attracted much attention from researchers, media, and policymakers alike (Attendance Works, 2016; M. A. Gottfried & Hutt, 2019; Jordan & Miller, 2017). Frequently absent students miss out on teacher-led lessons, peer interactions, or activities that may stimulate their learning (Morrissey et al., 2014). Consequently, higher rates of absenteeism are linked with school exclusion (Alexander, Entwisle, & Kabbani, 2001; Bowman-Perrott et al., 2011), poorer academic achievement (Aucejo & Romano, 2016; M. Gottfried, 2011; M. A. Gottfried, 2010; M. A. Gottfried & Kirksey, 2017; Kirksey, 2019; Morrissey et al., 2014; Smerillo et al., 2018), school dropout (Allenworth & Easton, 2007; Balfanz et al., 2007; Ou & Reynolds, 2008; Rumberger, 1995) and lower educational attainment later in life (Ansari et al., 2020; Smerillo et al., 2018).

School absenteeism may have severe, long-lasting consequences for children's life course trajectories and outcomes. Developmental and economic theories argue that individuals' long-term capabilities and outcomes are built on skills and dispositions acquired earlier in the life course (Heckman, 2006). The theory of cumulative (dis)advantage suggests that small initial skill differences early in the life course generate differences in the skill accumulation across the life course (e.g., DiPrete & Eirich, 2006). Hence, school absenteeism is a key vulnerability that likely locks young people and adolescents into path dependencies of disadvantaged life course trajectories (Ansari et al. 2020).

For example, frequent school absenteeism may lead to less favorable post-school destinations because students gain fewer skills and do not achieve the necessary educational qualifications to succeed in the labor market (Iannelli & Duta, 2018). According to the Faucet theory, students enhance their skills through frequent exposure to schooling, and they stop making educational gains once the exposure is turned off (Alexander, Entwisle, & Olson,

2001). More time spent on instruction in the classroom has been found to be associated with better academic achievement (Bodovski & Farkas, 2007; Fitzpatrick et al., 2011; Heatly et al., 2015; Marcotte & Hemelt, 2008). Therefore, lower educational attainment may explain the association between school absenteeism and poorer labour market outcomes.

However, school absences may be detrimental to adolescents' post-school destinations via other pathways than educational attainment. They are associated with adverse events and experiences detrimental to students' career prospects, such as alcohol and substance abuse (Eaton et al., 2008; Hallfors et al., 2002; Henry & Huizinga, 2007), engaging in risky and sexual behavior (Ansari & Pianta, 2019), or juvenile delinquency (Dalun Zhang et al., 2007; Rocque et al., 2017). These problem behaviors are, in turn, detrimental to adolescents' labor market outcomes (Baert & Verhofstadt, 2015; MacDonald & Pudney, 2001; Tanner et al., 1999; Terza, 2002).

School absenteeism is further associated with developing fewer social skills (a combination of students' approaches to learning and interpersonal skills) and greater levels of internalizing (e.g., mood disturbance, including anxiety, depression, and social withdrawal) or externalizing behavior (e.g., conflict with others and violation of social norms) (Ansari & Gottfried, 2021; Ansari & Pianta, 2019; M. A. Gottfried, 2014). Moreover, Santibañez and Guarino (2021) show that school absences negatively impact children's socio-emotional development, including lack of social awareness, self-efficacy, self-management and growth mind-set. Hence, school absences may lead to a lack of behavioral dispositions needed to succeed in the labor market (Daly et al., 2015; Deming, 2017; Egan et al., 2015; Ettner et al., 1997; Healey et al., 2004; Heckman et al., 2006; Le et al., 2005).

Investigating different reasons for absenteeism (e.g., sickness and truancy) and their link to post-school destinations may help us further understand the role of these mediating pathways. For example, accounting for differences in educational attainment, the link between

truancy and post-school destinations may be due to greater problem or externalizing behaviors. By contrast, net of educational attainment, the link between sickness absence and post-school destinations may signal underlying health conditions or greater internalizing behavior that have a long-term impact on employment and occupational attainment. Hence, depending on their link with these underlying processes, different forms of absenteeism may be more or less associated with post-school destinations when fixing differences in educational attainment.

A limited number of studies have investigated the association between school absences and post-school destinations. For Great Britain, Hibbett, Fogelman, and Manor (1990) showed that truancy was associated with lower status occupations, less stable career patterns, and higher unemployment. Likewise, Attwood and Croll (2006, 2015) found that truancy was associated with not staying in education post-16 and a higher risk of becoming unemployed in England. Using Swedish administrative data, Cattan et al. (2017) showed that frequent absences in elementary school lowered the probability of employment at the age of 25-30. However, none of these studies investigated whether specific reasons for absences are differently associated with post-school outcomes. Most importantly, the literature did not examine the mediating role of educational attainment for the association between school absences and post-school destinations.

The Current Study

The present study's goal is to advance our understanding of the association between school absenteeism and post-school destinations. For this purpose, we use unique data from the Scottish Longitudinal Study linking school administrative records (2007-2010) to Census data from 2001 and 2011. These linkages of Scottish data allow us to have comprehensive and robust information on adolescents' sociodemographic background, school attendance in secondary schooling, their educational attainment, and their post-school destinations.

Scotland has a comprehensive schooling system, where primary education lasts for seven (from P1 to P7) and secondary education for six years (from S1 to S6). At the end of compulsory (stage S4) and post-compulsory schooling (stage S5/S6), students in Scotland undertake national examinations, which are highly consequential for school continuation, entry into higher education, and labor market outcomes (Iannelli et al., 2016; Iannelli & Duta, 2018). Schools in Scotland report specific reasons for absences following guidelines set by the government (Scottish Government, 2007). These may be due to authorized reasons where parents contact the school and provide reasons for why their child cannot attend school or is not at school. Absences can be authorized by schools for reasons such as sickness, exceptional domestic circumstances, or family holidays. Where a child does not attend school and the parent has not contacted the school to indicate that their child will be absent, it is to be assumed that the child is either missing or truanting until an explanation is received by the school. Our research questions are as follows:

- To what extent are school absences in upper secondary schooling associated with students' post-school destinations (risk of not in education, employment, or training (NEET), occupational attainment)?

- To what extent does educational attainment mediate the association between school absences and post-school destinations?

- Does the association with post-school destinations and the mediating role of educational attainment vary with the reason for absence (sickness absence, truancy)?

Data and Methods

Data

The Scottish Longitudinal Study (SLS) links 2001 and 2011 census data, administrative school records, and Scottish Qualifications Authority (SQA) data, allowing us to harness reliable and comprehensive information on the reasons for absences, students' achievement

and post-school destinations. The SLS is a large-scale, anonymized record linkage study designed to capture a representative sample of the Scottish population. SLS members were selected by using 20 semi-random birthdates and cover 5.3% of the Scottish population. We obtained ethical approval for the study from the University of xxxx (removed for blind review) ethics committee.

Our SLS sample (n = 6,031) consists of two student cohorts in their final year of compulsory schooling (stage S4) in state-funded schools in 2007 and 2008, respectively, who were followed into postcompulsory secondary schooling (stages S5 and S6). To access information on essential covariates from Scotland's Census 2001, we did not consider pupils who lived outside of Scotland during the 2001 census or did not live with their parents in our analytic sample (n = 1026). We also did not consider pupils who attended special schools, those recorded to have repeated a school year, and those who appeared to have skipped a consecutive school stage (n = 62) in our analytic sample. We also had to exclude pupils who lack SQA achievement records (n = 128) or were not present during the Census 2011 (n = 408) because we do not have information on their achievement or post-school destinations. After listwise deletion (n = 368), our sample consists of 4,039 pupils who were observed from S4 until the recording of their post-school destinations in the Census 2011. In this paper, we will focus on pupils who continued schooling into upper secondary stages (S5/S6) since we wish to adjust our analysis with previous educational attainment after compulsory schooling (S4). Hence, our sample further reduces to 2,941 pupils due to pupil dropout after compulsory schooling. To correct for potentially selective dropout, we will weigh all analyses with inverse probability of censoring weights (see the section on Analytic Strategy). For the analysis of occupational attainment, we focus on a sample of pupils that were employed during the Census 2011 (n = 488). Likewise, we will use inverse probability of censoring weights to correct for selective employment (for details see the Analytic Strategy).

Measures

Our measures included post-school destinations as the dependent variable, overall and specific reasons for absenteeism as our main independent variables, educational attainment as our mediator, SES as our moderator and a rich list of covariates including attainment after compulsory schooling (for summary statistics of all variables, see Table 1).

Post-school destinations

We measure pupils' *economic activity* with a binary outcome indicating whether pupils are NEET (9%) vs. employed, in further education, or training (91%) during the time of the Census 2011. The vulnerable group of adolescents who become NEET at the transition from school to work are of policy concern in the UK (Bynner & Parsons, 2002; Powell, A., 2018; Scottish Government, 2015). For example, economically inactive young people have a significantly higher risk of depression, alcohol or substance misuse and suicidal attempts than their economically active peers (Scott et al., 2013). Being NEET early in the career has also long-term scarring effects on future labor market exclusion and wages (Bäckman & Nilsson, 2016; European Foundation for the Improvement of Living and Working Conditions., 2012).

Regarding *occupational attainment*, we used a binary outcome differentiating between the working class (34%) and all other classes (66%). For this purpose, we used the National Statistics Socioeconomic Classification (NS-SEC) from the Census 2011 (Goldthorpe, 2007). The working class comprises adolescents working in lower supervisory and technical occupation, semi-routine and routine occupations, while the other classes include small employers and own account workers, intermediate occupations, and managerial, administrative and professional occupations. The NS-SEC captures differences in employment relations that are associated with advantages and disadvantages in income security, short-term income stability, and longer time income prospects (Goldthorpe & McKnight, 2006)

School absences

We measured *overall absences* as the proportion of days a pupil was absent from school, regardless of the reason for being absent. Schools are expected to record a daily register of attendance twice a day (morning and afternoon) to note attendance and absences (Scottish Government, 2007). To account for differences in the number of possible days between different school authorities and students, we divided the total number of days attended by the total number of possible days for each student. We subtracted the resulting proportion from one to obtain the proportion of overall absences. *Sickness-related absences* measure the proportion of days a pupil was absent from class due to sickness and for which no alternative educational arrangements were provided. It includes any time a pupil was off sick, with proof of illness such as a parental letter or medical certificate. *Truancy* was measured as the proportion of days a pupil was absent when no adequate explanation was provided (e.g., sickness, exceptional domestic circumstances). On average, students missed 12 percent of their days overall ($SD = 0.11$), 5 percent due to sickness ($SD = 0.06$) and 2 percent due to truancy ($SD = 0.05$) in the first year of upper secondary schooling.

Educational attainment at the end of upper secondary schooling

Students' *educational attainment* at the end of upper secondary schooling (S5/S6, age 16-18) was measured using grades obtained from national standardized examinations. In our observation period, students took exams at various levels including "Intermediate 1", "Intermediate 2", "Highers" or "Advanced Highers", of which the latter is more difficult. Students can choose to complete exams in any number of subjects at any of these levels. Grades are awarded for each subject using an alphanumeric system and are used to determine admissions to higher education and high-demand programs. These examinations are set and administered by the SQA, the national body responsible for awarding qualifications in Scotland. To effectively deal with the Scottish system's complex nature, we operationalized educational attainment as a continuous outcome using the extended version of the Universities

and Colleges Admissions Service (UCAS) Scottish tariff points system (for more details, see Online Appendix A and section 3.3 in Scottish Government, 2012). This converts achievement across all subjects for each student into tariff points. Universities use these tariff points in combination with subject choices for decisions on admissions to their institutions. On average, students achieved a tariff point of 217.59 (SD = 142.57) at the end of upper secondary schooling.

Covariates

Based on theoretical and empirical considerations, we selected covariates that are likely to be correlated with students' post-school destinations and school absenteeism. Our analysis adjusts for students' previous educational attainment, socioeconomic, health, and demographic characteristics.

Educational attainment at the end of compulsory schooling (S4, age 15-16) was measured using grades obtained from national standardized examinations. At this stage, students took high-stakes national standardized exams in about eight subjects (Standard Grades), of which only English and mathematics are compulsory. Students can choose to take exams at a given level of difficulty (i.e., Foundation, General, and Credit) depending on their future educational plans. As with upper secondary attainment, we used the extended version of the Universities and Colleges Admissions Service (UCAS) Scottish tariff points system. On average, students achieved a tariff point of 187.74 (SD = 71.57) at the end of compulsory schooling.

Parental education was measured with the highest educational qualification among parents using five categories: (1) No qualification (11%); (2) Lower secondary qualification (Standard Grade or equivalent) (30%); (3) Upper secondary qualification (Highers/Advanced Highers or equivalent) (20%); (4) College below degree (Higher National Certificates

(HNC)/Higher National Diplomas (HND) or equivalent) (11%); and (5) First degree/Postgraduate degree or equivalent (28%).

Parental class was measured with the eight-class "analytical" version of the National Statistics Socioeconomic Classification (NS-SEC): (1) Higher managerial, administrative, and professional occupations (14%), (2) Lower managerial, administrative, and professional occupations (30%), (3) Intermediate occupations (16%), (4) Small employers and own account workers (6%), (5) Lower supervisory and technical occupations (10%), (6) Semi-routine occupations (14%), (7) Routine occupations (8%), and (8) Never worked and long-term unemployed (3%). We used the highest class among both parents and, in single-parent households, the present parent's class.

Free school meal (FSM) registration was measured as a binary variable, indicating whether a student was registered as entitled to free school meals (1) or not (0). Six percent of students were registered for free school meals.

Housing tenure differentiated between students living in socially rented accommodation (24%) and an owner-occupied or privately rented accommodation (76%).

Neighborhood deprivation was measured using quintiles of the Scottish Index of Multiple Deprivation (SIMD), ranging from most deprived (SIMD 1) to least deprived (SIMD 5) neighborhoods. The SIMD ranks 6,505 small areas, each containing around 350 households from most deprived to least deprived according to seven life course domains (employment; income; health; education, skills, and training; geographic access to services; crime; housing).

Family structure differentiated between families where both parents were present (72%), families where one household member is a stepparent (7%), and single-parent households (21%). The *number of siblings* is categorized as no siblings (18%), one sibling (54%), and two or more siblings (28%). A binary indicator also measured whether at least one *grandparent was present* in the household (1%) or not.

Student health is a subjective measure indicating whether children's health had been "good/fairly good" (92%) or "not good" (8%) over the last 12 months. *Long-term parental illness* captures whether at least one of the pupils' parents had a limiting long-term illness, health problems, or a disability (14%). *Parental caring responsibilities* records whether at least one parent present in the household gave any help or support to family members, friends, neighbors, or others because of long-term physical or mental ill-health or disability, or problems related to old age (18%).

Additional support needs (ASN), also known as special educational needs in other contexts*,* is measured with a binary indicator indicating whether students were classified as ASN (4%). ASN can include disability (e.g., language and speech disorder), learning environment (e.g., inflexible curricular arrangements), family circumstances (e.g., children in care of their local authority), or social and emotional factors (e.g., experiencing bullying behavior).

Temporary exclusion (defined as out-of-school suspensions in other contexts) accounts for incidents in which students were suspended from school for a fixed period at least once during the first year of upper secondary schooling (2%).

We further controlled for demographic characteristics such as *student sex, student age, mother's age at birth, residence* (rural vs. urban)*, ethnicity* ("White" vs. "Other ethnic background"), and *school cohort* (starting S4 in 2007 vs. 2008).

Analytic strategy

To decompose the total effect of school absences on our binary outcomes into direct and indirect effects via educational attainment, we use the Karlson-Holm-Breen (KHB) method (Karlson et al., 2012). Comparing coefficients across nested non-linear probability models within the same sample involves the rescaling problem, i.e., log-odds ratios or odds ratios in

these nested models not only reflect changes in the magnitude of the independent variables but also differences in unobserved heterogeneity across these models (Mood, 2010).

The KHB method achieves comparable regression coefficients across nested non-linear probability models by equalizing the explained variance of the models. To do so, the method runs a linear regression of school absences and covariates on educational attainment and includes the model's residuals as explanatory variable in the outcome model without educational attainment. Since school absences and the residuals are uncorrelated, this does not change the total effect of school absences but makes the model fit of outcome model without attainment and outcome model with attainment identical, i.e., they have the same scaling parameter. As with linear models, we can then use the difference method (Alwin & Hauser, 1975) to estimate direct and indirect effects of school absences via academic achievement.

In a first step, we apply the KHB method to the exposure of overall school absences for both outcomes conditioning on all covariates. In a second step, we use the KHB method for the specific reasons for absence conditioning on all covariates and additionally adjusting for the other reason in the same model. Hence, we account for differences in truancy when considering total, direct, and indirect effects of sickness absences on post-school destinations and vice versa.

To correct for selective inclusion in our sample of upper secondary students, we weighted the KHB analyses on economic activity by inverse probability of censoring weights (Hernán & Robins, 2006). Using these weights created a pseudo-population that would have been observed had selection into upper secondary schooling been random regarding our list of covariates (e.g., academic achievement, school absenteeism, sociodemographic and health characteristics). For the analyses on class position, we additionally created inverse probability of censoring weights correcting for non-random selection into our employment sample. Using the product of both weights for reweighting the uncensored sample thus effectively corrects for

12

non-random censoring due to school dropout and non-employment based on all measured variables (for more information on the weighting procedure see Online Appendix B).

Results

Table 2 shows the findings from our decomposition of the total effect of upper secondary school absences on adolescents' risk of being NEET into direct and indirect effects via educational attainment in S5/S6 (see full KHB output in Online Appendix C). All models are weighted by inverse probability of censoring weights to correct for nonrandom loss to dropout after compulsory schooling (S4). Effect estimates are shown both as logit coefficients and average marginal effects (AMEs).

We found statistically significant effects of overall absences, sickness absences, and truancy on the risk of being NEET net of our covariates, including sociodemographic characteristics and previous school attainment. Considering AMEs, a one percentage point increase in overall absences is associated with a 0.3 percentage point increase in the risk of being NEET. The total effect of sickness absences is somewhat larger (AME = 0.004; SE = 0.001) than the total effect of truancy (AME = 0.003; SE = 0.002).

Table 2 here

Once accounting for educational attainment in upper secondary schooling (S5/S6), the effects of overall absences, sickness absences, and truancy were reduced but to varying degrees. Pupil differences in educational attainment explain more than one third (36%) of the total effect of overall absences on the risk of being NEET. The mediating pathway vial educational attainment is somewhat smaller for the association between sickness absences and the risk of being NEET (29%). For truancy, half of the association with NEET status can be explained with pupils' educational attainment in upper secondary schooling.

While we found statistically significant direct effects of overall absences (AME = 0.002; SE = 0.001) and sickness absences (AME = 0.003; SE = 0.001) on the risk of being NEET, the effect of truancy became statistically non-significant (AME = 0.002; SE = 0.002). For instance, a one percentage point increase in sickness absences, on average, increases the risk of being NEET by 0.3 percentage points net of pupils' educational attainment.

In further analyses, we differentiated between NEET, employment and full-time education using the KHB decomposition for multinomial logit models (see Table D1 in the Online Appendix). These findings suggest that school absences overall and the specific reasons (sickness absence, truancy) significantly increase the likelihood of being employed rather than in full-time education. However, this association is predominantly explained by differences in educational attainment (87% for overall absences, 98% for sickness absences, and 76% for truancy). Hence, there are no statistically significant direct effects of school absences overall and its specific forms on the likelihood of being employed rather than in full-time education.

Table 3 shows the findings of decomposing the total effect of upper secondary school absences on adolescents' risk of entering a working-class position into direct and indirect effects via educational attainment. All models are weighted by the product of inverse probability of censoring weights to correct for nonrandom loss to school dropout and nonrandom loss to non-employment. Effect estimates are shown both as logit coefficients and average marginal effects (AMEs).

Our results show that there is no statistically significant effect of overall absences in upper secondary schooling on the risk of entering a working-class position. The same can be found for sickness absences and truancy. Conditioning on upper secondary educational attainment does not make any difference to these associations. These null findings for absences overall and the specific reasons for absence are confirmed when considering the International Socio-Economic Index of Occupational Status (ISEI) as a measure of occupational attainment

(see Table D2 in the Online Appendix). School absences have no impact on adolescents' occupational attainment among those who opt for employment right after upper secondary schooling.

Discussion

Our paper aimed to shed light on the relation between school absences in upper secondary schooling and adolescents' post-school destinations. Previous research on the link between school absenteeism and labour market outcomes is sparse (Attwood & Croll, 2006, 2015; Hibbett et al., 1990; Cattan et al., 2017). Investigating absences overall and specific reasons for absence (sickness, truancy) may provide us with an understanding of the possible pathways between absences and post-school destinations. Most importantly, we directly assessed to what extent educational attainment at the end of upper secondary schooling explains the association between school absences and outcomes at the transition from school to work. For this purpose, we exploited unique data linkages from the Scottish Longitudinal Study allowing us to access detailed information on adolescents' sociodemographic characteristics, their school attendance records, educational attainment, and immediate destinations after leaving school.

Our findings indicate that upper secondary absences overall and the specific reasons of sickness absence and truancy increase the risk of being not in employment, education, or training (NEET) net of confounders, including educational attainment at the end of compulsory schooling. However, we found no discernible effect of absences overall and specific reasons (sickness, truancy) on occupational attainment among the employed. This suggests that school absences have detrimental consequences for accessing further education or employment among upper secondary students, but do not harm their labour market returns when entering employment.

Further, our findings show that educational attainment in upper secondary schooling partly explains associations between school absences and the risk of being NEET. While for

15

school absences overall more than one third and for sickness absences less than one third of the effect on NEET can be attributed to differences in educational attainment. Thus, educational attainment is an important mechanism through which school absences are associated with negative post-school destinations.

However, overall absences and sickness absences also significantly increased the risk of being NEET net of educational attainment. This suggests that there are other mechanisms than education at play that may account for the harmful consequences of school absences generally and sickness absences on post-school destinations. The direct link between sickness absences and NEET status may indicate the detrimental impact of underlying health conditions, including mental health problems, on inclusion into the labour market or further education.

Our findings further suggest that both unauthorised (truancy) and authorised are detrimental to adolescents' post-school destinations. While we found a direct effect for sickness absence, the direct effect of truancy was statistically non-significant. Regarding post-school destinations, we cannot confirm previous literature indicating that unauthorised absences are more detrimental to school attainment than authorised absences (Gershenson et al., 2017; Gottfried, 2009). Policymakers and practitioners may, therefore, pay equal attention to reducing school absences due to unauthorised and authorised reasons.

Our results have further implications for policy and practice. Aside from reducing absenteeism, focus may be shifted to mitigating the harmful consequences of school absenteeism for educational attainment. Helping frequently absent adolescents with catching up in school will reduce their risk of exclusion from the labour market and further education. Frequently absent students also need career support that goes beyond schooling, either by facilitating access to further education or help in integrating into the labour market.

Our study involves several limitations. *First*, causal interpretations of our estimates of associations between school absences and post-school destinations rest on the strong

assumption that we observed and conditioned on all relevant confounders. Although we control for a wide array of sociodemographic characteristics and previous educational attainment, it is plausible that we did not capture other factors such as psychosocial measurements that are linked with school absences and post-school destinations. *Second*, our findings are restricted to upper secondary school students and cannot be generalised to the whole student population. Findings may differ if we considered the link between absences and the destinations of pupils leaving school after compulsory schooling. *Third*, our findings are limited to the analysis of immediate post-school destinations. It would be worthwhile to consider future research how school absences are associated with longer-term educational and labour market outcomes.

References

Alexander, K. L., Entwisle, D. R., & Kabbani, N. S. (2001). The dropout process in life course perspective: Early risk factors at home and school. *Teachers College Record*, *103*, 760–822. https://doi.org/10.1111/0161-4681.00134

Alexander, K. L., Entwisle, D. R., & Olson, L. S. (2001). Schools, Achievement, and Inequality: A Seasonal Perspective. *Educational Evaluation and Policy Analysis*, *23*(2), 171–191.

Allenworth, E. M., & Easton, J. Q. (2007). *What matters for staying on-track and graduating in Chicago public high schools: A close look at course grades, failures, and attendance in the freshman year*. Consortium on Chicago School Research.

Alwin, D. F., & Hauser, R. M. (1975). The Decomposition of Effects in Path Analysis. *American Sociological Review*, *40*(1), 37–47. https://doi.org/10.2307/2094445

Ansari, A., & Gottfried, M. A. (2021). The Grade-Level and Cumulative Outcomes of Absenteeism. *Child Development*, *00*(0), 1–17. https://doi.org/10.1111/cdev.13555

Ansari, A., Hofkens, T. L., & Pianta, R. C. (2020). Absenteeism in the First Decade of Education Forecasts Civic Engagement and Educational and Socioeconomic Prospects in Young Adulthood. *Journal of Youth and Adolescence*. https://doi.org/10.1007/s10964-020-01272-4

Ansari, A., & Pianta, R. C. (2019). School absenteeism in the first decade of education and outcomes in adolescence. *Journal of School Psychology*, *76*(July), 48–61. https://doi.org/10.1016/j.jsp.2019.07.010

Attendance Works. (2016). *Chronic absence: Our Top Pick for the ESSA School Quality or Student Success Indicator: A Policy Brief*.

Attwood, G., & Croll, P. (2006). Truancy in secondary school pupils: Prevalence, trajectories and pupil perspectives. *Research Papers in Education*, *21*(4), 467–484. https://doi.org/10.1080/02671520600942446

Attwood, G., & Croll, P. (2015). Truancy and well-being among secondary school pupils in England. *Educational Studies*, *41*(1–2), 14–28. https://doi.org/10.1080/03055698.2014.955725

Aucejo, E. M., & Romano, T. F. (2016). Assessing the effect of school days and absences on test score performance. *Economics of Education Review*, *55*, 70–87. https://doi.org/10.1016/j.econedurev.2016.08.007

Bäckman, O., & Nilsson, A. (2016). Long-term consequences of being not in employment, education or training as a young adult. Stability and change in three Swedish birth cohorts. *European Societies*, *18*(2), 136–157. https://doi.org/10.1080/14616696.2016.1153699

Baert, S., & Verhofstadt, E. (2015). Labour market discrimination against former juvenile delinquents: Evidence from a field experiment. *Applied Economics*, *47*(11), 1061–1072. https://doi.org/10.1080/00036846.2014.990620

Balfanz, R., Herzog, L., & Mac Iver, D. J. (2007). Preventing student disengagement and keeping students on the graduation path in urban middle-grades schools: Early identification and effective interventions. *Educational Psychologist*, *42*(4), 223–235. https://doi.org/10.1080/00461520701621079

Bernardi, F. (2014). Compensatory Advantage as a Mechanism of Educational Inequality: A Regression Discontinuity Based on Month of Birth. *Sociology of Education*, *87*(2), 74–88.

Bernardi, F., & Grätz, M. (2015). Making up for an unlucky month of birth in school: Causal

evidence on the compensatory advantage of family background in England.

Sociological Science, 2, 235–251. https://doi.org/10.15195/v2.a12

Bernardi, F., & Triventi, M. (2020). Compensatory advantage in educational transitions.

Trivial or substantial? A simulated scenario analysis. *Acta Sociologica*, *63*(1), 40–62.

https://doi.org/10.1177/0001699318780950

Bodovski, K., & Farkas, G. (2007). Do Instructional Practices Contribute To Inequality in

Achievement?: The Case of Mathematics Instruction in Kindergarten. *Journal of*

Early Childhood Research, *5*(3), 301–322.

https://doi.org/10.1177/1476718X07080476

Bowman-Perrott, L., Benz, M. R., Hsu, H., Kwok, O., Eisterhold, L. A., & Zhang, D. (2011).

Patterns and Predictors of Disciplinary Exclusion Over Time: An Analysis of the

SEELS National Data Set. *Journal of Emotional and Behavioral Disorders*, *21*(2),

83–96. https://doi.org/10.1177/1063426611407501

Bynner, J., & Parsons, S. (2002). Social Exclusion and the Transition from School to Work:

The Case of Young People Not in Education, Employment, or Training (NEET).

Journal of Vocational Behavior, *60*(2), 289–309.

https://doi.org/10.1006/jvbe.2001.1868

Cattan, S., Kamhöfer, D. A., Karlsson, M., Nilsson, T., Aucejo, E., Bhalotra, S., Chevalier,

A., Dev-Ereux, P., Dribe, M., Fischer, M., Lundborg, P., Plug, E., Salm, M.,

Salvanes, K., Schmitz, H., Schwarz, N., Schwerdt, G., & Westphal, M. (2017). *The*

short-and long-term effects of student absence: Evidence from Sweden.

Dalun Zhang, Katsiyannis, A., Barrett, D. E., & Willson, V. (2007). Truancy Offenders in the

Juvenile Justice System examinations of first and second referrals. *Remedial and*

Special Education, *28*(4), 244–256. https://doi.org/10.1177/07419325070280040401

Daly, M., Delaney, L., Egan, M., & Baumeister, R. F. (2015). Childhood Self-Control and

    Unemployment Throughout the Life Span: Evidence From Two British Cohort

    Studies. *Psychological Science*, *26*(6), 709–723.

    https://doi.org/10.1177/0956797615569001

Deming, D. J. (2017). The growing importance of social skills in the labor market. *Quarterly*

    Journal of Economics, *132*(4), 1593–1640. https://doi.org/10.1093/qje/qjx022

DiPrete, T. A., & Eirich, G. M. (2006). Cumulative Advantage as a Mechanism for

    Inequality: A Review of Theoretical and Empirical Developments. *Annual Review of*

    Sociology, *32*(1), 271–297. https://doi.org/10.1146/annurev.soc.32.061604.123127

Eaton, D. K., Brener, N., & Kann, L. K. (2008). Associations of health risk behaviors with

    school absenteeism. Does having permission for the absence make a difference?:

    Research article. *Journal of School Health*, *78*(4), 223–229.

    https://doi.org/10.1111/j.1746-1561.2008.00290.x

Egan, M., Daly, M., & Delaney, L. (2015). Childhood psychological distress and youth

    unemployment: Evidence from two British cohort studies. *Social Science and*

    Medicine, *124*, 11–17. https://doi.org/10.1016/j.socscimed.2014.11.023

Ettner, S. L., Frank, R. G., & Kessler, R. C. (1997). The impact of psychiatric disorders on

    labor market outcomes. *Industrial and Labor Relations Review*, *51*(1), 64–81.

    https://doi.org/10.1177/001979399705100105

European Foundation for the Improvement of Living and Working Conditions. (2012).

    NEETs, young people not in employment, education or training :characteristics, costs

    and policy responses in Europe. Publications Office.

    https://data.europa.eu/doi/10.2806/41578

Evans, G. W., Li, D., & Whipple, S. S. (2013). Cumulative risk and child development.

    Psychological Bulletin, *139*(6), 1342–1396. https://doi.org/10.1037/a0031808

Fitzpatrick, M. D., Grissmer, D., & Hastedt, S. (2011). What a difference a day makes:

Estimating daily learning gains during kindergarten and first grade using a natural

experiment. *Economics of Education Review*, *30*(2), 269–279.

https://doi.org/10.1016/j.econedurev.2010.09.004

Goldthorpe, J. H. (2007). Social Class and the Differentiation of Employment Contracts. In J.

H. Goldthorpe (Ed.), *On Sociology. Volume Two: Illustration and Retrospect*

(Second, Vol. 2, pp. 101–124). Stanford University Press.

Goldthorpe, J. H., & McKnight, A. (2006). The Economic Basis of Social Class. In S. L.

Morgan, D. B. Grusky, & G. S. Fields (Eds.), *Mobility and Inequality: Frontiers of*

Research in Sociology and Economics (pp. 109–136). Stanford University Press.

Gottfried, M. (2011). The Detrimental Effects of Missing School: Evidence from Urban

Siblings. *American Journal of Education*, *117*(2), 147–182.

https://doi.org/10.1086/657886

Gottfried, M. A. (2010). Evaluating the Relationship Between Student Attendance and

Achievement in Urban Elementary and Middle Schools: An Instrumental Variables

Approach. *American Educational Research Jounal*, *47*(2), 434–465.

https://doi.org/10.3102/0002831209350494

Gottfried, M. A. (2014). Chronic Absenteeism and Its Effects on Students' Academic and

Socioemotional Outcomes. *Journal of Education for Students Placed at Risk*, *19*(2),

53–75. https://doi.org/10.1080/10824669.2014.962696

Gottfried, M. A., & Hutt, E. (2019). *Absent from School: Understanding and Addressing*

Student Absenteeism. Havard University Press.

Gottfried, M. A., & Kirksey, J. J. (2017). 'When' students miss school: The role of timing of

absenteeism on students' test performance. *Educational Researcher*, *46*(3), 119–130.

https://doi.org/10.3102/0013189X17703945

Grätz, M. (2014). When Growing Up Without a Parent Does Not Hurt: Parental Separation

and the Compensatory Effect of Social Origin. *European Sociological Review*, *31*(5),

546–557. https://doi.org/10.1093/esr/jcv057

Hallfors, D., Vevea, J. L., Iritani, B., Cho, H. S., Khatapoush, S., & Saxe, L. (2002). Truancy,

grade point average, and sexual activity: A meta-analysis of risk indicators for youth

substance use. *Journal of School Health*, *72*(5), 205–211.

https://doi.org/10.1111/j.1746-1561.2002.tb06548.x

Healey, A., Knapp, M., & Farrington, D. P. (2004). Adult labour market implications of

antisocial behaviour in childhood and adolescence: Findings from a UK longitudinal

study. *Applied Economics*, *36*(2), 93–105.

https://doi.org/10.1080/0003684042000174001

Heatly, M. C., Bachman, H. J., & Votruba-Drzal, E. (2015). Developmental patterns in the

associations between instructional practices and children's math trajectories in

elementary school. *Journal of Applied Developmental Psychology*, *41*, 46–59.

https://doi.org/10.1016/j.appdev.2015.06.002

Heckman, J. J. (2006). Skill Formation and the Economics of Investing in Disadvantaged

Children. *Science*, *312*, 1900–1902.

Heckman, J. J., Stixrud, J., & Urzua, S. (2006). The Effects of Cognitive and Noncognitive

Abilities on Labor Market Outcomes and Social Behavior. *Journal of Labor

Economics*, *24*, 411–482.

Henry, K. L., & Huizinga, D. H. (2007). Truancy's Effect on the Onset of Drug Use among

Urban Adolescents Placed at Risk. *Journal of Adolescent Health*, *4*, 358.e9-358.e17.

https://doi.org/10.1016/j.jadohealth.2006.11.138

Hernán, M. A., & Robins, J. M. (2006). Estimating causal effects from epidemiological data. *Journal of Epidemiology and Community Health*, *60*, 578–586. https://doi.org/10.1136/jech.2004.029496

Hibbett, A., Fogelman, K., & Manor, O. (1990). Occupational Outcomes of Truancy. *British Journal of Educational Psychology*, *60*, 23–36. https://doi.org/10.1111/j.2044-8279.1990.tb00919.x

Iannelli, C., & Duta, A. (2018). Inequalities in school leavers' labour market outcomes: Do school subject choices matter? *Oxford Review of Education*, *44*(1), 56–74. https://doi.org/10.1080/03054985.2018.1409970

Iannelli, C., Smyth, E., & Klein, M. (2016). Curriculum differentiation and social inequality in higher education entry in Scotland and Ireland. *British Educational Research Journal*, *42*(4), 561–581. https://doi.org/10.1002/berj.3217

Jackson, M., Goldthorpe, J. H., & Mills, C. (2005). Education, Employers and Class Mobility. *Research in Social Stratification and Mobility*, *23*, 3–33.

Jordan, W. P., & Miller, R. (2017). *Who's in: Chronic absenteeism under the Every Student Succeeds Act. Washington, DC: FutureEd at Georgetown University*.

Karlson, K. B., Holm, A., & Breen, R. (2012). Comparing Regression Coefficients Between Same-sample Nested Models Using Logit and Probit: A New Method. *Sociological Methodology*, *42*, 286–313.

Kirksey, J. J. (2019). Academic Harms of Missing High School and the Accuracy of Current Policy Thresholds: Analysis of Preregistered Administrative Data From a California School District. *AERA Open*, *5*(3), 233285841986769. https://doi.org/10.1177/2332858419867692

Le, A. T., Miller, P. W., Heath, A. C., & Martin, N. (2005). Early childhood behaviours, schooling and labour market outcomes: Estimates from a sample of twins. *Economics of Education Review*, *24*, 1–17. https://doi.org/10.1016/j.econedurev.2004.04.004

MacDonald, Z., & Pudney, S. (2001). Illicit drug use and labour market achievement: Evidence from the UK. *Applied Economics*, *33*(13), 1655–1668. https://doi.org/10.1080/00036840010014454

Marcotte, D. E., & Hemelt, S. W. (2008). Unscheduled School Closings and Student Performance. *Education Finance and Policy*, *3*(3), 316–338. https://doi.org/10.1162/edfp.2008.3.3.316

Mood, C. (2010). Logistic Regression: Why We Cannot Do What We Think We Can Do, and What We Can Do About It. *European Sociological Review*, *26*(1), 67–82. https://doi.org/10.1093/esr/jcp006

Morrissey, T. W., Hutchison, L., & Winsler, A. (2014). Family income, school attendance, and academic achievement in elementary school. *Developmental Psychology*, *50*(3), 741–753. https://doi.org/10.1037/a0033848

Ou, S. R., & Reynolds, A. J. (2008). Predictors of Educational Attainment in the Chicago Longitudinal Study. *School Psychology Quarterly*, *23*, 199–229. https://doi.org/10.1037/1045-3830.23.2.199

Powell, A. (2018). *NEET: Young people not in education, employment or training*. House of Commons Library: Briefing Paper.

Rocque, M., Jennings, W. G., Piquero, A. R., Ozkan, T., & Farrington, D. P. (2017). The Importance of School Attendance: Findings From the Cambridge Study in Delinquent Development on the Life-Course Effects of Truancy. *Crime and Delinquency*, *63*(5), 592–612. https://doi.org/10.1177/0011128716660520

Rumberger, R. W. (1995). Dropping Out of Middle School: A Multilevel Analysis of

    Students and Schools. *American Educational Research Journal*, *32*, 583–625.

    https://doi.org/10.3102/00028312032003583

Rutter, M. (1979). Protective factors in children's responses to stress and disadvantage. In M.

    W. Kent & J. E. Rolf (Eds.), *Primary prevention of psychopathology: Vol. 3. Social*

    competence in children. University Press of New England.

Santibañez, L., & Guarino, C. M. (2021). The Effects of Absenteeism on Academic and

    Social-Emotional Outcomes: Lessons for COVID-19. *Educational Researcher*, 1–9.

    https://doi.org/10.3102/0013189X21994488

Scott, J., Fowler, D., McGorry, P., Birchwood, M., Killackey, E., Christensen, H., Glozier,

    N., Yung, A., Power, P., Nordentoft, M., Singh, S., Brietzke, E., Davidson, S., Conus,

    P., Bellivier, F., Delorme, R., Macmillan, I., Buchanan, J., Colom, F., … Hickie, I.

    (2013). Adolescents and young adults who are not in employment, education, or

    training. *BMJ*, *347*, f5270. https://doi.org/10.1136/bmj.f5270

Scottish Government. (2007). *Included, engaged and involved part 1: Attendance in Scottish*

    schools.

    https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-

    guidance/2007/12/included-engaged-involved-part-1-attendance-scottish-

    schools/documents/0054747-pdf/0054747-pdf/govscot%3Adocument/0054747.pdf

Scottish Government. (2012). *Summary statistics for attainment, leaver destinations and*

    healthy living, No. 2: 2012 Edition. https://dera.ioe.ac.uk/15020/1/00395665.pdf

Scottish Government. (2015). *Consequences, risk factors, and geography of young people not*

    in education, employment or training (NEET) (p. 91).

Smerillo, N. E., Reynolds, A. J., Temple, J. A., & Ou, S. (2018). Chronic absence, eighth-grade achievement, and high school attainment in the Chicago Longitudinal Study. *Journal of School Psychology*, *67*, 163–178. https://doi.org/10.1016/j.jsp.2017.11.001

Tanner, J., Davies, S., & O'Grady, B. (1999). Whatever happened to yesterday's rebels? Longitudinal effects of youth delinquency on education and employment. *Social Problems*, *46*(2), 250–274. https://doi.org/10.2307/3097255

Tanskanen, A. O., Erola, J., & Kallio, J. (2016). Parental Resources, Sibship Size, and Educational Performance in 20 Countries: Evidence for the Compensation Model. *Cross-Cultural Research*, *50*(5), 452–477. https://doi.org/10.1177/1069397116671139

Terza, J. V. (2002). Alcohol abuse and employment: A second look. *Journal of Applied Econometrics*, *17*(4), 393–404. https://doi.org/10.1002/jae.671

Torche, F. (2018). *Prenatal Exposure to an Acute Stressor and Children's Cognitive Outcomes* Florencia Torche * Forthcoming,*. https://doi.org/10.1007/s13524-018-0700-9

Torche, F., & Echevarría, G. (2011). The effect of birthweight on childhood cognitive development in a middle-income country. *International Journal of Epidemiology*, *40*(4), 1008–1018. https://doi.org/10.1093/ije/dyr030

Table 1. Summary Statistics (n = 2,941)

	Mean/Proportion	SD
Economic activity		
NEET	0.09	
Employed, further education or training	0.91	
Class position*		
Working class	*0.34*	
Other class	*0.66*	
Overall absences	0.12	0.11
Sickness absences	0.05	0.06
Truancy	0.02	0.05
Academic achievement (S5/S6)	217.59	142.57
Previous academic achievement (S4)	187.74	71.57
Parental education		
No qualification	0.11	
Lower secondary qualification	0.30	
Upper secondary qualification	0.20	
College below degree	0.11	
First degree/Higher degree	0.28	
Parental class		
Higher managerial, administrative, and professional occupations	0.14	
Lower managerial, administrative, and professional occupations	0.30	
Intermediate occupations	0.16	
Small employers and own account workers	0.06	
Lower supervisory and technical occupations	0.10	
Semi-routine occupations	0.14	
Routine occupations	0.08	
Never worked or long-term unemployed	0.03	
Free school meal registration		
Yes	0.06	
No	0.94	
Housing tenure		
Social rented	0.24	
Private rented/owned	0.76	
Scottish Index of Multiple Deprivation		
SIMD 1 (most deprived)	0.17	
SIMD 2	0.19	
SIMD 3	0.21	
SIMD 4	0.21	
SIMD 5 (least deprived)	0.22	
Family structure		
Two-parent family	0.72	
One parent and one stepparent	0.07	
Single parent	0.21	
Number of siblings		
No siblings	0.18	
One sibling	0.54	
Two or more siblings	0.28	
Grandparent present		
Yes	0.01	
No	0.99	
Student health		

Good	0.92	
Not good	0.08	
Long-term parental illness		
Yes	0.14	
No	0.86	
Parent caring responsibility		
Yes	0.18	
No	0.82	
Additional support needs (ASN)		
Yes	0.04	
No	0.96	
Temporary exclusion		
Yes	0.02	
No	0.98	
Cohort member's sex:		
female	0.48	
male	0.52	
Child's age in S3	14.05	0.28
Mother's age at birth	28.11	4.92
Place of residence		
Urban	0.77	
Rural	0.23	
Ethnicity		
"White"	0.97	
"Other ethnic background"	0.03	
School cohort in S5/S6		
2008/09	0.48	
2009/10	0.52	

Source. Scottish Longitudinal Study, own calculations. Note: Summary statistics were weighted to correct for non-random dropout from school. * Statistics pertain to children who have been employed in the Census 2011 (n = 488).

Table 2. Decomposing the total effect of upper secondary school absences on adolescents' risk of being NEET into direct and indirect effects via educational attainment (S5/S6) (*KHB* method)

	Overall absences		Sickness		Truancy	
	Logit	AME	Logit	AME	Logit	AME
Total effect	0.041***	0.003***	0.057***	0.004***	0.045*	0.003*
	(0.010)	(0.001)	(0.014)	(0.001)	(0.022)	(0.002)
Direct effect	0.026*	0.002*	0.041**	0.003**	0.023	0.002
	(0.109)	(0.001)	(0.014)	(0.001)	(0.023)	(0.002)
Indirect effect	0.015***	0.001	0.016***	0.001	0.023***	0.002
	(0.038)	-	(0.004)	-	(0.006)	-
% Explained	36		29		50	
n	2,941		2,941		2,941	

Source: Scottish Longitudinal Study, own calculations.
Note: Models condition on educational attainment after compulsory schooling, parental education, parental class, FSM registration, housing tenure, neighbourhood deprivation, family structure, number of households, grandparent presence, student health, long-term parental illness, parental caring responsibilities, ASN, temporary exclusion, student sex, student age, mother's age at birth, residence, ethnicity, and school cohort. Models considering specific forms (sickness, truancy) additionally condition on the other form; all models are weighted by inverse probability of censoring weights to correct for nonrandom loss to dropout after compulsory schooling; AME = Average Marginal Effect; Standard errors of indirect effect not known for AME.
* $p < .05$, ** $p < .01$, *** $p < .001$. Robust standard errors in parentheses.

Table 3. Decomposing the total effect of upper secondary school absences on adolescents' *risk of entering a working-class position* into direct and indirect effects via educational attainment (S5/S6) (*KHB* method)

	Overall absences		Sickness		Truancy	
	Logit	AME	Logit	AME	Logit	AME
Total effect	0.006	0.001	-0.003	-0.001	0.063	0.011
	(0.014)	(0.002)	(0.024)	(0.004)	(0.036)	(0.006)
Direct effect	0.008	0.001	-0.001	-0.000	0.066	0.011
	(0.015)	(0.002)	(0.024)	(0.004)	(0.037)	(0.006)
Indirect effect	-0.002	-0.000	-0.002	-0.000	-0.003	-0.000
	(0.005)	-	(0.005)	-	(0.006)	-
n	488		488		488	

Source: Scottish Longitudinal Study, own calculations.

Note: Models condition on educational attainment after compulsory schooling, parental education, parental class, FSM registration, housing tenure, neighbourhood deprivation, family structure, number of households, grandparent presence, student health, long-term parental illness, parental caring responsibilities, ASN, temporary exclusion, student sex, student age, mother's age at birth, residence, ethnicity, and school cohort. Models considering specific forms (sickness, truancy) additionally condition on the other form; all models are weighted by the product of inverse probability of censoring weights to correct for nonrandom loss to dropout after compulsory schooling and nonrandom loss to non-employment; AME = Average Marginal Effect.

$^{*} p < .05,$ $^{**} p < .01,$ $^{***} p < .001.$ Cluster-robust standard errors in parentheses.