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OUTCOMES OF LEAVING SCHOOL WITHOUT FORMAL EDUCATIONAL
QUALIFICATIONS

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ABSTRACT

The aims of this study were to examine the linkages between leaving school without qualifications and later risks of crime, substance use, welfare dependence and reduced participation in further education/training. The data were gathered over the course of a 21-year study of a birth cohort of 1265 Christchurch-born children. Young people who left school without qualifications were at increased risk of involvement in juvenile crime; substance use; welfare dependence and having reduced participation in further training or education. After adjustment for confounding social, familial and individual factors, associations between leaving school without qualifications and the following factors remained significant: a) nicotine dependence, b) being in receipt of a benefit at 21 years, and, c) engaging in no further training or education. Other linkages between leaving school without qualifications and adverse outcomes appeared to reflect the effects of confounding factors. These factors were: gender, standard of living, deviant peer affiliations, child and parental smoking, scholastic abilities, cognitive abilities, suspension from school and truancy.

Keywords: school dropout, early school leaving, longitudinal study

INTRODUCTION

In recent years there has been increasing research and interest in the issue of young people leaving school without qualifications (for example, Achenbach, Howell, McConaughy, & Stanger, 1998; Cairns, Cairns, & Neckerman, 1989; Dekkers & Driessen, 1997). In the American literature this outcome is usually referred to as school dropout. The US Department of Education defines dropout as "...have not graduated from high school or completed a state- or district- approved educational program". In New Zealand this group is represented by young people who leave school without attaining any formal educational qualifications. There has been a growing literature on this group who are seen as being vulnerable in a number of ways. This literature has centred around two major themes.

The first and dominant line of research has examined the individual, social, family and school factors that place young people at risk of leaving school without qualifications. This literature has reported that those at most risk of school dropout are those from socially disadvantaged backgrounds, who show early educational delays and associated behavioural or adjustment problems (Achenbach et al., 1998; Cairns et al., 1989; Campbell & Duffy, 1998; French & Conrad, 2001; Vitaro, Larocue, Janosz, & Tremblay, 2001)

Second, interest has focussed on the extent to which leaving school without qualifications may place young people at increased psychosocial risk. Research in this area suggests the presence of pervasive associations between leaving school without qualifications and increased psychosocial risk. Specifically, leaving school without qualifications has been associated with increased risks of later: alcohol abuse and dependence (Crum, Ensminger, Ro, & McCord, 1998; Silbereisen, Robins, & Rutter, 1995); drug use (Mensch & Kandel, 1988; Savage & Marchington, 1977); crime (Farrington, Gallagher, Morley, St. Ledger, & West, 1986; Henry,

Caspi, Moffitt, Harrington, & Silva, 1999); unemployment (Lamb, 1994); and, delinquency (Jarjoura, 1993). There is little doubt that, as a population, those who leave school without qualifications are an at-risk group for later psychosocial adversity.

There are at least two possible explanations for the associations between leaving school without qualifications and these adverse psychosocial outcomes. First, a number of authors have suggested that this association may reflect a cause and effect linkage in which leaving school without qualifications may increase subsequent risks of criminal behaviours, substance use and adjustment problems (eg. Crum et al., 1998; Henry et al., 1999). Specifically, it has been proposed that educational underachievement and failure leads to decreased social bonds to the school and communities, which in turn leads to increased risks of crime and delinquent behaviours (Hawkins, Catalano, & Miller, 1992; Jarjoura, 1993). This conclusion has potentially important implications for educational policy since it suggests that reducing rates of school dropout by increasing the number of young people who leave school with qualifications will have beneficial effects in reducing the rates of psychosocial problems amongst young people.

An alternative explanation is that the association between leaving school without qualifications and adverse outcomes is partially or wholly non-causal and arises from selection processes associated with both leaving school without qualifications and increased risks of later adverse outcomes (Cairns et al., 1989; Ensminger & Slusarcick, 1992; Jessor, 1987).

Specifically, it has been well documented that leaving school without qualifications is more common among young people with low self esteem (Rumberger, 1987); low socio-economic status (Gaustad, 1991 as cited in Dekkers & Driessen, 1997); low grades (Achenbach et al., 1998; Cairns et al., 1989; Ensminger & Slusarcick, 1992); early depression (Bardone, Moffitt, Caspi, Dickson, & Silva, 1996; Fergusson & Woodward, 2002); early drug use (Fergusson &

Horwood, 1997; Mensch & Kandel, 1988); early alcohol abuse (Crum, Bucholz, Helzer, & Anthony, 1992; Crum, Helzer, & Anthony, 1993; Williams & Wynder, 1993); and, early conduct problems (Bardone et al., 1996; Brook & Newcomb, 1995; Fergusson & Horwood, 1998). In turn it has been well documented that these and similar factors are related to later adverse outcomes including crime, substance use, adjustment problems and unemployment (Caspi, Wright, Moffitt, & Silva, 1998; Farrington et al., 1990; Fergusson & Horwood, in press; Hawkins et al., 1992; Loeber, 1990). These findings raise the possibility that the linkages between leaving school without qualifications and later adjustment are non-causal and reflect the presence of confounding factors. Thus, a necessary (but not sufficient) condition for leaving school without qualifications to be causally related to later adjustment is for this association to persist when due allowance is made for social, personal and family factors that are associated with increased risks of both leaving school without qualifications and later adjustment problems.

A number of studies of the linkages between leaving school without qualifications and adverse psychosocial outcomes have examined this issue by controlling for confounding factors using regression methods (eg. Crum et al., 1998; Farrington et al., 1986; Henry et al., 1999; Lamb, 1994; Mensch & Kandel, 1988; Savage & Marchington, 1977). Typically, these studies have found that control for confounding factors reduces the association between leaving school without qualifications and later adverse psychosocial problems but does not fully explain these associations. However, these studies have a number of limitations. Specifically, none of the studies previously cited have controlled for a range of antecedent factors known to be associated with leaving school without qualifications, instead each study has controlled for factors associated with the outcome of interest. For example, Crum et al (1998) examined the association between dropping out of school and risks of alcohol problems. In this study,

participants were age and ethnically matched and from the same neighbourhood and analyses were statistically controlled for sex and prior alcohol use. However, no statistical control was made for other factors known to be associated with school dropout, such as low IQ, low self-esteem and family factors. In addition to the limited control for possible confounding factors, findings of previous studies have been limited by the use of small or selected samples.

Furthermore, there has only been one New Zealand study which concluded that staying in school can be a protective factor for boys with poor self-regulation from later crime (Henry et al., 1999).

Against this background, this paper examines the linkages between leaving school without qualifications and later adjustment in a Christchurch born birth cohort that has been studied to age 21 years. The specific aims of the analysis were:

1. To document the association between leaving school without qualifications and a series of later outcomes including: crime; substance use; welfare dependence; and, participation in tertiary education/training.
2. To document the linkages between antecedent (prior to age 16) social, family and individual factors and leaving school without qualifications.
3. To adjust the associations between leaving school without qualifications and adverse psychosocial outcomes for the potentially confounding effects of antecedent social, family and individual factors.

More generally, the aims of this study were to examine the extent of the association between leaving school without qualifications and later adverse psychosocial outcomes when due allowance was made for social, family and individual life histories prior to school leaving.

METHOD

Participants

The data described in this report were gathered during the course of the Christchurch Health and Development Study (CHDS). The CHDS is a longitudinal study of a birth cohort of 1265 children born in the Christchurch (New Zealand) urban area during a four month period in mid-1977. These young people have been studied at birth, 4 months, one year, annual intervals to age 16, and again at 18 and 21 years using information collected from a combination of sources including: parental interviews, teacher reports, standardised psychometric tests, interviews with the children, information from official records, and other sources. An overview of the study design has been given previously (Fergusson & Horwood, 2001; Fergusson, Horwood, Shannon, & Lawton, 1989).

Measures

Leaving School Without Formal Educational Qualifications

At age 18, sample members were questioned regarding their educational history. In particular information was obtained on the number of School Certificate subjects attempted and grades achieved. Examinations are graded from A to E. Sample members who had left school by age 18 without achieving at least one C grade in a School Certificate subject were classified as having left school without qualifications. A total of 19.5% of sample members met this criterion. This is comparable to the rates of students who left school with no school certificate subjects, irrespective of grade, in the whole of New Zealand in 1999 (17.2%) and 2000 (16.5%) (Ministry of Education, 2002).

Outcome Measures (18-21 years)

To examine the consequences of leaving school without qualifications for subsequent adjustment and life outcomes the following measures were used. These measures were obtained as part of the 21-year follow-up of the cohort and describe outcomes over the period from 18 to 21 years.

Substance use disorders. At age 21 sample members were questioned about their use of tobacco, alcohol, cannabis and other illicit drugs, since age 18. As part of this questioning, participants were assessed on DSM-IV (American Psychiatric Association, 1994) symptom criteria for nicotine, alcohol and illicit drug dependence. Alcohol and illicit drug dependence were assessed using items from the Composite International Diagnostic Interview (World Health Organization, 1993) whereas symptoms of nicotine dependence were assessed using custom written survey items. On the basis of this questioning 24.5% of the sample were classified as meeting DSM-IV criteria for nicotine dependence, 5.9% for alcohol dependence and 7.3% for illicit drug dependence over the period from 18-21 years.

Juvenile offending. At age 21 sample members were questioned about their offending behaviour and contact with the criminal justice system since age 18 using the Self Report Delinquency Inventory (SRDI, Elliott & Huizinga, 1989) and survey items related to police contact. This information was used to construct three measures of criminal offending. Violent offending was defined as the young person reporting committing a violent offence including assault, fighting, use of a weapon or threats of violence against a person in the preceding three years. 10.5% of sample members admitted violent offences. Property offending was if the young person reported committing a property offence including theft, burglary, breaking and entering, vandalism or fire setting and related offences in the preceding three years. 13.2% of

sample members admitted property offences. A conviction was a self-report measure of whether the young person had made a court appearance and was convicted of a criminal offence from the ages of 18 to 21 years. 11.7% of sample members had a conviction in this period.

Welfare dependence. This was measured by whether the young person was in receipt of a Social Welfare benefit at age 21 years. At this time 18.0% of the cohort were receiving a benefit: 9.3% received an Unemployment Benefit, 4.3% received a Domestic Purposes Benefit and, 5.1% received other types of benefit.

Tertiary education/training. At age 21 participants were asked about their participation in tertiary education or training subsequent to leaving school. For the purposes of the present analysis sample members who had enrolled in Trade Certificate or higher tertiary education were classified as having Tertiary education/training. Fifty percent of cohort members enrolled for such education/training following school leaving.

Antecedent Factors

The following factors were selected from the database of the study to describe antecedent social, family and individual factors associated with leaving school without qualifications. All factors described were assessed prior to leaving school age (16 years).

Social background. Four measures of social background were used. *Maternal age:* this was recorded in whole years at the child's birth. *Socio-economic status:* this was assessed at the time of the child's birth based on paternal occupation, using the Elley and Irving (1976) index of socio-economic status for New Zealand. *Maternal education:* this was assessed using a three-point scale which reflected the highest measure of educational achievement attained. This scale was: 1 = mother lacked formal educational qualifications; 2 = mother had secondary level

educational qualifications; and, 3 = mother had tertiary level qualifications. *Average standard of living (0-10 years)*: each year the living standards of the family were rated by the interviewers on a five-point scale that ranged from “very good” to “very poor”. These scores were then averaged over the first 10 years of the child’s life to provide a measure of typical family living standards during this period.

Family functioning. Five measures of family functioning were included. *Parental history of alcohol problems*: when sample members were aged 15 years, their parents were questioned as to whether any parent had a history of alcoholism or alcohol problems. On the basis of this questioning, 11.9% of the sample were classified as having a parental history of alcohol problems. *Parental history of criminal offending*: when sample members were aged 15 years, their parents were questioned as to whether any parent had a history of criminal offending. The young person was classified as having a parental history of offending if at least one parent had a history of offending. On the basis of this classification 12.4% of the sample were classified as having a parental history of criminal offending. *Parental history of illicit drug use*: when sample members were aged 11 years, their parents were questioned about the extent to which they had used cannabis or other illicit drugs. On the basis of this questioning, 24.4% of the sample were classified as having parental history of illicit drug use. *Parental history of cigarette smoking*: also at 15 years parents were questioned about their cigarette smoking. If either parent smoked the young person was considered to have a parental history of smoking. *Parental attachment*: at age 15 this was assessed using the parental attachment scale developed by Armsden and Greenberg (1987). The full parental attachment scale was used in this analysis and was found to have good reliability ($\alpha = .87$).

Individual factors. A range of measures of individual characteristics and behaviour were included. *Gender:* the sample contained 50.9% females and 49.1% males. *Cognitive ability:* at age 8 years a measure of child IQ was obtained using the Wechsler Intelligence Scale for Children – Revised (WISC-R, Wechsler, 1974). The full scale score was used in the present analysis. The reliability of this score, assessed using split half methods, was .93. *Scholastic ability:* at 13 years sample members were administered the Test of Scholastic Abilities (TOSCA, Reid, Jackson, Gilmore, & Croft, 1981). This test was of high reliability ($\alpha = .95$). *Childhood conduct problems:* this measure of early antisocial behaviour was assessed using a combination of parent and teacher reports of conduct disorder and oppositional behaviours. This was obtained using an instrument that combined items from the Rutter (1970) and Conners (1969; 1970) child behaviour rating scales and was administered when sample members were aged 8 years (Fergusson & Lynskey, 1998). The reliability of the conduct problems scale was $\alpha = .93$. *Self-esteem:* this was assessed at age 10 years using the Coopersmith Self Esteem Inventory (SEI, Coopersmith, 1981). The reliability of this scale was $\alpha = .89$. *Neuroticism:* this was assessed using the short form version of the neuroticism scale of the Eysenck Personality Inventory (Eysenck & Eysenck, 1964) administered when sample members were aged 14 years. The reliability of this scale was $\alpha = .80$. *Deviant peer affiliations:* at age 16 years sample members and their parents were questioned about the extent to which the young person's friends used tobacco, alcohol or cannabis, truanted or broke they law. These items were combined, and parent and child reports combined, to provide a scale measure of the extent of the young person's affiliations with delinquent or substance using peers (Fergusson & Horwood, 1996). The reliability of the child's report was $\alpha = .74$ and the parental report was $\alpha = .79$. *Truancy ever:* each year from 12 to 16 years sample members were asked whether they had truanted from

school over the past year. Any child who had admitted truanting was classified as ever before truanting. *Suspension ever*: sample members and their parents were asked each year from 12 to 16 if sample members had been suspended from school for any reason. A total of 7.4% of the sample had been suspended. *Early smoking*: participants were asked at age 15 years if they smoked cigarettes and if so how often. Those who had reported smoking in the previous 12 months were defined as early smokers.

Statistical Methods

The analysis was conducted in three stages. In the first stage the associations between leaving school without qualifications and later adverse outcomes were estimated (Table 1). In the second stage of the analysis associations between leaving school with no qualifications and social, family and individual factors assessed up to the age of 16 were estimated (Table 2). Associations were described by the odds ratio and 95% confidence interval (95% CI). In the third stage of the analysis, associations between leaving school without qualifications and later outcomes were adjusted for confounding social, family and individual factors. The model fitted was:

$$\text{Logit}(Y_i) = B_0 + B_1X_1 + \sum B_jZ_j$$

where $\text{logit } Y_i$ was the log odds of the i th outcome measure; X_1 was the measure of leaving school without qualifications and Z_j were the set of confounding social, family and individual factors.

The model thus estimates the association between leaving school without qualifications (X_1) and the outcome measure (Y_i) adjusted for confounders (Z_j). To describe this association the parameters of the logistic model were transformed to produce estimates of the adjusted odds ratios (ORs) between leaving school without qualifications and each outcome. The adjusted ORs are given by e^{B_1} where e is the base of natural logarithms.

Sample Size and Sample Bias

The analyses reported here were based on a sample size of 983 sample members for whom data were available on leaving school without qualifications and outcomes to age 21. This sample represented 78% of the original sample. To examine the effect of sample losses the 983 participants included in the analysis were compared to the remaining 282 sample members excluded from the analysis on a series of measures of socio-demographic characteristics assessed at the time of birth. These comparisons suggested that there were no differences for gender and ethnicity. However, there were detectable tendencies ($p < .05$) for the obtained sample to under-represent children from socially disadvantaged families characterised by low maternal education, low socio-economic status and single parenthood.

The above result raises the issue of the extent to which the findings reported here could have been influenced by sample selection bias resulting from the under-representation of children from disadvantaged families. To examine this issue, all analyses were repeated using the data weighting method described by Carlin et al (1999) to adjust for possible selection effects resulting from the pattern of sample attrition. These analyses produced essentially identical conclusions to those based on the unweighted data. Since the two sets of results were consistent, in the interests of simplicity, the results reported here are based on the unweighted sample.

RESULTS

Associations between leaving school without qualifications and subsequent outcome

Table 1 shows the relationships between leaving school with no qualifications and measures of juvenile crime and substance use. The strength of association between leaving school without qualifications and each outcome is described by the odds ratio (OR). The OR

shows the odds of each outcome amongst those leaving school without qualifications relative to those leaving school with qualifications.

The Table shows that young people who left school without qualifications were at increased risk of crime and substance use outcomes. These outcomes include: illicit drug dependence; nicotine dependence; convictions; violent offending and property offences. There was a marginally significant increased risk of alcohol dependence. In addition, those who left school without qualifications were more likely to be in receipt of a benefit at age 21 years and have received no tertiary education/training.

INSERT TABLE 1 HERE

Associations between leaving school without qualifications and social, family and individual factors

Table 2 shows the relationships between leaving school without qualifications and a range of measures of social background, family functioning and individual factors before the age of 16. For ease of data display, all measures have been presented in dichotomous form. Results revealed that those who left school without qualifications were more likely to have had a young mother, who had no school qualification, and belong to families characterised by low socio-economic status, and below average living standards. The child's parents were more likely to have used illicit substances, to have alcohol problems, to smoke, and to have participated in criminal offending. At 15 the children had poorer attachment to these parents.

The young people who left school without qualifications were also more likely to have low IQ scores at 8 years and low TOSCA scores at 13 years. They had higher truancy levels, greater

risks of early conduct problems, school suspensions and were more likely to have associated with deviant peers. They were also more likely to be smoking at 15 years, have low self-esteem and high neuroticism scores. Those who left school without qualifications were also slightly more likely to be males.

INSERT TABLE 2 HERE

The general impressions conveyed by Table 2 are that those who left school without qualifications were more likely to have come from disadvantaged family backgrounds, were of lower cognitive ability and were more likely to have behavioural and adjustment problems in childhood and adolescence.

Adjusted associations

The results in Table 2 raise the possibility that the associations between leaving school without qualifications and later outcomes (shown in Table 1) could be due to the related social, family and individual factors that were present prior to school leaving. To address this issue the associations between leaving school without qualifications and later adverse outcomes were adjusted using logistic regression (see Methods).

The results of these analyses are shown in Table 3, which shows the estimates of the odds ratios between leaving school without qualifications and later adverse outcomes adjusted for the confounding factors. The table also reports on the significance of leaving school without qualifications as a predictor of the outcome after adjustment and shows the significant confounding variables for each equation. The consequences of statistical adjustments for confounding were:

1. To reduce the association between leaving school without qualifications and most outcomes to the point of statistical non-significance. Non significant outcomes included: violent crime, property crime, criminal convictions, illicit drug dependence, and, alcohol dependence. These findings suggest the linkages between leaving school without qualifications and crime and substance use were non-causal and reflected confounding factors that were associated with both leaving school without qualifications and later crime/substance use outcomes. Key confounding factors included: gender, deviant peer affiliations, suspensions from school, truancy from school, early smoking, parental smoking, scholastic ability, cognitive ability and standard of living.

2. Nonetheless a number of associations remained statistically significant after control for confounding factors. In particular those leaving school without qualifications remained at significantly increased risk of: welfare dependence in young adulthood; reduced participation in tertiary education/training; and, nicotine dependence. However, since the analyses included multiple comparisons it is possible that the association reflected the effects of chance variations rather than a true association. To account for multiple comparisons a Bonferroni corrected significance level was used ($p < .006$). Using this criterion: welfare dependence in young adulthood; reduced participation in tertiary education/training; and, nicotine dependence remained statistically significant.

INSERT TABLE 3 HERE

Further Analysis

Tests of interaction. The models fitted in Table 3 failed to take account of possible interactive relationships between leaving school without qualifications and the confounding factors. To examine this issue the analyses were extended to include 2-way interactions between leaving school without qualifications and each confounder. This analysis failed to show any significant interactions between leaving school without qualifications and covariate factors.

Choice of predictor variables. To examine the sensitivity of the study conclusions to the way in which “school dropout” was defined, two alternative measures were analysed. These measures were: a) whether the young person left school at age 16 or younger; b) a continuous measure of the number of school certificate subjects with grades of C or better that the young person attained. Analysis using the alternative measures produced the same conclusions as were found for leaving school without qualifications.

DISCUSSION

This study has used data gathered over the course of a 21 year longitudinal study of a cohort of Christchurch born young people, to examine the linkages between leaving school without qualifications and later adverse outcomes including crime, substance use, welfare dependence and reduced participation in tertiary education/training. The principal focus of this analysis was to examine the extent of association between leaving school without qualifications and later outcomes after adjustment for confounding social, family and personal factors that were associated with increased risks of leaving school without qualifications. The findings of this study and their implications are discussed below.

In confirmation of previous research (Crum et al., 1998; Farrington et al., 1986; Henry et al., 1999; Jarjoura, 1993; Lamb, 1994; Mensch & Kandel, 1988; Savage & Marchington, 1977;

Silbereisen et al., 1995) those who left school without qualifications were found to be at increased risks of later adverse outcomes including crime, substance abuse or dependence, welfare dependence and reduced participation in tertiary education or training. These results were replicated using alternative measures of “school dropout” including leaving school early and measures of qualifications at the point of school leaving. These findings suggest that irrespective of issues of causality, those leaving school early and/or without qualifications are an “at risk” population for later adverse outcomes.

In turn, these findings raise important questions about the origins of associations between leaving school without qualifications and later outcomes. Broadly speaking, the literature on this topic has presented alternative perspectives on this issue. A number of authors (Crum et al., 1998; Crum et al., 1993; Hawkins et al., 1992; Henry et al., 1999; Jarjoura, 1993) have suggested that the association between leaving school without qualifications and later outcomes reflects a causal association in which: a) leaving school without qualifications reduces opportunities for social participation; and b) reduced opportunities for social participation are reflected in higher rates of crime, substance use and other adverse outcomes. This explanation implies that increasing the numbers of young people staying at school and obtaining qualifications will have a beneficial effect in reducing crime, substance use and welfare dependence.

The alternative explanation has been that these associations are non causal and arise from a selective process that is associated with leaving school without qualifications and later adverse outcomes. Specifically, it has been well documented that those who leave school without qualifications tend to come from socially disadvantaged backgrounds, have higher exposure to family dysfunctions and difficulties and are also more prone to educational and behavioural difficulties prior to school leaving. Given this profile, it may be suggested that the elevated rates

of crime, substance use and other problems that are found amongst those who leave school without qualifications reflect the effects of early social, family and individual factors that are associated with increased risks of leaving school without qualifications and later adverse outcomes.

The present study has provided an opportunity to contrast these alternative perspectives on the linkages between leaving school without qualifications and later outcomes by controlling these associations for a wide range of confounding social, individual and other factors that were present prior to school leaving age.

This analysis showed that in confirmation of previous research (Crum et al., 1998; Farrington et al., 1986; Henry et al., 1999; Jarjoura, 1993; Lamb, 1994; Mensch & Kandel, 1988; Savage & Marchington, 1977; Silbereisen et al., 1995) leaving school without qualifications was associated with a wide range of adverse, social, personal, educational and behavioural factors that were present prior to school leaving. These factors gave the general impression that those who left school without qualifications were more likely to have come from disadvantaged family background, were of lower cognitive ability and were more likely to have behavioural and adjustment problems.

For a number of outcome variables (property/violent crime; convictions; illicit drug abuse; alcohol dependence), statistical control for these confounding factors reduced the association between leaving school without qualifications to statistical and practical non significance. These findings suggested that the associations between leaving school and later crime and substance use were largely or wholly non causal and reflected the fact that young people at risk of later crime and substance use also tended to leave school without qualifications.

Nonetheless, for a number of other outcomes (welfare dependence, nicotine dependence and reduced participation in tertiary education) associations between leaving school without qualifications persisted after extensive control for potentially confounding factors. Correction for multiple significance testing using a Bonferroni corrected p-value suggested that those remaining associations were not due to chance association arising from the application of multiple significance tests. The resilience of these associations suggests the presence of a possible causal process in which leaving school without qualifications was associated with increased risk of later welfare dependence and lack of participation in tertiary education/training. For both of these outcomes, it is relatively easy to see the way in which lack of qualifications at school leaving may encourage dependence on welfare benefits and limited participation in further education/training.

The linkages between leaving school without qualifications and increased rates of nicotine dependence are, however, less easy to explain. However, it may be that for young people who leave school without qualifications, who are in receipt of benefits and not engaged in training, cigarette smoking becomes an accepted pastime.

The present study has a number of strengths and limitations that should be taken into account in appraising the results. The strengths of the study include: the large sample size; the use of a representative cohort; the relatively high rate of sample retention and the availability of prospectively assessed confounding factors. Potential limitations of the study include:

1. Measurement errors. In this study the majority of measures are based on self-report data. These data clearly give fallible accounts of the true but non-observed behaviours.
2. Sample Specificity. The findings are based on results obtained from a particular cohort born at a particular time and studied over a specific period. These features raise uncertainties

about the extent to which the findings from the present study apply to other samples and populations.

3. Control for confounding. Although we have attempted to control sources of confounding it is possible that this analysis may omit some important confounding factors, such as the effects of streaming or school type. If this were the case the results may lead to an over-estimation of the causal linkages between leaving school without qualifications and later adverse psychosocial outcomes.

Conclusions

In summary, the findings of this study suggest the following conclusions. First, young people who leave school without qualifications have an increased risk of a range of adverse outcomes including substance use, juvenile offending and receiving a benefit and engaging in no tertiary training. Secondly, young people from disadvantaged backgrounds, with low cognitive abilities and behaviour and adjustment problems are more likely to leave school with no qualifications. Finally, after adjusting for these antecedent factors young people who leave school without qualifications have increased risks of developing nicotine dependence, receiving a benefit, and engaging in no further education or training.

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Table 1. Associations between leaving school without qualifications and measures of substance use disorders, juvenile offending and social role outcomes (18-21 years).

Measure	Left School Without Qualifications		OR	95% CI	P ¹
	Yes (N = 181) %	No (N = 802) %			
Substance Use disorders					
Nicotine dependence	49.7	18.5	4.4	3.1-6.2	<.001
Alcohol dependence	8.8	5.2	1.8	1.0-3.2	<.1
Illicit drug dependence	11.6	5.9	2.1	1.2-3.6	<.01
Juvenile Offending					
Convictions	27.1	8.0	4.3	2.8-6.5	<.001
Violent offences	23.8	7.0	4.2	2.7-6.4	<.001
Property offences	19.9	7.4	3.1	2.0-4.9	<.001
Welfare Dependence	38.9	13.0	4.3	3.0-6.2	<.001
No Tertiary Education/Training	90.6	40.7	14.1	8.4-23.7	<.001

¹p value based on chi squared statistic

Table 2. Social background, family functioning and individual characteristics of young people who left school without formal educational qualifications.

Measure	Left School Without Qualifications		OR	95% CI	P ¹
	Yes %	No %			
Social Background					
Mother under 20 at the birth of child	18.8	6.4	3.4	2.2-5.3	<.001
Mother lacked formal educational qualifications	72.6	43.4	3.5	2.4-5.9	<.001
Father semi-skilled/unskilled (low SES)	46.7	19.8	3.5	2.6-4.9	<.001
Lowest quartile standard of living over first 10 years	49.2	16.7	4.9	3.5-6.8	<.001
Familial Factors					
Parental use of illicit substances	35.5	21.8	2.0	1.4-2.8	<.001
Parental criminality	26.3	9.2	3.5	2.3-5.3	<.001
Parental alcohol problems	22.4	9.4	2.8	1.8-4.2	<.001
Parental smoking	50.8	27.9	2.7	1.9-3.6	<.001
Lowest quartile of parental attachment score	36.6	20.1	2.3	1.6-3.3	<.001
Individual Factors					
Being male	56.8	47.5	1.5	1.1-2.0	<.05
Been suspended ever	25.8	4.2	8.0	4.9-12.9	<.001
Truancy ever	66.1	33.1	4.0	2.8-5.5	<.001

Outcomes of leaving school without formal educational qualifications

Measure	Left School Without Qualifications		OR	95% CI	P ¹
	Yes %	No %			
Highest quartile deviant peer affiliations at 16 years	58.0	22.5	4.8	3.4-6.7	<.001
Lowest quartile IQ at 8 years	58.5	15.4	7.7	5.3-11.3	<.001
Lowest quartile TOSCA score at 13 years	62.7	15.6	9.1	6.1-13.5	<.001
Highest quartile conduct problems at 8 years	52.7	19.0	4.8	3.4-6.7	<.001
Smoking at 15 years	49.7	28.5	2.5	1.8-3.5	<.001
Lowest quartile self-esteem	41.4	21.1	2.7	1.8-3.8	<.001
Highest quartile neuroticism	33.9	20.4	2.0	1.4-2.9	<.001

¹p value based on chi squared statistic

Table 3. Associations between leaving school without qualifications and substance use disorders, juvenile offending and social role outcomes after adjustment for confounding factors.

Measure	OR	95% CI	P	Significant covariates ^a
Substance Use disorders				
Nicotine dependence	2.5	1.3-5.0	<.005	2,3,4
Alcohol dependence	1.3	0.4-3.7	>.60	3,7
Illicit drug dependence	1.0	0.4-3.0	>.90	1,2,5
Juvenile Offending				
Convictions	0.8	0.4-1.8	>.60	1
Violent offences	1.0	0.5-2.1	>.90	1
Property offences	0.7	0.3-1.5	>.30	1,2,7
Welfare Dependence				
	2.5	1.4-4.6	<.005	1,8
No Tertiary Education/Training				
	3.0	1.4-6.2	<.005	7,8,9

^a1 = Gender; 2 = Deviant peer affiliations; 3 = Suspension from school; 4 = Child smoking;

5 = Cognitive abilities; 6 = Parental smoking; 7 = Truancy; 8 = Standard of living; 9 = TOSCA scores.