

# Part-time Work and Cigarette Use Among Teenagers

Does Age Moderate this Relationship?

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## ABSTRACT

**Objectives:** Previous studies on part-time work and substance use suggest that those teenagers working longer hours during the school year use cigarettes more frequently than those working less or not at all. The purpose of this study was to investigate whether age moderates the relationship between part-time work hours and smoking status.

**Methods:** This 1999 study consisted of a cross-sectional survey of 4,297 junior high and high school students aged 13 to 19 from 111 randomly selected schools in Ontario.

**Results:** Compared to not working at all, moderate (11 to 20 hours/week) to long (21+ hours) work hours was more strongly associated with the probability of being a smoker among young teenagers (13 to 16 years old). Work intensity was only weakly associated with cigarette use in late adolescence (17 to 19 years old).

**Conclusions:** Working longer hours during school is associated with cigarette use, particularly among young teenagers. Although these cross-sectional data prohibit any firm conclusions regarding causality, the strong association observed among young teenagers increases the plausibility of early work transition being a risk factor for initiating smoking.

Cigarette smoking is a major risk factor for certain cancers, cardiovascular disease, lung disease, and other problems (e.g., low birthweight).<sup>1</sup> Estimates have placed tobacco's contribution to premature deaths in North America at 20% to 60%.<sup>2,3</sup> Prevention of smoking among teenagers is seen as a central goal of public health efforts to reduce smoking and its health consequences because most people start smoking before they are 18 years old.<sup>4</sup>

Socialization that occurs in family and school environments appears to play a critical role in the onset of smoking.<sup>5,6</sup> Less is understood about another social role that is apparently associated with teenage cigarette use, working part-time during the school year. In Canada, about one third of 15 to 19 year old full-time students are estimated to work for an employer during the school year.<sup>7</sup> In addition, informal work arrangements (e.g., babysitting, yard-work, delivery) are not uncommon among young teenagers,<sup>8</sup> and bring into question the belief that juggling work and school begins in late adolescence.

The association between part-time work and use of substances such as cigarettes has been described as one of the most consistent findings in research on youth and work,<sup>9</sup> with 20 or more hours per week being particularly associated with adverse developmental consequences.<sup>10</sup> According to a recent review,<sup>10</sup> 5 of 7 cross-sectional studies and 4 of 6 longitudinal studies showed a positive relationship between work hours during school and composite indices of substance use that included cigarettes. Two of the three studies that specifically assessed tobacco showed a positive association between work hours and frequency of cigarette use.<sup>11-13</sup>

Explanations of this association posit either causal or selective processes: Does a work-smoking association reflect the impact of part-time work or the influence of prior characteristics of the individuals who later work longer hours? Working longer hours does appear to increase socialization with drug-using peers and decrease parental control.<sup>14,15</sup> With regard to the selection hypothesis, students who report working long hours also report poorer school performance, more antisocial behaviours (e.g., trouble with police), and more health-compromising behaviours (e.g., poor diet) than peers working a few

*La traduction du résumé se trouve à la fin de l'article.*

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hours or not at all.<sup>11,16,17</sup> This precocious engagement in more “adult” behaviours may reflect individual differences in academic inclination or personality traits (e.g., impulsivity and sensation-seeking).<sup>11,18</sup> Longitudinal evidence suggests that, even though selection effects are evident, work hours are correlated with alcohol, drug and cigarette use above and beyond any pre-employment differences.<sup>12,13,15,19</sup>

Regardless of the extent to which causal or selection processes are involved, it would be useful to know whether the work intensity-smoking association is similar across early and late adolescence. One might posit, for example, that balancing work and school demands might be more difficult for younger teenagers than older teenagers. Most cross-sectional studies examine two to three grade levels, thereby restricting the ability to detect any moderating effects of age. A recent study that included 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> graders did not investigate whether work hours was differentially associated with smoking across the age groups.<sup>14</sup> Accordingly, the purpose of this study was to investigate whether age moderates the relationship between work hours and smoking status among middle and high school students.

## METHODS

### Data

The 1999 Ontario Student Drug Use Survey employed a two-stage cluster design (school, class) and included eight strata defined by type of school (middle 7-8 grades vs. secondary 9-12 grades) and four geographic regions.<sup>20</sup> In this survey, 111 of 123 randomly selected schools in Ontario participated. The response rate for students within participating schools was 76.6%. Reasons for non-completion included absenteeism (14.7%) and absence of parental consent (8.7%). Self-administered questionnaires were distributed by staff of the Institute for Social Research, York University on a classroom basis. The questionnaire took about 30 minutes to complete.

Of the 4,894 respondents who completed the survey, our analytic sample was the 4,297 students aged 13 to 19 who completed the measures described below. Students who were in the Ontario Academic Credit (OAC) program, an optional college preparation program

equivalent to a 13<sup>th</sup> grade, were also included in the analyses below ( $n=428$ ). When the analyses below were performed excluding this group (not shown), however, no appreciable change in the results was observed. Table I shows the background characteristics of the respondents in the analytic sample.

### Measures

Current involvement in part-time work was assessed using the following question: “On average, how many hours a week do you spend working part-time?” To assess different levels of work hours, we dummy-coded work hours into four levels: not working (reference group), working 1 to 10 hours/week, working 11 to 20 hours/week, and 21+ hours/week.

Covariates were chosen based on previous research.<sup>11</sup> Respondents were asked about their current family composition (i.e., living with both parents or not), school marks (i.e., ordinal scale from below 50% to 100%), and maternal education (1=post-secondary education). About 10% of the sample who completed the other measures did not know or did not provide information on their mother’s education. We therefore constructed an additional dummy variable that contrasted respondents with missing data on maternal education from all other respondents.

Respondents were asked how often they smoked cigarettes in the past 12 months. Consistent with Safron et al.,<sup>14</sup> those not smoking or smoking less than one cigarette per day were defined as nonsmokers. The remaining seven response categories, ranging from “one to two cigarettes a day” to “more than 20 cigarettes a day,” were categorized as smokers (24.1% of sample).

### Analytic strategy

To examine the relationship between work hours and smoking status, we conducted logistic regressions using Taylor methods for estimating variance in complex survey designs.<sup>21</sup> Because of non-independence within clusters (i.e., school), the likelihood does not accurately reflect the distribution of the sample and the (-2) log likelihood test should not be used. Consequently, adjusted Wald  $F$  tests were used to evaluate the overall model.<sup>22</sup>

As suggested by Jaccard,<sup>23</sup> we first conducted a logistic regression with the two

**TABLE I**  
Characteristics of the Sample

	Study Participants n=4297	[std error]
Age (%)		
13 years old	15.3	[0.7]
14	18.9	[1.7]
15	17.1	[1.7]
16	16.2	[1.5]
17	16.6	[1.3]
18	11.8	[1.4]
19	4.3	[1.0]
Sex (%)		
Female	49.5	[1.8]
Male	50.5	[1.8]
Maternal education (%)		
No post secondary degree	45.4	[1.4]
Post secondary degree	43.9	[1.4]
Missing	10.7	[0.6]
Work status (%)		
Not working at all	54.0	[1.2]
Working 1 to 10 hr/week	22.3	[0.8]
Working 11 to 20 hr/week	16.8	[1.0]
Working 21+	6.9	[0.6]
Living arrangement (%)		
Both parents	72.4	[1.3]
Other	27.6	[1.3]
School grades (maximum=100)	77.5	[0.4]
Smoking status, last 12 months (%)		
Never in lifetime	42.9	[1.4]
Not in last 12 months	11.8	[0.7]
Tried one cigarette	14.1	[0.7]
< 1/day	7.0	[0.4]
1-2/day	3.9	[0.3]
3-5/day	5.7	[0.4]
6-10/day	6.6	[0.6]
11-15/day	4.0	[0.5]
16-20/day	2.1	[0.3]
> 20/day	1.8	[0.2]

focal predictors (i.e., age, work hours), covariates (i.e., gender, family composition, maternal education, and school marks), and the three age-by-work interaction terms (i.e., age by “worked 1 to 10 hours/week”, age by “worked 11 to 20 hours/week”, age by “worked 21+ hours/week”). To test whether the interaction terms together significantly contributed to the model, an adjusted Wald  $F$  test was conducted. Because of a significant age by work hours interaction, we then examined the effect of work hours stratified by age group (i.e., 13 to 16 and 17 to 19 years old). Respondents were stratified into these two age groups based on the fact that school is compulsory for the younger age group.

## RESULTS

In the logistic regression on smoking status that included the main effects, covariates, and the age by work hours interaction

**TABLE II**  
**Logistic Regressions Stratified by Age Group of Cigarette Smoking in the Past 12 Months**

	Cigarette Use for 13 to 16 Year Olds (Smoker=1)					
	Unadjusted Model		Adjusted Model*			
	Odds Ratio	95% CI		Odds Ratio	95% CI	
Work intensity						
Not working	–			–		
Work 1 to 10 hr /week	1.20	0.91	1.60	1.25	0.95	1.65
Work 11 to 20 hr /week	2.05	1.51	2.77	1.98	1.44	2.72
Work 21+ hr /week	4.42	2.91	6.72	3.92	2.40	6.42

  

	Cigarette Use for 17 to 19 Year Olds (Smoker=1)					
	Unadjusted Model		Adjusted Model*			
	Odds Ratio	95% CI		Odds Ratio	95% CI	
Work intensity						
Not working	–			–		
Work 1 to 10 hr /week	0.87	0.60	1.29	0.96	0.66	1.42
Work 11 to 20 hr /week	1.16	0.81	1.65	1.32	0.95	1.86
Work 21+ hr /week	1.60	0.95	2.69	1.60	0.95	2.70

\* Adjusting for gender, family composition, maternal education, and school marks

terms (not shown), the overall adjusted Wald test was significant,  $F(12, 92)=34.28$ ,  $p<0.001$ , as was the specific test of the block of age by work hours interaction terms,  $F(3, 101)=7.34$ ,  $p<0.001$ . Examining the three parameter estimates in the model that comprised the interaction term, the age by moderate work hours (i.e., 11 to 20 hours/week) and the age by long work hours (i.e., 21 or more hours/week) were the only significant interaction terms ( $p<0.005$ ).

Table II presents the logistic regression models stratified by age group. For the younger age group, working moderate or long hours was associated with a two- to four-fold increase in the likelihood of being a smoker compared to not working at all. Working 1 to 10 hours/week was only marginally associated with smoking status ( $p=0.10$ ).

For the older age group, respondents working moderate or long hours were 30 to 60% more likely to report being a smoker, but this did not meet traditional levels of significance ( $p<0.10$ ).

## DISCUSSION

The present study examined whether age modified the work-smoking status association among students 13 to 19 years old. We found evidence that this work-smoking association was significantly stronger among younger teenagers than older ones. Previous studies have noted that alcohol use and smoking status covary with work hours as early as age 14,<sup>14,15</sup> but the present analyses are the first to specifically evaluate age differences. Although these cross-sectional data prohibit any firm conclusions

regarding causality, the strong association observed among young teenagers increases the plausibility of early work transition being a risk factor for initiating smoking.

One may speculate that the work-smoking association is stronger among younger teenagers because of the stress associated with learning how to manage the conflicting demands of work and school. Cigarette use may help alleviate this stress. Another possibility is that young teenagers' attitudes towards smoking are more easily influenced by co-workers who smoke than older teenagers. Selection processes may also explain this differential association. Younger teenagers who work longer hours may represent a more homogenous group who precociously engage in a range of risky or deviant behaviours.<sup>11</sup> In contrast, as work becomes more normative in late adolescence, the reasons why students work and the types of individuals who work becomes more heterogeneous, thereby diluting the work-smoking association.

A possible methodological explanation is that those students who precociously engage in working and smoking may have already dropped out of school by late adolescence. This differential attrition would presumably lead to an underrepresentation of this group in our sample of older teenagers. This hypothesis cannot be assessed in the present data, but could be examined in a large prospective cohort study that began in late childhood/early adolescence and followed those who dropped out of high school as well as those who stayed in school.

An important strength of the present findings is the use of a representative sample of middle and high school students.

Consequently, our findings are relatively generalizable to adolescents in Ontario. Also, we employed multivariate techniques to control for potential confounders. Nevertheless, certain limitations in the present study suggest directions for future research. First, although we collected data on work hours, we do not have data on the types of work the students engaged in. There is preliminary evidence that the quality of work has an influence on whether work has positive or negative effects.<sup>10</sup> Second, these cross-sectional data limit our understanding of the time course of work and smoking status. Prospective data allow us to determine more precisely the timing of entry into the workforce and the initiation of regular cigarette use. Future research could also focus on changes in smoking status as teenagers move from odd jobs to formal employment or from working to not working.

Finally, we did not examine whether, among smokers, work hours increased the quantity of cigarettes smoked. If work hours are positively related to smoking intensity, it would be consistent with the hypothesis that cigarette use is linked to the amount of work stress. It would also be consistent with the possibility that, for those working teenagers who smoke, the purchase of cigarettes does not have as great an opportunity cost when compared to teenage smokers who have less disposable income. Future research could therefore determine whether work may facilitate nicotine dependence by increasing the number of cigarettes smoked.

If further research among young teenagers suggests that working longer hours is a risk factor for cigarette use, at

least two policy implications may be indicated. From a legislative perspective, more stringent laws regarding work hours and better enforcement of them might have a beneficial impact on smoking rates. From an intervention perspective, the possible influence of co-workers who smoke on youth might be suggestive of further education and intervention efforts in workplaces.

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## RÉSUMÉ

**Objectifs :** Selon les études antérieures sur le travail à temps partiel et la consommation d'intoxicants, les adolescents qui travaillent de longues heures durant l'année scolaire fument plus souvent la cigarette que ceux qui travaillent moins ou pas du tout. Nous avons voulu déterminer si l'âge a un effet modérateur sur la relation entre le travail à temps partiel et le fait d'être ou non un fumeur.

**Méthode :** Nous avons mené en 1999 une enquête transversale auprès de 4 297 élèves de 13 à 19 ans dans 111 écoles secondaires ontariennes de premier et de deuxième cycles sélectionnées au hasard.

**Résultats :** Comparée au fait de ne pas avoir d'emploi, une semaine de travail moyenne (11 à 20 heures) ou longue (21 heures et plus) était plus fortement associée à la probabilité d'être un fumeur chez les jeunes adolescents (13 à 16 ans). L'intensité du travail n'était que faiblement associée au tabagisme chez les adolescents plus vieux (17 à 19 ans).

**Conclusion :** Les longues heures de travail durant l'année scolaire sont associées à l'usage de la cigarette, particulièrement chez les jeunes adolescents. Bien qu'il s'agisse de données transversales qui empêchent de conclure avec certitude à une relation causale, la forte association observée chez les jeunes adolescents accroît la plausibilité que l'intégration précoce au marché du travail soit un facteur de risque pour l'initiation au tabagisme.



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