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Does Participation in Extracurricular Activities Reduce Engagement in Risky Behaviours?

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Abstract

This study finds that participation in extracurricular activities significantly reduces engagement in risky behaviours among Australian adolescents. However, the effects differ by activity type, gender and to some extent by socio-economic status (SES). Participation in activities other than sports and arts reduces both weekly drinking and marijuana use for both genders. Participation in arts reduces weekly drinking among males and marijuana use among females, whereas participation in non-organised sports reduces regular smoking and marijuana use among males only. Even though weekly drinking is positively associated with participation in organised sports among males, the association is likely to reflect unobserved differences between participants in organised sports and non-participants. There is some evidence that extracurricular activity participation lowers engagement in risky behaviours for low-SES females more than it does for high-SES females, yet among males the SES gradient is almost non-existent.

1 Introduction

Extracurricular activities are a significant part of school life in developed countries. However, being outside the core academic programs, they are among the first candidates to be reduced in times of budget constraints. For example, a recent survey of US school administrators indicates that 24 percent of schools reduced extracurricular activities in 2010–11, 29 percent did so in 2011–12, and that over 40 percent consider it for 2012–13 (Ellerson, 2012).

Cuts in extracurricular activities are, however, often met with opposition, with opponents arguing that those activities are important to young people's personal development.[1] Theory suggests that participation in extracurricular activities can benefit young people by developing certain qualities (such as self-esteem and leadership skills) and improving their health. Group membership through extracurricular activity participation may provide access to the relationships and networks that influence and support positive outcomes for students, or to the knowledge and skills which support higher social status (Shulruf, 2010). Extracurricular activity participation may also reduce the time young people have to spend wastefully, such as watching too much television, hanging out with deviant peers or engaging in health risk behaviours. Sound empirical evidence on the impact of participation in extracurricular activities will thus help direct public and private investment in those activities. This study addresses this issue by focusing on the link between adolescents' participation in extracurricular activities and their engagement in risky behaviours.

Many potentially risky activities such as smoking, drinking, sex, and drugs are generally first experienced during adoldescence (Gruber, 2001). While experimenting with new things is part of adolescent transition into adulthood, for some, the risk-taking experiences during adolescence can mark the beginning of a downward

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[1]See, for example, DeBolt (2012); Fitzgerald (2009); Fox (2011); The Daily Telegraph (2012).

spiral to many problems later in life. This is because engaging in risky behaviour can undermine educational progress and increase the risk of developing social, behavioural, physical, and mental health problems later on. Moreover, involvement in one risky behaviour often leads to another, multiplying the likelihood of self-injury, victimization by others and other negative consequences (see the review by Terzian et al., 2011). It is thus not surprising that parents and educators are very interested in ways to reduce risky behaviours among adolescents.

According to a recent review by Farb and Matjasko (2012), although several studies (mostly in sociology, psychology, behavioural sciences, education, and sport psychology) have examined the link between extracurricular activity participation and risky behaviours, most fall short of identifying causal effects. Economists have only considered the impact of sports participation on educational and labour market outcomes.

Specifically, this study seeks to answer three questions. First, does adolescents' extracurricular activity participation have a causal impact on their engagement in risky behaviours? Second, does the impact vary with the type of extracurricular activity, gender and socio-economic status (SES)? For example, does the impact of sports participation differ from that of music program participation? Does coming from a socio-economically disadvantaged background enhance or limit the benefits of extracurricular activity participation? The study draws on data from a specialised survey of Australian adolescents linked to administrative data on their family welfare history. The study distinguishes four groups of extracurricular activities: organised sports, other sports, arts and other activities. Three risky behaviours are considered: currently smoking regularly, currently drinking weekly, and ever tried marijuana. The range of extracurricular activities and risky behaviours will help shed light on the possible mechanism through which participation in the former affects engagement in the latter.

This study makes several contributions to the literature. First, it extends the literature on the impact of extracurricular activity participation on adolescent outcomes by shedding light on the causal impact of extracurricular activities on engagement in risky behaviours and on the role of SES in moderating the effect of an adolescent experience. This study extends the economics literature on the subject by considering extracurricular activities (arts and other activities) and outcomes (engagement in risky behaviours) that have not previously explored. Moreover, this is one of the few studies on the impact of extracurricular activities that use data from a country other than the US.[2]

Australia provides an interesting context to study this topic as both extracurricular activity participation and risky behaviours are common among Australian adolescents. The 2010 National Drug Strategy Household Survey reveals that 38 percent of 12 to 17 year-olds consumed alcohol and 23 percent of 18 to 19 year-olds used marijuana in the previous 12 months (Australian Institute of Health and Welfare, 2011). According to the 2009 survey of Children's Participation in Cultural and Leisure Activities, 35 percent of 12–14 year-old Australians participated in organised cultural activities (playing a musical instrument, singing, dancing and drama) while 65 percent participated in sports organised by a club, association or school outside school hours in the previous 12 months (Australian Bureau of Statistics, 2009). However, Australian schools have also raised concerns over the potential need to cut back on extracurricular activities, given the forthcoming slash in NSW state funding on education by $1.7 billion over the next four years,[3] or the expected review in education funding that could see over 3,000 schools lose funding.[4]

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[2]For example, 28 out of the 29 studies covered in Shulruf (2010) are based on US data. Of the 52 studies reviewed in Farb and Matjasko (2012), 48 are based on US data and the other 4 Canadian data.

[3]See, for example, Way (2012).

[4]See Maiden (2012).

This paper proceeds as follows. Section 2 briefly reviews the relevant literature. Sections 3–4 describe the data and methods. Section 5 presents and discusses basic regression results. Section 6 analyses whether the effects found in Section 5 are likely to reflect a causal relationship, and Section 7 shows how these effects differ by SES. Section 8 summarises and concludes.

2 Background literature

According to Farb and Matjasko (2012), the link between extracurricular activity participation and an adolescent engagement in risky behaviours can be explained by the ecological systems theory (Bronfenbrenner, 1989) which studies individual development in the context of a series of environments (ecological systems) in which they reside (e.g. their families, neigbourhoods, schools and peers). In this theory, extracurricular activity participation can affect engagement in risky behaviours by changing the extent and nature of adolescents' interactions with their environments. Feldman and Matjasko (2005) note two possible pathways in which extracurricular activity participation can impact on risky behaviours. Extracurricular activity might promote developmentally appropriate pro-social behaviours and reduce the likelihood that adolescents will engage in risky behaviours. Alternatively, extracurricular activities might link participants to peer groups who engage in risky behaviours, increasing the probability that they will engage in those behaviours. The first pathway is consistent with the social control theory, which argues that people's attachment to conventional institutions encourage them not to break the law. While some students enjoy the academic environment of schools, others prefer the social aspect of them. Extracurricular activity give adolescents opportunities outside the academic setting to strengthen bonds with schools and peers and to shun anti-social behaviours. This pathway also concurs with social learning theory which contends that people learn within a social context. Thus,

by exposing adolescents to good peers and role models, extracurricular activities encourage good behaviours and discourage bad behaviours. The social learning theory can also be used to explain the second pathway. In particular, if extracurricular activities expose adolescents to peer groups who engage in risky behaviours, extracurricular activity participants are likely to emulate those behaviours.

Several studies have documented a link between extracurricular activity participation and risky behaviours. For example, Darling (2005) observe that adolescents who participated in extracurricular activities reported lower levels of smoking, marijuana use, and use of other drugs compared to non-participants, while Barnes et al. (2007) find sports involvement to be associated with less cigarette smoking and less illicit drug use. Intriguingly, sports participation is often found to be associated with more drinking (e.g. Denault et al., 2009; Eccles and Barber, 1999). Nevertheless, none of these studies establish if any relationship between extracurricular activity participation and risky behaviours is causal.

Economists have only considered the causal impact of sports participation on educational and labour market outcomes. For example, Barron et al. (2000), who use an instrumental variable (IV)[5] method to address potential endogeneity, find that athletic participation increases educational attainment after high school. Also using the IV method (with respondent's height at age 16 as an instrument for athletic participation in high school), Eide and Ronan (2001) show that the impact of high-school athletic participation on educational outcomes is positive for white women and black men but negative for white men and that participation improves wages for black men. Using a fixed-effects model, Lipscomb (2007) shows that participation in school-sponsored clubs and sports is associated with higher math and science test scores and higher Bachelor's degree attainment expectations.

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[5]The instruments that were considered include school size, parental income, student health, whether the school is a private school, library books-per-student ratio, faculty-to-student ratio, and height and weight of the student in high school.

Farb and Matjasko (2012) note that since extracurricular activity participation affects risky behaviours through adolescents' interactions with their environments, the impact depends on the characteristics of the individual, the activity and the environments. Thus, overlooking activity type and important factors like SES and gender can obscure the relationship between extracurricular activity participation and risky behaviours.

While very few studies have explored the role of activity type and other factors in moderating the relationship between the extracurricular activity participation and risky behaviours, some differential impact has been found. For example, Hoffmann (2006) finds sports participation to be associated with an increase alcohol use and non-sports participation associated with a decrease in alcohol use. Hoffmann (2006) also shows that the negative association between non-sports activities and alcohol use is stronger among males in low-SES schools, whereas the positive association between sports participation and alcohol use is stronger among females in low-SES schools and males in high-SES schools. This study seeks to fill the gap in the literature by examining whether adolescents' extracurricular activity participation has a causal impact on their engagement in risky behaviours and whether the impact varies with the type of extracurricular activity, gender and SES.

3 Data and descriptive statistics

3.1 Data source

This study uses data from the Youth in Focus (YIF) survey, which asks questions about family background, living arrangements, education, work, relationships, income, health, spare time, and aspirations and attitudes of Australia's young people. Individuals born between October 1987 and March 1988 who appeared in the Centrelink (Australia's social security administrative) database were randomly se-

lected and invited to participate in the survey.[6] One of the parents, usually the mother, of the selected individuals was also invited to answer the parent questionnaire.

Respondents were interviewed in late 2006 (wave 1, when they were around 18 years of age) and late 2008 (wave 2) whereas parents were only interviewed in wave 1. A self-completion questionnaire was also administered to respondents in both waves. With consent, these survey responses can be linked to the Centrelink records, which provide a history of welfare receipt (or lack thereof) of the youth's family when he/she was growing up.

This study only uses wave 1 as it contains all the required data on participation in extracurricular activities and risky behaviours. While 4,079 youths and 3,964 parents participated in wave 1, it was not uncommon for the youth to participate while the parent did not, or vice versa. As a result, only 2,430 youth-parent pairs could be formed. Data on drinking and marijuana use come from the self-completion questionnaire, which has a 27 percent non-response rate, so analyses of these behaviours are based on smaller samples.[7] After observations with missing data are dropped, the estimation sample is about 750–1,020 for males and 930–1,110 for females.

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[6]A young person can have a Centrelink record because while he/she was growing up his/her family received a government payment, such as the Child Care Benefit, which is not means tested, or any social security support, such as the Disability Support Pension. Less commonly, he/she can have a Centrelink record in his/her own right if he/she received any government payment, such as Youth Allowance. Over 98 percent of Australians born in that period appear in the Centrelink sampling frame (Breunig et al., 2009) even though their families do not necessarily receive any welfare.

[7]The smoking rate among those who did not return a self-completion questionnaire is 28 percent, compared with 15 percent among those who did. Thus, drinking and marijuana use among the latter sample are likely to be more common than among the former. Extracurricular activity participation rates are very similar between the two samples (79 percent vs. 80 percent). Accordingly, estimates based on the self-completion questionnaire sample are likely to understate the protective impact of extracurricular activity participation on engagement in drinking and marijuana use. Indeed, this is what is observed when the analysis on smoking is restricted to the self-completion questionnaire sample.

3.2 Key variables

Youths were asked about a range of social and health risks that they may have engaged in. This study considers three health risk behaviours which have often been examined in analysis of risky behaviours: 1) Currently (i.e. at age 18) smoking regularly, 2) Currently drinking weekly, and 3) Ever tried marijuana.

YIF asked the parent whether during high school the youth participated in any organised activities after school or on weekends, such as sports, gymnastics, dance, scouts, clubs or religious groups. Forty-three activities were identified, which can be classified into four groups:[8] organised sports (sports that are usually organised by a club, association or school), other sports (sports that are usually played on a casual or un-organised venue), arts and other activities. Appendix Table 1 contains further details on definitions of participation in extracurricular activities and engagement in risky behaviours.

A key control is SES, which in this study is defined as a categorical variable based on the welfare history of the individual's family as recorded by Centrelink data: 1) no history of welfare receipt; 2) received less than six years of welfare while the respondent was growing up (moderate receipt); and 3) received at least six years of welfare (intensive receipt).[9] This variable is arguably a much better indicator of SES than commonly used variables like family income, parental education and parental occupation, as it captures a family's economic circumstances over a long duration rather than just at a point in time.

Other controls include demographic characteristics (indigenous status, metropolitan residence), family background when the respondent was 14 (whether the respondent lived with both parents, employment status of mother) and

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[8]This grouping follows the common practice in the literature, see the studies reviewed in Feldman and Matjasko (2005) and Farb and Matjasko (2012).

[9]Cobb-Clark et al. (2012), who use the same data set to examine the effect of growing up on welfare on engagement in risky behaviours, distinguish two categories of moderate welfare receipt: early (some occurring before the respondent was 10 years of age) and late (all occurring after the respondent was 10). This study combines these two categories as they do not produce statistically different effects in the analyses.

parental characteristics (mother's age, mother's smoking status, country of birth of parents, and education of father and mother), as listed in Table 1. All analyses are carried out separately for each gender to capture gender differences in preferences for risk and leisure activities. Such an extensive set of controls minimises selection on observables as well as reducing the potential bias due to selection on unobservables.

3.3 Descriptive statistics

Table 1 contains the means of the regression variables for the total sample and separately for those who participated in extracurricular activities in high school and those who did not. About one in six adolescents are currently a regular smoker while 43 percent are currently a weekly drinker. The high incidence of weekly drinking is a concern, especially for such a young age, as 65 percent of weekly drinkers are high-risk drinkers.[10] Experience with marijuana is common; 36 percent have tried it.[11] Over half of the sample has been involved in at least one of these three risky behaviours.

A vast majority (80 percent) of adolescents participated in extracurricular activities during high school, some even participated in multiple activities. The dominant form of extracurricular activity is organised sports, attracting over 59 percent of the sample. Participation rates in each of other sports, arts and other activities are around 20 percent.

YIF does not collect information on the frequency with which young people participated in extracurricular activities. However, the 2009 survey of Children's Participation in Cultural and Leisure Activities (Australian Bureau of Statistics, 2009) suggests that 92 percent of 12–14 year-old boys who participated in organised

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[10]Defined as average daily consumption of at least 7 standard drinks for males and at least 5 standard drinks for females, according to National Health and Medical Research Council guidelines.

[11]More than half of those who report having tried marijuana were still using it in the past 12 months.

sports did so at least 14 times while 85 percent did so at least 27 times in the past 12 months. For 12–14 year-old girls, these proportions are 91 percent and 82 percent respectively. Among 5–14 children who played a musical instrument (classified as an 'arts' activity in this study), 78 percent (68 percent) did so at least 14 (27) times in the past 12 months.[12] Thus, it seems that most of young people who participate in extracurricular activities do so at least once a fortnight.

Even though extracurricular activity participants and non-participants are equally likely to be involved with any risky behaviour (54 percent vs. 57 percent respectively), the two groups differ significantly in engagement rates by behaviour. Interestingly, while engagement in smoking and marijuana use is lower among extracurricular activity participants, engagement in weekly drinking is higher among participants. At the mean level, extracurricular activity participants and non-participants are also statistically different from each other in most other characteristics.

Table 2 shows significant differences in participation rates in risky behaviours and extracurricular activities across gender and welfare history. Compared with males, females have a lower probability of being a weekly drinker (38 percent vs. 49 percent). Females are somewhat less likely to engage in smoking and marijuana use than males, yet the differences are not statistically significant. While the two genders are equally likely to participate in any extracurricular activity, males have higher participation rates than females in sports while the opposite is true of arts and other activities. Adolescents who come from families without a welfare history are more likely to participate in extracurricular activities than those from moderate-welfare families, who in turn are more likely to do so than those from intensive-welfare families. While welfare-free adolescents are less likely than other adolescents to engage in smoking and marijuana use, they are more likely be a weekly drinker. These differences suggest that the relationship between

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[12]The published data do not contain a finer age breakdown for these statistics.

participation in an extracurricular activity and a risky behaviour might differ by gender and SES.

4   Estimation strategy

To examine the effect of extracurricular activity participation on engagement in risky behaviours, a reduced-form model will be estimated:

$$Y_i = \alpha_i + \beta_{Ei}E_i + \boldsymbol{\beta_{Xi}X_i} + \epsilon_i \tag{1}$$

where i indexes individuals, E is a binary indicator of whether the individual participated in extracurricular activities during high school, and $\boldsymbol{X}$ a vector of controls.

A problem with identifying the causal effect of extracurricular activity participation in (1) is selection into extracurricular activities. Fortunately, the extensive set of controls available from YIF helps minimise selection bias due to observable characteristics. To address selection bias due to unobserved heterogeneity, past studies have used the IV method (e.g. Barron et al., 2000; Eide and Ronan, 2001) and the fixed-effects model on longitudinal data (e.g. Lipscomb, 2007). A limitation with these approaches is that IV results are often questionable as it is difficult to find a valid instrument,[13] whereas the individual fixed-effects model requires longitudinal data which are not usually readily available.

Instead of explicitly addressing selection bias due to unobserved heterogeneity,[14] this study uses two methods proposed by Altonji et al. (2005) to assess the

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[13]Eide and Ronan (2001) use height at age 16 as an instrument for athletic participation in high school while Barron et al. (2000) use school size, parental income, student health, whether the school is a private school, library books-per-student ratio, faculty-to-student ratio, and height and weight of the student in high school.

[14]Extracurricular activity participation refers to the entire high school period (starting from age 12 or 13 in Australia). Smoking and drinking refer to status at age 18. Only 3 percent of those who report having tried marijuana did so before age 12, three quarters of whom still use marijuana in the past 12 months. Thus, reverse causality is unlikely to be at work here.

extent to which the observed associations between extracurricular activity participation and engagement in risky behaviours can be interpreted as capturing causal relationships. The first method estimates the effect of extracurricular activity participation when selection on unobservables equals selection on observables ('equal selection', for short). Altonji et al. (2005) argue that if the observable determinants of an outcome are a random subset of the full set of determinants, selection on observables must be equal to selection on unobservables. That is, the information collected in a survey is just as important as the information not observed by the researcher in determining the outcome in question.

As noted in Section 3, the YIF survey collects comprehensive information on many aspects of life, so selection on observables is arguably higher than selection on unobservables. Thus, in this case selection on unobservables is likely to be at the most as high as as selection on observables. Zero selection and 'equal selection' thus represent the two extremes of selection on unobservables, and the true effect of extracurricular activity participation on engagement in risky behaviours should fall within the two estimates evaluated at these two extremes of selection on unobservables.

The second method involves calculating the amount of selection on unobservables relative to selection on observables (the 'implied ratio') that would be required to attribute the entire effect of extracurricular activity participation to unobserved heterogeneity. Since selection on unobservables is argued to be no greater than selection on observables, an implied ratio that is greater than one suggests that the observed association is likely to reflect a causal relationship. An implied ratio of less than one means that selection on unobservables is smaller than selection on observables, which is very plausible, thus the observed association is more likely to reflect selection bias due to unobserved heterogeneity.

The advantage of the Altonji et al.'s (2005) approach is that it allows one to informally gauge the extent of a causal relationship between a potentially en-

dogenous variable and the dependent variable without requiring an exclusion restriction. Many studies have recently adopted this approach to indirectly address endogeneity in educational experiences.[15]

5   Basic estimation results

This section reports the basic results from estimating (1) using a probit model. As shown in Table 3, the (marginal) effects of extracurricular activity participation on young people's engagement in risky behaviours vary by gender, activity type and behaviour.

For males, the most striking result is that participation in organised sports is strongly positively associated with alcohol use; with participants being 15 percentage points more likely to be a weekly drinker than non-participants, other things being equal. This pattern is in line with findings from the literature mentioned in Section 2. Participation in other sports is also positively related to weekly drinking, but the relationship is not statistically significant. While participation in organised sports does not have any significant relationship with smoking and marijuana use, participation in other sports is negatively associated with engagement in these behaviours.

The only significant relationship that males' arts participation has is with weekly drinking. Males who participated in arts activities during high school are 12 percentage points less likely to be a weekly drinker than non-participants. While other activities (mainly clubs and volunteering work) is negatively related to engagement in all three risky behaviours among males, the relationship is only significant for drinking and marijuana use. Males who participated in other activities during high school are 14 percentage points less likely to be a weekly drinker

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[15]For example, Chatterji (2006); Fletcher and Frisvold (2011); Hinrichs (2011); Schwerdt and Wuppermann (2011); Van Klaveren (2011).

and 15 percentage points less likely to have tried marijuana than males who did not.

For females, neither organised sports nor other sports have any significant association with any risky behaviour. Arts participation is only significantly associated with marijuana use, with participants 7.9 percentage points less likely to have tried this substance. The strongest results for females are for other activities. Participation in these activities is significantly negatively related with engagement in all three risky behaviours. For example, female participants in other activities are 7.8 percentage points less likely to be a weekly drinker and 17 percentage points less likely to have tried marijuana than non-participants.

Across both genders, other activities appear the most beneficial type of extracurricular activities. Participation in these activities is significantly negatively related to engagement in all three risky behaviours for females and with weekly drinking and marijuana use for males. While participation in non-organised sports is negatively significantly related to engagement in most risky behaviours for males, no statistical significance is found for females. Arts participation only has a significant negative association with one risky behaviour for each gender (weekly drinking for males and marijuana use for females). Participation in organised sports is popular (attracting 59 percent of the sample), but it does not show strong negative associations with engagement in risky behaviours. For males, participation in organised sports is positively associated with weekly drinking while for females no significant association prevails.

6   Causality

This section adopts the two methods suggested by Altonji et al. (2005), as outlined in Section 4, to assess whether the associations between extracurricular activity participation and engagement in risky behaviours observed in Section 5 are more

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likely to reflect the causal effects of, or the selection effects into, extracurricular activity participation.

6.1 Range of effects

First, I estimate the effects of extracurricular activity participation on engagement in risky behaviours under two extreme values of selection on unobservables. At one extreme, there is no selection on unobservables, which is when extracurricular activity participation is truly exogenous to engagement in risky behaviours. At the other extreme, selection on unobservables equals selection on observables, which is what Altonji et al. (2005) argue is the highest possible value for selection on unobservables. Estimates of extracurricular activity participation evaluated at these two extremes form a range within which the true effect should fall.

As reported in Tables 4–5, for some equations, the range spans across both positive and negative territories, and is thus not very helpful in pinning down the true impact. For example, for males the effect of participation in organised sports on the probability of being a weekly drinker is estimated to range from +15 percentage points to −3.8 percentage points. Below I will only discuss cases where the basic estimate (i.e. 'zero selection') is statistically significant and the possible range of estimate is narrow enough to provide a useful indication of the true impact.[16]

For males (Table 4), participation in other sports is estimated to be associated with a 6.3 percentage point lower probability of being a regular smoker when participation is exogenous, and with 0.5 percentage points lower when selection on unobservables equals selection on observables. ('Equal selection' occurs when the correlation ρ between unobserved determinants of other sports participation and unobserved determinants of regular smoking is −0.15.) Thus, participation

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[16]Those cases are highlighted in Tables 4–5).

in other sports is likely to reduce the probability of regular smoking by 0.5–6.3 percentage points among males.

Interestingly, among males the effect of participation in other sports on marijuana use is even higher (in absolute terms) when selection on unobservables equals selection on observables (-35 percentage points, when $\rho = 0.39$) than when there is no selection on unobservables (-14 percentage points). This pattern indicates that unobserved determinants of other sports participation are positively correlated with unobserved determinants of engagement in marijuana use (i.e. positive selection bias). Thus, the basic estimate is only a lower bound of the true effect of other sports participation on marijuana use. Accordingly, among males participation in other sports is likely to reduce the probability of having tried marijuana by *at least* 14 percentage points. This is a substantial effect, given that 36 percent of males in the sample have tried marijuana.

By the same logic, among males participation in arts activities reduces the probability of being a weekly drinker by at least 12 percentage points, whereas participation in other activities lowers the probabilities of being a weekly drinker and having tried marijuana by at least 14 and 15 percentage points respectively.

In sum, for males, most of the significant associations between extracurricular activity participation and engagement in risky behaviours observed in Table 3 are likely to reflect causal relationships. The only exception is the association between participation in organised sports and weekly drinking. The positive association in this case reflects positive selection bias. When selection on unobservables is assumed to equal selection on observables ($\rho = 0.30$), the association between participation in organised sports and weekly drinking switches sign. Given this result, it seems unlikely that participation in organised sports causes males to engage in weekly drinking.

For females (Table 5), arts participation reduces the probability of having tried marijuana by at least 7.9 percentage points. Females' participation in other activ-

ities decreases the probability of having tried marijuana by 16.1–16.7 percentage points and decreases the probability of being a weekly drinker by at least 7.8 percentage points. It is notable that in the two latter cases, equal selection occurs when ρ is almost zero ($\rho = -0.02$ and $\rho = 0.03$ respectively), suggesting that there is very little selection bias due to unobserved heterogeneity in these equations.

While females' participation in other activities is significantly negatively associated with regular smoking, the associations switch sign when selection on unobservables is assumed to equal selection on observables. Thus, it is not clear whether participation in other activities causes females to engage less in regular smoking.

6.2 Ratio of selection on unobservables to selection on observables

Next, I calculate the ratio of selection on unobservables to selection on observables that would be required to completely explain the observed association between extracurricular activity participation and engagement in risky behaviours. As noted in Section 4, an implied ratio of less than one (i.e. selection on unobservables is smaller than selection on observables) suggests that the observed association can be explained by selection bias, whereas a ratio of greater than one suggests that the association is likely to be a causal relationship.

Table 6 shows that for males, even though participation in organised sports is significantly positively associated with weekly drinking, selection on unobservables that is smaller than selection on observables is sufficient to attribute the association to selection bias. Thus, these associations are likely to capture unobserved differences between participants in organised sports and non-participants rather than to reflect the causal effect of participation in the sports.

For males, there are five cases where selection on unobservables is required to be greater than selection on observables to attribute the observed association to selection bias, suggesting that the observed association is likely to signify a causal impact. Specifically, participation in non-organised sports reduces regular smoking and marijuana use, participation in arts reduces weekly drinking, while participation in other activities reduces weekly drinking and marijuana use.[17]

Similarly, for females, participation in arts reduces marijuana use, while participation in other activities reduces both weekly drinking and marijuana use. The only case where a significant association does not indicate a causal relationship is between participation in other activities and regular smoking.

Taken together, the results from Altonji et al.'s (2005) two methods suggest that participation in other activities reduces both weekly drinking and marijuana use for both genders. Participation in arts reduces weekly drinking among males and marijuana use among females, whereas participation in non-organised sports reduces regular smoking and marijuana use among males only. Even though weekly drinking is positively associated with participation in organised sports among males, this association is unlikely to be causal.

7 Differential impact by SES

To examine whether SES moderates the relationship between extracurricular activity participation and engagement in risky behaviours, I estimate an extension of (1) that includes an interaction between low SES and extracurricular activity participation dummies. A statistically significant negative (positive) marginal effect of the interaction term[18] indicates that the effect of extracurricular activity participation is more (less) negative for low SES than for high SES. The SES indi-

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[17]A negative implied ratio indicates that the estimate is a lower bound of the true effect, which is consistent with the results in Section 6.1.

[18]The marginal effects on the interaction terms are calculated using the method suggested by Ai and Norton (2003).

cator, family welfare receipt, is already included as controls in (1). For simplicity, this analysis only distinguishes two SES categories: low SES (those with intensive welfare receipt) and high SES (those with no to moderate receipt).

Table 7 shows that the interaction term is small or insignificant in most cases. For males, participation in non-organised sports is associated with an 11 percentage point lower probability of weekly drinking for low SES, yet this association is (insignificantly) positive for high SES. That is, participation in non-organised sports benefits low-SES males more than high-SES males in this case.

An opposite pattern prevails between males' participation in other activities and regular smoking. Here participation is associated with a reduction by 7.2 percentage points in the probability of regular smoking for high SES, while the association is (insignificantly) positive for low SES. That is, participation in other activities appears to benefit high-SES males more than low-SES males. In other cases, the effects of extracurricular activity participation for males in two SES groups are not statistically different from each other.

For females, arts participation has a large negative effect on engagement in regular smoking and weekly drinking (-10 and -15 percentage points respectively) for low-SES individuals while having no significant effect for high-SES counterparts. Participation in other activities is associated with a 14 percentage point lower probability of regular smoking among low-SES females while having no significant effect for high-SES females. Overall, there is some evidence that extracurricular activity participation lowers engagement in risky behaviours for low-SES females more than it does for high-SES females, whereas among males the SES gradient is almost non-existent.[19]

These puzzling results can be explained by existing evidence on parental supervision. It has been found that low-SES children, who are disproportionately

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[19]When low SES is defined as having any welfare receipt, the results are even less statistically significant.

from single-parent families or step-parent families, tend to have less parental supervision than high-SES children (Cookston, 1999; Zick and Allen, 1996). There is consistent evidence that the more time parents spend in supervision and in engaging in activities with their daughters, the less likely the daughters are to exhibit problem behaviours whereas for boys the evidence has been mixed (e.g. Cookston, 1999). It follows that participation in extracurricular activities, which usually involves adult supervision and thus can serve as a substitute for parental supervision, is likely to benefit low-SES females relative to high-SES females more than it benefits low-SES males relative to high-SES males.

8   Conclusion

While there has been ample evidence of significant links between extracurricular activity participation and engagement in risky behaviours, it is not clear whether the relationships are causal. This study finds that extracurricular activity participation is likely to lead to less engagement in risky behaviours. Moreover, in several cases, there is positive selection bias between extracurricular activity participation and engagement in risky behaviours. Thus, the observed association between the two in those cases is likely to represent a lower bound of the true effect of the former on the latter.

However, the effects differ by activity type, gender and to some extent by SES. Participation in activities other than sports and arts reduces both weekly drinking and marijuana use for both genders. Participation in arts reduces weekly drinking among males and marijuana use among females, whereas participation in non-organised sports reduces regular smoking and marijuana use among males only.

Like many earlier studies, this study finds a significant positive association between participation in organised sports and weekly drinking among males. How-

ever, this association is likely to capture unobserved differences between participants in organised sports and non-participants rather than to reflect a causal impact of participation in these sports.

Despite their popularity, participation in organised sports has no significant effect in reducing engagement in risky behaviours among either gender. This is not to say that organised sports are not useful.[20] Rather, these results suggest that organised sports may not be the most effective deterrents of risky behaviours.

There is some evidence that extracurricular activity participation lowers engagement in risky behaviours more for low-SES females than it does for high-SES females, yet among males the SES gradient is almost non-existent. This puzzling result can be explained by the differential effect of parental supervision (of which SES is a proxy) on adolescent behaviours. Nevertheless, the weak results on the moderating effect of SES could be due to the small numbers of low-SES males and females who participated in the extracurricular activity in question. This issue should be further investigated with larger samples.

The findings in this study appear to corroborate the social control theory, as they show a negative causal impact of extracurricular activity participation on engagement in risky behaviours despite a positive selection between the two. The different effects found for different activity type, gender and to some extent SES indicate that the social learning theory may also be at work.[21] These findings provide solid evidence on a benefit of extracurricular activities that has not been considered in the economics literature. This evidence improves our understanding of adolescent transition into adulthood and should be taken into account when making decisions about public and private investments in extracurricular activities.

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[20]Sports participation has been found to increase psychological resiliency, self-esteem, GPA and educational expectations and to lower depression and internalizing (Fredricks and Eccles, 2006, 2008).

[21]This is in line with Booth and Nolen's (2012) findings that gender differences in risk behaviour might reflect social learning rather than inherent gender traits.

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Table 1: Means of regression variables

	Total sample	Participated in extracurricular activities	
		No	Yes
Risky behaviours			
Engage in any risky behaviour	0.524	0.551	0.518
Current regular smoker	0.171	0.269	0.146***
Current weekly drinker	0.433	0.358	0.454***
Ever tried marijuana	0.358	0.437	0.339***
Extracurricular activities			
Participated in any activity	0.796		1.000
Organised sports	0.594		0.746
Other sports	0.210		0.263
Arts	0.247		0.311
Other activities	0.194		0.244
Own characteristics			
Indigenous Australian	0.032	0.047	0.029**
Migrant from a NESB country	0.034	0.043	0.029
Metropolitan residence	0.596	0.612	0.592
Family characteristics at age 14			
Lived with both parents at 14	0.765	0.689	0.783***
Mother employed at 14	0.727	0.614	0.757***
Family welfare history			
Moderate receipt	0.309	0.336	0.302
Intensive receipt	0.235	0.370	0.201***
Parental characteristics			
Age of mother	46.864	46.071	47.069***
Mother is a smoker	0.201	0.292	0.179***
At least one parent is NESB migrant	0.175	0.236	0.156***
Mother's education: Year 12	0.085	0.085	0.085
Mother's education: above Year 12	0.642	0.565	0.662***
Father's education: Year 12	0.152	0.152	0.153
Father's education: above Year 12	0.452	0.340	0.479***
Number of observations	2,348	531	1,805

Notes: Entries are weighted sample means. Parental migrant status is reported by the young person, all other parental characteristics as well as youth's participation in extracurricular activities are reported by the parent. *, ** and *** denote sample means that are significantly different from the column to the left at the 10%, 5% and 1% level respectively.

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Table 2: Key regression variables by family welfare history and gender

	Total sample	Gender		Family welfare history		
		Male	Female	None	Moderate	Intensive
Risky behaviours						
Engage in any risky behaviour	0.524	0.539	0.508	0.526	0.511	0.536
Current regular smoker	0.171	0.175	0.166	0.109	0.183***	0.273***
Current weekly drinker	0.433	0.490	0.381***	0.464	0.429	0.371***
Ever tried marijuana	0.358	0.365	0.353	0.319	0.383**	0.412***
Extracurricular activities						
Participated in any activity	0.796	0.802	0.791	0.869	0.778***	0.680***
Organised sports	0.594	0.647	0.539***	0.670	0.589***	0.454***
Other sports	0.210	0.235	0.182***	0.259	0.181***	0.152***
Arts	0.247	0.142	0.358***	0.298	0.210***	0.197***
Other activities	0.194	0.174	0.215**	0.208	0.191	0.170*
Number of observations	2,348	1,122	1,226	680	920	748

Notes: Entries are weighted sample means. *, ** and *** denote sample means that are significantly different from the reference category (Male or No welfare) at the 10%, 5% and 1% level respectively.

Table 3: Marginal effects of extracurricular activity participation on engagement in risky behaviours

	Regular smoking	Weekly drinking	Tried marijuana
	(1)	(2)	(3)
Male			
Organised sports	-0.030	0.147***	0.014
	(0.025)	(0.037)	(0.036)
Other sports	-0.063**	0.031	-0.139***
	(0.025)	(0.042)	(0.038)
Arts	0.025	-0.123**	-0.009
	(0.035)	(0.049)	(0.048)
Other activities	-0.032	-0.138***	-0.151***
	(0.030)	(0.044)	(0.040)
Observations	1022	749	748
Pseudo R^2	0.092	0.056	0.046
Female			
Organised sports	-0.010	0.050	0.047
	(0.023)	(0.032)	(0.032)
Other sports	-0.019	0.032	-0.000
	(0.030)	(0.043)	(0.042)
Arts	-0.009	0.004	-0.079**
	(0.024)	(0.034)	(0.033)
Other activities	-0.067***	-0.078**	-0.167***
	(0.025)	(0.036)	(0.033)
Observations	1114	928	927
Pseudo R^2	0.109	0.053	0.081

Notes: Each row represents a separate model controlling for a broad range of characteristics. Sample size is the same while pseudo R-squared statistics are very similar within each column. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Effect of extracurricular activity participation on engagement in risky behaviours under two extreme values of selection on unobservables – for males

	Regular smoking	Weekly drinking	Tried marijuana
Organised sports			
Zero selection			
Estimate	-0.125	0.390***	0.039
Standard error	(0.100)	(0.099)	(0.100)
Marginal effect	[-0.030]	[0.147]	[0.014]
Equal selection			
Estimate	0.332***	-0.102	-0.068
Standard error	(0.098)	(0.096)	(0.100)
Marginal effect	[0.081]	[-0.038]	[-0.025]
ρ	-0.28	0.30	0.07
Other sports			
Zero selection			
Estimate	-0.287**	0.082	-0.404***
Standard error	(0.125)	(0.110)	(0.116)
Marginal effect	[-0.063]	[0.031]	[-0.139]
Equal selection			
Estimate	-0.023	-0.689***	-1.036***
Standard error	(0.124)	(0.102)	(0.110)
Marginal effect	[-0.005]	[-0.252]	[-0.353]
ρ	-0.15	0.46	0.39
Arts			
Zero selection			
Estimate	0.104	-0.330**	-0.024
Standard error	(0.140)	(0.133)	(0.134)
Marginal effect	[0.025]	[-0.123]	[-0.009]
Equal selection			
Estimate	0.868***	-0.744***	-0.059
Standard error	(0.132)	(0.131)	(0.134)
Marginal effect	[0.209]	[-0.274]	[-0.021]
ρ	-0.40	0.23	0.02
Other activities			
Zero selection			
Estimate	-0.141	-0.370***	-0.443***
Standard error	(0.136)	(0.122)	(0.128)
Marginal effect	[-0.032]	[-0.138]	[-0.151]
Equal selection			
Estimate	0.795***	-1.014***	-0.861***
Standard error	(0.125)	(0.116)	(0.126)
Marginal effect	[0.196]	[-0.360]	[-0.301]
ρ	-0.49	0.38	0.25

Notes: Zero selection: selection on unobservables = 0. Equal selection: selection on unobservables = selection on observables. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Highlighted estimates are discussed in text.

Table 5: Effect of extracurricular activity participation on engagement in risky behaviours under two extreme values of selection on unobservables – for females

	Regular smoking	Weekly drinking	Tried marijuana
Organised sports			
Zero selection			
Estimate	-0.041	0.139	0.135
Standard error	(0.097)	(0.090)	(0.091)
Marginal effect	[-0.010]	[0.050]	[0.047]
Equal selection			
Estimate	0.853***	-1.028***	0.794***
Standard error	(0.087)	(0.072)	(0.085)
Marginal effect	[0.217]	[-0.344]	[0.267]
ρ	-0.55	0.73	-0.41
Other sports			
Zero selection			
Estimate	-0.081	0.090	0.000
Standard error	(0.132)	(0.118)	(0.120)
Marginal effect	[-0.019]	[0.032]	[0.000]
Equal selection			
Estimate	0.482***	-0.447***	0.395***
Standard error	(0.128)	(0.114)	(0.118)
Marginal effect	[0.115]	[-0.159]	[0.138]
ρ	-0.30	0.30	-0.22
Arts			
Zero selection			
Estimate	-0.037	0.012	-0.229**
Standard error	(0.101)	(0.094)	(0.096)
Marginal effect	[-0.009]	[0.004]	[-0.079]
Equal selection			
Estimate	0.562***	-0.869***	-0.516***
Standard error	(0.097)	(0.084)	(0.095)
Marginal effect	[0.136]	[-0.297]	[-0.178]
ρ	-0.36	0.55	0.18
Other activities			
Zero selection			
Estimate	-0.311**	-0.223**	-0.510***
Standard error	(0.124)	(0.106)	(0.111)
Marginal effect	[-0.067]	[-0.078]	[-0.167]
Equal selection			
Estimate	0.232*	-0.273**	-0.469***
Standard error	(0.120)	(0.106)	(0.111)
Marginal effect	[0.055]	[-0.097]	[-0.161]
ρ	-0.30	0.03	-0.02

Notes: Zero selection: selection on unobservables = 0. Equal selection: selection on unobservables = selection on observables. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Highlighted estimates are discussed in text.

Table 6: Amount of selection on unobservables relative to selection on observables required to attribute the effect of extracurricular activity participation on risky behaviour to selection bias

	Regular smoking	Weekly drinking	Tried marijuana
Male			
Organised sports			
Estimate	-0.125	0.390***	0.039
Marginal effect	[-0.030]	[0.147]	[0.014]
Implied bias	-0.437	0.457	0.085
Implied ratio	0.29	0.85	0.46
Other sports			
Estimate	-0.287**	0.082	-0.404***
Marginal effect	[-0.063]	[0.031]	[-0.139]
Implied bias	-0.262	0.651	0.355
Implied ratio	1.10	0.13	-1.14
Arts			
Estimate	0.104	-0.330**	-0.024
Marginal effect	[0.025]	[-0.123]	[-0.009]
Implied bias	-0.605	0.243	-0.019
Implied ratio	-0.17	-1.36	1.26
Other activities			
Estimate	-0.141	-0.370***	-0.443***
Marginal effect	[-0.032]	[-0.138]	[-0.151]
Implied bias	-0.741	0.347	-0.020
Implied ratio	0.19	-1.07	22.15
Female			
Organised sports			
Estimate	-0.041	0.139	0.135
Marginal effect	[-0.010]	[0.050]	[0.047]
Implied bias	-0.750	0.900	-0.280
Implied ratio	0.06	0.15	-0.48
Other sports			
Estimate	-0.081	0.090	0.000
Marginal effect	[-0.019]	[0.032]	[0.000]
Implied bias	-0.526	0.456	-0.300
Implied ratio	0.15	0.20	0.00
Arts			
Estimate	-0.037	0.012	-0.229**
Marginal effect	[-0.009]	[0.004]	[-0.079]
Implied bias	-0.463	0.602	0.077
Implied ratio	0.08	0.02	-2.97
Other activities			
Estimate	-0.311**	-0.223**	-0.510***
Marginal effect	[-0.067]	[-0.078]	[-0.167]
Implied bias	-0.494	-0.023	-0.111
Implied ratio	0.63	9.70	4.59

Notes: *** p<0.01, ** p<0.05, * p<0.1. Highlighted estimates are discussed in text.

Table 7: Effect of extracurricular activity participation on engagement in risky behaviour by SES

	Male			Female		
	Regular smoking	Weekly drinking	Tried marijuana	Regular smoking	Weekly drinking	Tried marijuana
Organised sports						
For high SES (1)	-0.024	0.111**	0.019	0.008	0.050	0.024
	(0.029)	(0.044)	(0.042)	(0.027)	(0.038)	(0.037)
For low SES (2)	-0.049	0.239***	-0.003	-0.058	0.060	0.101
	(0.049)	(0.067)	(0.067)	(0.040)	(0.059)	(0.061)
(2) − (1)	-0.026	0.128	-0.021	-0.066	0.010	0.077
	(0.056)	(0.080)	(0.080)	(0.048)	(0.070)	(0.071)
Other sports						
For high SES (1)	-0.082***	0.075	-0.109**	-0.014	0.054	0.001
	(0.027)	(0.047)	(0.044)	(0.034)	(0.048)	(0.046)
For low SES (2)	-0.025	-0.107	-0.233***	-0.043	-0.024	-0.021
	(0.057)	(0.082)	(0.066)	(0.057)	(0.090)	(0.094)
(2) − (1)	0.057	-0.182*	-0.124	-0.029	-0.077	-0.022
	(0.063)	(0.094)	(0.079)	(0.067)	(0.102)	(0.105)
Arts						
For high SES (1)	0.009	-0.112*	-0.057	0.028	0.062	-0.078**
	(0.039)	(0.057)	(0.055)	(0.029)	(0.039)	(0.037)
For low SES (2)	0.059	-0.149*	0.116	-0.097**	-0.149***	-0.086
	(0.073)	(0.090)	(0.094)	(0.039)	(0.057)	(0.063)
(2) − (1)	0.050	-0.036	0.174	-0.125***	-0.211***	-0.007
	(0.083)	(0.106)	(0.109)	(0.048)	(0.069)	(0.073)
Other activities						
For high SES (1)	-0.072**	-0.124**	-0.174***	-0.036	-0.075*	-0.150***
	(0.030)	(0.051)	(0.045)	(0.031)	(0.043)	(0.040)
For low SES (2)	0.092	-0.187**	-0.069	-0.136***	-0.086	-0.209***
	(0.073)	(0.088)	(0.088)	(0.039)	(0.064)	(0.061)
(2) − (1)	0.164**	-0.062	0.105	-0.100**	-0.011	-0.058
	(0.079)	(0.101)	(0.099)	(0.050)	(0.077)	(0.072)

Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Highlighted estimates are discussed in text.

Appendix Table 1: Definitions of participation in extracurricular activities and engagement in risky behaviours

Definition	Question	Questionnaire
Participated in extracurricular activities during high school	While attending secondary school, did [Focal Youth] participate in any organised activities after school or on weekends, such as sports, gymnastics, dance, scouts, clubs or religious groups? • Organised sports: basketball, football/ rugby/ soccer, netball, cricket, gymnastics, swimming, and other organised sports; • Other sports: bush-walking, horse-riding, skate boarding, tennis, skiing, motor sport, athletics/ cross country running, badminton/ squash/ table tennis, baseball/ softball, boxing/ martial arts, bowling (ten pin/ lawn), cadets (army/ navy/ air force), cycling/ BMX racing, diving/ water polo, field hockey, golf, ice skating/ ice hockey, roller blading/ roller hockey (in-line skating), rowing/ canoeing/ kayaking, surfing/ surf life saving, volleyball, water sports (sailing/ fishing/ snorkelling etc); • Arts: music, art, drama, dance; • Other activities: brownies/ guides, cubs/ scouts, church group, other organised club, debate team, volunteer work, cultural activities, academic activities/ competitions (language/ science/ writing), other, and unspecified.	Parent questionnaire, Section G: Questions about Focal Youth's Education and Youth
Current regular smoker	Do you regularly smoke cigarettes or any other tobacco products?	Youth questionnaire, Section L: Health
Current weekly drinker	Do you drink alcohol? –Yes, I drink alcohol every day –Yes, I drink alcohol 5–6 days per week –Yes, I drink alcohol 3–4 days per week –Yes, I drink alcohol 1–2 days per week	Youth self-completion questionnaire, Lifestyle and Health
Ever tried marijuana	Have you ever tried marijuana?	Youth self-completion questionnaire, Lifestyle and Health