

An examination of the validity of the Family Affluence Scale II (FAS II) in a general adolescent population of Canada

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Abstract This study examined the performance of the FAS II in a general population of 17,545 students in grades 7, 9, 10 and 12 in the Atlantic provinces of Canada. The FAS II was assessed against two other measures of socioeconomic status: mother's highest level of education and family structure. Our study found that the FAS II reduces the likelihood of nonresponse which is a common threat to the validity of items inquiring about parental income, education or occupation. Ordinal regression analysis revealed that mother's education and family structure were independent risk factors of lesser affluence. Participants whose mother had less than a post secondary degree were 2 to 3 times more likely to report lesser affluence and those who reported living in other than 2 parent families were 1.5 to 3 times more likely to report lesser affluence. The authors conclude that the FAS II is a useful measure of socioeconomic status for this population.

Keywords Adolescent · SES · Family affluence scale · Mother's education · Family structure · Validity

The finding that better health outcomes are associated with higher socioeconomic status (SES) is a robust phenomenon for the adult population. Investigations of the wealth-health association among the adolescent population have met with mixed results. Some researchers have found an association between SES and poor health outcomes and behaviours among adolescents (Goodman et al. 2001; Lowry et al. 1996; Newacheck et al. 2003; Spurrier et al. 2003; Starfield et al. 2002) while others have not (Tuinstra et al. 1998; West 1997; West and Sweeting 2004).

Despite the mixed empirical results, it is widely recognized that SES is a key determinant of health largely because it speaks to available resources to acquire and maintain health. Having resources available to cope with life stressors is one explanation of health

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disparities along the SES gradient for adults (Lynch and Kaplan 1997). From a lifecourse perspective (Kuh and Ben-Schlomo 2004), available resources for good health are important at every age, from the intrauterine environment (Barker 1998) to old age (Dannefer 2003).

Socioeconomic status is a multifaceted construct that is considered to be an amalgamation of the head of household's (HoH's) education, occupation and income. Education, occupation and income are moderately correlated and, together, are considered to measure the underlying construct of affluence (Liberatos et al. 1988). Largely due to high rates of nonresponse, problems arise when adolescents' responses to measures of parental education, occupation and income are used as proxies for the HoH's SES. Income is a socially sensitive issue and commonly demonstrates a high rate of nonresponse. Adolescents may not know the HoH's income; and depending on their age, they may be even less knowledgeable about the HoH's education (Ensminger et al. 2000) or occupation. In the 1986 Scottish component of the WHO's Health Behaviour in School-aged Children (HSBC) study, more than 20% of the responses to parental occupation were either missing or unable to be coded (Currie, unpublished data cited in Currie et al. 1997). Similar rates of nonresponding were found for parental occupation and education in other studies with adolescents (Goodman 1999; Lien et al. 2001; Tuinstra et al. 1998).

Because SES is considered to be a key determinant of health, it is important to establish an accurate indicator of affluence for the adolescent population. Several researchers have had success reducing nonresponse rates with adolescents by employing alternative measures of SES that are more familiar to adolescents (Currie et al. 1997; Goodman et al. 2001; Wardle et al. 2002). Among such tools are the Family Affluence Scale I and II (FAS I and II). The FAS II asks adolescents about: number of cars owned by the family; whether the participant has their own bedroom; number of yearly holidays taken by the family; and number of computers owned by the family. The FAS I (Currie et al. 1997) is identical to the FAS II except that the former asks about number of telephones rather than computers and does not include an item about family holidays. The FAS items were selected from deprivation indices developed by Townsend (1987) and Carstairs and Morris (1991) to tap the degree of material resources available to the family and are interpreted as a measure of family affluence.

The FAS I was examined in relation to father's occupation in a sample of more than 4,000 Scottish public school children aged 11, 13 and 15 years (Currie et al. 1997). The item nonresponse rate was approximately 1%. The FAS I mean score demonstrated a steady decline with lower classification of father's occupation. The authors reported a significant Spearman rank order correlation of 0.41 ($P < .001$) between FAS I score and father's occupation.

The FAS II has been validated against Gross Domestic Product (GDP) using the data from the 2001/2002 HBSC study representing 35 countries and more than 160,000 participants aged 11, 13 and 15 years (Boyce et al. 2006). Spearman rank order correlations for country-level mean FAS II scores and FAS II items were significant ($P < .01$) and 0.70 or above for all items except having one's own bedroom which was 0.17 ($P > .05$). In addition, Boyce et al. correlated the FAS I mean country scores between the 1997/1998 HBSC data as well as the 2001/2002 HBSC data and found the FAS I to be stable with a Spearman rank order correlation of 0.95 ($P < .01$). The FAS II was also demonstrated to be significantly correlated with GDP. The Spearman rank order correlation for FAS II score and GDP was .87 ($P < .01$) (Boyce et al. 2006).

As SES is a multifaceted construct it has been recommended that epidemiological studies have more than one indicator of SES. Following Coleman's (1988) argument that

children need three forms of capital for successful development (financial, human, and social), Entwisle and Astone (1994) suggest that researchers include measures of mother's highest level of education, family structure and family income. Mother's highest level of education is reflective of human capital (Entwisle and Astone 1994) and the education of women has been widely touted as instrumental in positive social change, particularly as it relates to enhanced health for women and children (Levine et al. 2001). Family structure is important because if only one parent is present it may limit the amount of resources, human, financial or otherwise that are available to the child. Over the last 150 years in the United States there has been a tremendous increase in single parent families, with an estimated 30% of children under the age of 18 living in single parent households (Hernandez 1997). Single parent families are more likely to report lower SES than two parent families (Ensminger et al. 2000) and as a group are expected to have fewer financial resources than two parent families.

The objective of this study was to examine the performance of the FAS II with the general adolescent population in the Atlantic provinces of Canada, including the internal consistency of the instrument as well as the association between FAS II category and mother's education and family structure.

1 Methods

1.1 Participants

The data for this study was collected for the 2007 iteration of the Student Drug Use Survey for the Atlantic Provinces (SDUSAP). Participants were recruited from grades 7, 9, 10 and 12 in public schools across the Atlantic provinces of Canada. The Atlantic provinces are comprised of Nova Scotia (NS), New Brunswick (NB), Newfoundland and Labrador (NL) and Prince Edward Island (PE). In 2006, the total population for the Atlantic provinces was 2.3M (Statistics Canada 2007a) with the most and least populous provinces being NS and PE, respectively. In 2001, the population of Atlantic Canada was relatively homogenous with greater than 95% of each of the provinces reporting Caucasian race (Statistics Canada 2001a). Detailed ethnographic data for the 2006 census were not available at the time of publication, however, early indicators of migration for the Atlantic provinces suggest the distribution of ethnicity will not have substantially changed (Statistics Canada 2007b). English and French are the official languages of Canada and the majority of residents in the Atlantic provinces primarily speak English at home, however, there is variability among the provinces. New Brunswick has the highest percentage of residents who primarily speak French at home with 29% compared to 2% or less for NS, PE and NL (Statistics Canada 2007c). As a group, families in the Atlantic provinces have fewer financial resources than the Canadian average. In 2005, the median total family income in each of the Atlantic provinces was \$47,600 (NL), \$51,500 (NB), \$53,400 (PE), and \$54,000 (NS) (Statistics Canada 2007d). The median total family income in Canada was \$60,000.

A total sample of 17,454 students participated in the 2007 SDUSAP. About 51% of the sample was female and the average age was 15.1 years. The sampling was derived from a two-stage cluster design, composed of randomly selected classes from randomly selected schools. The design stratified the sample by grade and by intra-provincial health district.

1.2 Instrument

The SDUSAP is an effort to gather epidemiological data from the general adolescent population concerning issues of addictions-related health. The 2007 SDUSAP is a self-reported questionnaire consisting of 98 items asking students about: demographic data; substance use; consequences of substance use; sexual behaviour; gambling; and mental health. Assessment of validity and reliability of the overall survey has been replicated at each implementation of the survey (Poulin et al. 1993). Evidence of validity and minimization of under-reporting include: measures to ensure the anonymity of respondents and the assurance of confidentiality; low nonresponse rates; and estimates consistent with similar surveys.

The SDUSAP is offered in English and French. The questionnaire was first translated in 1994 when the survey was standardized across the four Atlantic provinces (Poulin et al. 1996). A majority of items have remained the same through the four iterations of the survey performed in 1996, 1998, 2002 and 2007. In 2007, new items were translated from English to French, then back-translated, by a team of bilingual individuals comprising the Principal Investigator (C. Poulin), a professional translator, and a Francophone academician. The English and French versions were then scrutinized by bilingual teachers and/or health professionals in the departments of health and/or school boards in NS and NB. In 2007, only the NB and NS samples included French questionnaires comprising 10% of the NB sample and less than 1% of the NS sample.

1.3 FAS II

The 2007 SDUSAP included the FAS II. The FAS II can be scored as either a composite measure ranging from 0 to 9, or as different categories ranging from low to high. Table 1 presents the FAS II items and the scoring of their respective response options. The authors have followed Boyce et al. (2006) suggestion of dividing the composite score into low affluence (0–2), middle affluence (3–5) and high affluence (6–9) for categorical analysis. Boyce et al. did not describe participants that did not answer all four items, nor did they suggest how to classify these cases. For prevalence estimates, we categorized those cases who failed to respond to any one or more FAS II items as Indeterminate.

1.4 Proxy Measures of Socioeconomic Status

The SDUSAP item measuring mother's highest level of education ranges from "post secondary graduate" to "did not graduate high school." Two alternate response options for mother's education were "no mother" and "don't know." Very few participants responded

Table 1 FAS II items and their respective scoring

FAS II Item	Points per response option			
	0	1	2	3
How many vehicles does your family own?	None	One	Two or more	
Do you have your own bedroom for yourself?	No	Yes		
During the past 12 months, how many times did you travel away on holiday with your family?	Not at all	Once	Twice	More than twice
How many computers does your family own?	None	One	Two	More than two

to the “no mother” option (0.5%). Comparatively, many more participants responded that they did not know the highest educational level achieved by their mother (17.1%). The authors decided to combine “no mother” and “don’t know” into a single response option. The response categories for mother’s highest level of education were: post secondary graduation; some post secondary education (attended, but did not graduate); high school graduation; attended, but did not graduate high school; and don’t know/no mother. The validity of the SDUSAP item measuring mother’s highest level of education was demonstrated in a previous study (Poulin et al. 2006). That study showed that adolescents’ reports of their mother’s highest level of education aggregated to the school postal code level correlated well with the median percentage of educational attainment as reported in the 2001 Canadian Census (Statistics Canada 2001b) also aggregated for residents in those postal codes. In particular, aggregated adolescents’ responses in the 2002 SDUSAP and aggregated residents’ responses of the 2001 Census Canada showed correlations of 0.55 and 0.52 for post-secondary graduation and less than secondary school graduation, respectively.

The SDUSAP item measuring family structure describes participants that live in either single or two parent families. Additionally, there were response options for “living alone or with friends” and “other.” Very few participants indicated they lived alone or with friends (0.7%); many more responded they lived in an “other” family structure (3.7%). We decided to include “alone or with friends” with the “other” category. The response options for family structure were: two parents (biological or step-parents); single parent; and other.

1.5 Statistical Analyses

The analyses conducted addressed three aspects of the data: (1) an examination of how the proxy SES measures covary with FAS II score categories; (2) an analysis of the internal consistency of the FAS II; and (3) an analysis of the independent association of mother’s highest level of education and family structure with FAS II score categories. An alpha level of 0.01 was used to identify statistical significance. All analyses were conducted with *Stata 9.0* (StataCorp 2005). All analyses took into account the stratified disproportionate cluster sample and postestimation weights.

1.6 Pearson Product-Moment Correlations

Pairwise Pearson product-moment correlation coefficients were calculated for FAS II category and all independent variables. The pairwise correlation coefficients were calculated with a sample of 16,725, omitting the Indeterminate FAS II category.

1.7 Cronbach’s Alpha Coefficient

The internal consistency of the FAS II was examined with the Cronbach’s alpha coefficient. The alpha was calculated with a sample of 17,169 using casewise deletion and omitting the Indeterminate FAS II category.

1.8 Ordinal Logistic Regression

Boyce et al. (2006) indicate that the FAS II can be ordered from low to high affluence, therefore ordinal logistic regression is an appropriate technique to employ in the analysis.

The Indeterminate category yields little insight into the participants comprising this group except that they failed to respond to all FAS II items. The Indeterminate cases were excluded from the analysis; results from preliminary multinomial regression models that included the Indeterminate category did not differ materially from those presented in Table 3 below.

2 Results

Prevalence estimates for the FAS II score categories and the independent variables are presented in Table 2. The overall prevalence of low, medium and high affluence as measured by the FAS II for this population was 2.4%, 38.8%, and 56.6%, respectively. One percent of participants living in a two parent family reported a low affluence score as compared to more than 7% in the other two family living arrangements. Only 1% of participants whose mother had graduated with a post secondary degree reported a low affluence score while more than 6% of those whose mother did not graduate high school reported the same level of affluence.

2.1 Pearson Product-Moment Correlations

FAS II score categories were significantly correlated with mother's education ($r = .19$; $P < .001$), family structure ($r = .16$; $P < .001$) and grade level ($r = .07$; $P < .001$). Gender and province of residence were not correlated with FAS II score category. Mother's education and family structure were correlated ($r = .07$; $P < .001$).

2.2 Cronbach's Alpha Coefficient

The alpha coefficient for the FAS II was 0.31. Deleting single items from the scale altered the alpha coefficient. The item-rest coefficients suggested that deleting either the car ownership ($\alpha = .18$), or computer ownership ($\alpha = .22$) or holiday ($\alpha = .23$) items resulted in an appreciable drop in the value of the alpha coefficient. If the own bedroom item were deleted from the scale, the alpha coefficient would improve to 0.36.

2.3 Ordinal Logistic Regression

Two models were created for these analyses. Model 1 included all independent variables except language of questionnaire. Model 2 includes all the independent variables plus the interaction term between language of questionnaire and province of residence.

2.4 Univariate Analysis

Table 3 presents the results of the ordinal regression analyses. Univariate ordinal regression models revealed a significant association between FAS II category and all independent variables except gender. Unadjusted odds ratios (OR's) for grade indicated that grade 10 and 12 students were almost 1.5 times more likely to report lesser affluence than grade 7 students. Students from NL were 1.3 times more likely to report lesser affluence than students from NS. Students who lived in a family structure that was anything other than two parents were at twice the risk of reporting lesser affluence. Those students whose

Table 2 Prevalence of independent variables according to FAS II score category

Independent variable	n	FAS II score category							
		Low (0–2)		Middle (3–5)		High (6–9)		Indeterminate	
		Wt'd %	99% ci	Wt'd %	99% ci	Wt'd %	99% ci	Wt'd %	99% ci
Overall	17545	2.4	±0.5	38.8	±1.5	56.6	±1.6	2.1	±0.4
Gender									
Male	8546	2.2	±0.6	37.9	±2.0	57.2	±2.0	2.6	±0.8
Female	8917	2.6	±0.6	39.8	±1.9	56.1	±2.0	1.5	±0.4
Nonresponse	82	3.0	±6.3	25.4	±15.4	48.5	±16.6	23.0	±15.5
Grade									
07	3741	1.9	±0.7	33.9	±3.0	60.3	±3.1	3.8	±0.9
09	4829	2.8	±0.8	36.1	±2.7	58.7	±3.0	2.4	±0.7
10	4586	2.4	±0.9	41.3	±3.2	54.7	±3.4	1.5	±0.5
12	4389	2.5	±1.1	43.8	±3.2	52.8	±3.4	0.9	±0.4
Province									
NS	4486	2.4	±0.8	39.0	±2.8	56.4	±2.9	2.2	±0.6
NB	6237	2.2	±0.7	35.7	±2.2	60.2	±2.3	1.9	±0.6
NL	3848	3.3	±1.0	44.3	±3.4	50.1	±3.9	2.3	±0.8
PE	2974	1.4	±0.6	38.2	±2.6	58.4	±2.8	2.0	±0.7
Language of Questionnaire									
English	14487	2.5	±0.5	39.3	±1.6	56.1	±1.7	2.0	±0.4
French	3058	1.6	±1.4	34.4	±3.6	60.9	±3.6	3.1	±0.9
Family structure									
Two parents	13809	1.1	±0.2	35.8	±1.7	61.2	±1.8	1.9	±0.4
Single parent	2754	7.3	±1.8	52.8	±3.0	37.8	±2.9	2.2	±0.9
Other	788	7.8	±3.3	40.4	±5.6	49.3	±5.3	2.5	±1.9
Nonresponse	194	3.5	±3.9	42.6	±10.1	40.2	±10.1	13.8	±7.2
Mother's education									
Post-secondary graduate	8179	0.9	±0.4	31.7	±2.1	65.9	±2.1	1.5	±0.4
Some post-secondary	679	2.0	±1.8	39.1	±5.8	57.1	±5.7	1.8	±1.6
High school graduate	3535	2.8	±0.9	46.5	±2.9	49.1	±2.9	1.6	±0.6
Did not graduate HS	1730	6.6	±2.0	56.1	±3.7	36.5	±3.7	0.9	±0.6
Don't know/no mother	3142	4.2	±1.1	42.1	±2.9	50.7	±3.1	3.0	±1.0
Nonresponse	280	5.4	±4.2	30.4	±9.5	39.0	±9.0	25.2	±8.1

mother's highest level of education was something less than a post secondary degree were between two and three times the risk of reporting lesser affluence. The risk of those participants who did not respond to either the family structure or mother's highest level of education items was similar to participants who reported the lowest levels of those variables, respectively.

The univariate analysis also showed that students responding to the French questionnaire were at reduced risk of being in a lesser affluent category (OR = .79; *P* < .001) than those responding to the English questionnaire. Additionally, inspection of the univariate

Table 3 Ordinal regression results

Independent variable	n	FAS II score category				High (6–9) (Referent)				Ordinal logistic regression			
		Low (0–2)		Middle (3–5)		High (6–9) (Referent)		Univariate		Model 1 ^a		Model 2 ^b	
		Wt'd %	99% ci	Wt'd %	99% ci	Wt'd %	99% ci	Unadj'd OR	Adjusted OR	Adjusted OR	Adjusted OR	Adjusted OR	Adjusted OR
Overall	17169	2.5	±0.9	39.7	±1.5	57.9	±1.6	–	– ^a	– ^b	–	–	
Gender													
Male	8326	2.3	±0.4	38.9	±1.5	58.8	±1.6	1.00	1.00	1.00	1.00	1.00	
Female	8777	2.7	±0.5	40.4	±1.4	56.9	±1.5	1.08	1.10	1.10	1.10	1.10	
Nonresponse	66	3.9	±6.2	33.3	±13.9	62.9	±14.2	0.87	0.97	0.97	0.97	0.97	
Grade													
07	3595	2.0	±0.5	35.3	±2.3	62.7	±2.4	1.00	1.00	1.00	1.00	1.00	
09	4714	2.9	±0.7	37.0	±2.1	60.1	±2.3	1.13	1.09	1.09	1.08	1.08	
10	4517	2.5	±0.7	42.0	±2.4	55.6	±2.6	1.34***	1.31***	1.31***	1.30***	1.30***	
12	4343	2.5	±0.8	44.2	±2.5	53.3	±2.5	1.46***	1.51***	1.51***	1.49***	1.49***	
Province													
NS	4385	2.4	±0.6	39.9	±2.2	57.7	±2.2	1.00	1.00	1.00	–	–	
NB	6108	2.3	±0.5	36.4	±1.7	61.4	±1.8	0.86	0.86**	0.86**	–	–	
NL	3760	3.3	±0.8	45.3	±2.6	51.4	±2.9	1.30**	1.37***	1.37***	–	–	
PE	2916	1.4	±0.5	39.0	±2.0	59.6	±2.1	0.91	0.96	0.96	–	–	
Language of Questionnaire													
English	14195	2.6	±0.4	40.1	±1.3	57.3	±1.3	1.00	–	–	–	–	
French	2974	1.6	±0.5	35.5	±2.8	62.9	±2.8	0.79***	–	–	–	–	
Province X language of Questionnaire ^b													
NS English Qntrs	4346	2.4	±0.6	40.0	±2.2	57.6	±2.2	1.00	–	–	1.00	1.00	
NB English Qntrs	3173	2.5	±0.7	36.6	±2.2	60.9	±2.3	0.88	–	–	0.88	0.88	
NL English Qntrs	3760	3.3	±0.8	45.3	±2.6	51.4	±2.9	1.29**	–	–	1.35***	1.35***	
PE English Qntrs	2916	1.4	±0.5	39.0	±2.0	59.6	±2.1	0.91	–	–	0.95	0.95	

Table 3 continued

Independent variable	n	FAS II score category				High (6–9) (Referent)				Ordinal logistic regression	
		Low (0–2)		Middle (3–5)		High (6–9) (Referent)		Univariate	Model 1 ^a	Adjusted OR	Model 2 ^b
		Wt'd %	99% ci	Wt'd %	99% ci	Wt'd %	99% ci				
NS French Qnrs	39	0.0	–	18.0	±4.2	82.1	±4.2	–	–	–	^b
NB French Qnrs	2935	1.7	±0.5	35.9	±2.8	62.4	±2.8	0.82**	–	–	0.80**
NL French Qnrs	0	–	–	–	–	–	–	–	–	–	–
PE French Qnrs	0	–	–	–	–	–	–	–	–	–	–
Family structure											
Two parents	13534	1.1	±0.2	36.5	±1.3	62.4	±1.4	1.00	1.00	1.00	1.00
Single parent	2696	7.4	±1.4	53.9	±2.2	38.7	±2.2	2.84***	2.84***	2.84***	2.84***
Other	771	8.0	±2.6	41.4	±4.2	50.6	±4.1	1.81***	1.59***	1.59***	1.59***
Nonresponse	168	4.1	±3.4	49.3	±8.6	46.6	±8.3	1.94***	1.80***	1.80***	1.79**
Mother's education											
Post-secondary graduate	8048	0.9	±0.3	32.2	±1.6	67.0	±1.6	1.00	1.00	1.00	1.00
Some post-secondary	664	2.0	±1.4	39.8	±4.4	58.2	±4.4	1.46***	1.40***	1.40***	1.40***
HS graduate	3473	2.8	±0.7	47.3	±2.2	49.9	±4.4	2.05***	2.06***	2.06***	2.06***
Did not graduate HS	1711	6.6	±1.5	56.6	±2.8	36.8	±2.8	3.64***	3.35***	3.35***	3.36***
Don't know/no mother	3053	4.3	±0.9	43.4	±2.3	52.3	±2.4	1.92***	2.06***	2.06***	2.08***
Nonresponse	220	7.3	±4.2	40.6	±8.8	52.1	±8.9	2.05***	2.29***	2.29***	2.31***

^a The n for Model 1 is 17,169 (17,545 [total sample]–376 [Indeterminate cases]). Coefficients of ordered logit estimated cut-points for FAS II are 1.17 ($P < .001$) between high and medium/low and 4.72 ($P < .001$) between high/medium and low

^b The n for Model 2 was 17,130 (17,545 [total sample]–376 [Indeterminate cases]–39 [NS French questionnaire cases]). There were too few NS French questionnaire data to support a valid estimate for this group, therefore they are not included in this analysis. Coefficients of ordered logit estimated cut-points for FAS II are 1.16 ($P < .001$) between high and medium/low and 4.70 ($P < .001$) between high/medium and low

** $P < .01$; *** $P < .001$

Note: Because grade, province of residence and language were part of the sampling design, participants could be assigned accurate information for these items thereby creating a 0% nonresponse rate for these items

analysis suggested that the effect of French questionnaire was localized in the NB sample ($OR = .82$; $P < .01$). Detailed analyses of the four items of the FAS II instrument revealed that students responding to the French questionnaire were almost twice as likely to endorse the highest response options to three of the four FAS II items (analysis available upon request).

2.5 Multivariate Analyses

With only one exception, the adjustment achieved through the Model 1 multivariate analysis did not appreciably change the risk for any of the independent variables. In particular, when compared with students residing in NS, those residing in NB were found to be less likely to be in a lower family affluence category ($OR = .86$; $P < .01$).

Model 2 was constructed to investigate the role of the French questionnaire in the NB sample, by including an interaction term between language of questionnaire and province of residence. The results of Model 2 were nearly identical to those of Model 1, with the exception that NB participants who responded to the French questionnaire were found to be less likely ($OR = .80$; $P < .01$) to be in a lesser affluent FAS II category than those from NS who responded to the English questionnaire.

3 Discussion

These results provide evidence that the FAS II is a useful and valid indicator of family material resources in a general adolescent population of Canada. The FAS II performed as expected with two other indicators of SES. Participants who lived in a family structure other than two parents were found to be at increased risk of being categorized as having a lower level of family affluence, as were those who reported their mother's highest level of education was less than a post secondary degree. These results are consistent with other adolescent studies examining the association between parental education and family structure with measures of SES.

Our findings pertaining to gender and grade were consistent with those of comparable adolescent studies. We found no evidence of differences between gender in SES, and we found a trend toward lower affluence with increasing grade. Lower FAS II scores with increasing grade could be due to older adolescents being more accurate at assessing the family's financial resources. Research comparing adolescent reports of SES to those of their parents reveal that compared with assessments of SES made by younger adolescents, SES as reported by older adolescents tend to be more consistent with the SES as reported by their parents. Ensminger et al. (2000) found that 14–19 years old were almost three times ($OR = 2.9$; $P < .05$) more likely to agree with their parents in estimating SES than were 10–13 years old. von Rueden et al. (2006) demonstrated that the FAS II was predictive of parental reports of family financial resources for adolescents but not for children. Medium ($OR = 1.6$; $P < .05$) and low ($OR = 3.9$; $P < .05$) affluence was predictive of family resources for 12–18 years old, but was not significantly associated with medium and low affluence odds ratios for 8–11 years old (von Rueden et al.).

Compared with residence in the province of NS, residence in NL was found to be associated with a lower level of family affluence, while residence in NB was initially found to be associated with a higher level of family affluence. The finding relative to NL was expected as NL ranked lowest in median total family income of the four provinces (Statistics Canada 2007d). However, the finding of residence in NB as a protective factor

against lower family affluence was unexpected and led to an examination of the effect of the language of the questionnaire. Language of questionnaire was found to mediate the effect of province such that residence in NB ceased to be an independent predictor of family affluence category when language of questionnaire was taken into account. These findings could be a function of cultural differences with regards to the particular practices queried by the FAS II, or alternatively, a function of subtle differences in concepts arising from translation.

Mother's highest level of education was found to be associated with FAS II score category in the expected direction. Education is considered to be a component of SES (Liberatos et al. 1988). Higher levels of mother's education have been associated with both greater income and better health outcomes for children and adolescents (von Rueden et al., 2006). As such, mother's education is an important marker of SES in studies of adolescent health.

The biggest problem with employing mother's highest level of education in youth studies has been high rates of missing or uncodeable responses. Youth reports of mother's education have been demonstrated to have nonresponse rates of 7–13% (Goodman 1999; Lien et al. 2001; Tuinstra et al. 1998). The prevalence rate of missing and "don't know" responses in our study was 18.8%. Evidence from other adolescent studies suggest that reports of mother's education are less accurate and more likely to be missing if the respondent is young (Ensminger et al. 2000; Looker 1989). Our data are consistent with this evidence. Missing and "don't know" comprised nearly 19% of the responses to mother's education, and 44% of those cases were from grade 7 participants relative to only 28%, 20%, and 8% among grade 9, 10 and 12 participants, respectively. Subsequent univariate logistic regression analysis regressing grade on mother's education with missing and "don't know" pooled together versus all other categories combined revealed that grade 9, 10, and 12 participants were 0.47, 0.31, and 0.11 ($P < .001$) times as likely to report missing or "don't know" to the mother's education item as grade 7 students. Despite the large number of missing and "don't know" responses, mother's education performed as expected when regressed on the FAS II score categories.

The advantage of the FAS II over mother's education is a much lower rate of non-responding. Our data revealed a prevalence of 2.1% for non-scoreable responses (Indeterminates) to the FAS II. von Rueden et al. (2006) found a comparable rate of 2.4% for non-scoreable cases among a cross-national European study of children and adolescents. The rates of informative data for the FAS II are clearly superior to that of mother's education and lend support to the original thesis of Currie et al. (1997) that children and adolescents are more able to respond to the FAS II items than to more remote indicators of family SES. However, it is important to note that the assessment of the FAS II's association with mother's education may be compromised as it relates to grade 7 participants partly because they are over-represented in the missing and "don't know" categories.

Single parent families are known to be at risk of lower SES (Hernandez 1997; Proctor and Dalaker 2002). In an analysis of more than 15,000 children and adolescents in the 2001 British Family and Children's study, Spencer (2006) demonstrated that living in a single parent family was associated with significantly greater risk of adverse health outcomes, and much of this association was mediated by the material hardship characteristic of lone parent families. In as much as family structure can serve as a proxy for material resources, it performed as expected when regressed on the FAS II score categories in our study. Participants with missing data for this item were found to be at a risk greater than those living in an "other" family structure but less than participants who lived in single parent families. This finding is consistent with Currie et al. (1997) finding that adolescents with

missing data on father's occupation had FAS I scores comparable to those students reporting the lowest level of father's occupation.

The changing nature of family structure in contemporary society is challenging investigators to measure the complexities inherent in modern living arrangements. The preponderance of single female headed families are precipitated by separation or divorce (Hernandez 1997). Family living arrangements become more complex as people remarry, or children shuttle back and forth between the respective households of their divorced parents. Other family arrangements could include grandparents or other adults who provide supervision or support in-kind to single parent households. Our study employed a relatively restricted set of response options given the complexity of the modern family structure and is noted here as a limitation of our proxy of family material resources (i.e., family structure).

The major limitation to this study is that we did not have an external measure of family SES by which to assess the accuracy of the FAS II for this sample. A stronger study design would have been to examine adolescent reported FAS II scores with their parental estimates of family SES. The FAS II was included in the SDUSAP questionnaire in order to gather information about key epidemiological indicators of addictions-related health. Performing due diligence to gather important demographic information in order to provide context associated with health outcomes, the SDUSAP follows the guidelines of good practice for gathering SES information as suggested by Entwisle and Astone (1994) by including measures of mother's education, family structure and family income (i.e., FAS II). Our results provide evidence that the FAS II performs as expected with both mother's education and family structure. Our prevalence estimates of low, medium, and high are not consistent with von Reuden et al.'s (2006) estimates, but their sample was derived from seven different European countries while our data were collected from four geo-politically related provinces. However, our data is consistent with the 2001/2002 HBSC national Canadian data (Boyce et al. 2006). The mean FAS II scores were 5.9 among adolescents in the Atlantic region in 2007 and 5.7 among adolescents across Canada in 2001/2002.

In summary, the present study suggests that the FAS II is a useful and valid measure of family affluence as reported by adolescents in a general population of Canada. Our study found that the FAS II reduces the likelihood of nonresponse which is a common threat to the validity of items inquiring about parental income, education or occupation. Our study found that the FAS II performed as expected in terms of the association between family affluence category and mother's education as well as family structure. However, our study also found that language had a bearing on the determinants of family affluence category. This finding suggests that the FAS II may not be measuring family affluence independently of culture. It is therefore recommended that users of the FAS II assess its performance in their own sample taking into account known cultural factors that may influence the measurement of socioeconomic status.

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