

# Protective Factors related to Smoking among Brazilian Youth\*

## Factores protectores relacionados con el consumo de cigarrillo en jóvenes brasileiros

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### ABSTRACT

The aim of this study is to explore the relation of positive family climate, well-being at school and religiosity/spirituality between Brazilian youth groups of smokers and non-smokers. A non-random sample of 1.232 participants (631 males and 601 females) completed the questionnaire of this study. Ages ranged from 14 to 18 years (mean=15.68; SD=1.26). Smokers had significantly less positive family climate and well-being in school than the non-smoking youth. Regression analysis showed that all psychological characteristics act as protective factors for the smoking behavior among girls. On the other side, high well-being in school and attending school during the day can work as protective factors for boys. These findings can be important in the elaboration of public politics to reduce tobacco consumption.

### Key words authors:

Adolescent behavior, smoking, tobacco, risk factors.

### Key words plus:

Adolescent behaviour, smoking, public policies, Brasil

### RESUMEN

El objetivo del presente estudio fue investigar la relación entre clima familiar positivo, bienestar en la escuela y religiosidad/espiritualidad entre grupos de jóvenes brasileños fumadores y no fumadores. La muestra no aleatorizada estuvo compuesta por 1.232 participantes (631 varones y 601 mujeres) que completaron un cuestionario elaborado para la investigación. Las edades de los jóvenes variaron entre 14 y 18 años (media = 15.68; DT=1.26). Los jóvenes fumadores presentaron menos clima familiar positivo y bienestar en la escuela de manera significativa que los jóvenes no fumadores. El análisis de regresión mostró que todas las características psicológicas actuaron como factores de protección para la conducta fumadora entre las jóvenes mujeres. Por otro lado, altos niveles de bienestar y de presencia en la escuela durante el día pueden actuar como un factor de protección para los jóvenes varones. Estos resultados pueden ser importantes en la elaboración de políticas públicas para reducir el consumo de tabaco.

### Palabras clave autores:

conducta del adolescente, tabaquismo, tabaco, factores de riesgo.

### Palabras claves descriptores:

Conducta del adolescente, tabaquismo, políticas públicas Brasil.

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Smoking is considered one of the challenges of public health in the modern societies by the World Health Organization (WHO). It is responsible for four million deaths a year, which corresponds to 1900 deaths a day (WHO, 1998). Tabagism can also be associated with a vast range of diseases such acute myocardial infarction (Avezum, Piegas & Pereira, 2005), and major depression (Breslau, Kilbey & Andreski, 1991). Moreover, smoking is affiliated with other drug use including alcohol. In Brazil, Chaieb and Castellarin (1998) found that among alcoholics, 67% are smokers, and among non-alcoholics only 44% are smokers.

Prior researchers have found similar results regarding the prevalence of smoking among Brazilian youth. Carlini, Galduróz, Noto and Nappo (2002) investigated adolescents in ages 12 to 17 and found a prevalence rate from 15.7% (16.2% of males and 15.2% of females). Malcon, Menezes and Chatkin (2003) found a total of 12% of smokers in their sample. Similar results were found by Muza, Bettiol, Muccillo and Barbieri (1997) showing prevalence rates of 15.8% smokers among adolescents. Higher rates were found by Galduróz, Noto, Nappo and Carlini (2005) in their study of 107 Brazilians cities, in which 19.2% of the sample had smoked in the last month and 19.5% in the last year.

Research about the prevalence of smoking has been contradictory regarding gender in literature. Some Brazilians authors have found a significant higher number of male smokers than female smokers (Barbosa, Carlini-Coltrin & Silva-Filho, 1989; Muza et al., 1997) or did not find any difference (Horta, Calheiros, Pinheiro, Tomasi & Amaral, 2001; Malcon et al., 2003). However, studies in others countries found a higher prevalence of female smokers (Altobelli et al., 2005; Ivanovic, Castro & Ivanovic, 1997; Pinilla, González, Barber & Santana, 2002).

Age also seems to be an important factor related to smoking. A large number of researchers from different countries found that older adolescents smoke more than younger adolescents

(Ahmed, Brown, Gary & Saadatmand, 1994; Barbosa et al., 1989; Ivanovic et al., 1997; Malcon et al., 2003; Muza et al., 1997). Concerning age, it is important to point out that younger adolescents who engage in early smoking experimentation may look after peers whose members are smokers, increasing their own probability to become a future smoker (Fergusson, Lynskey & Horwood, 1995). On the other side, smoking in late adolescence can be a powerful predictor to smoking in adulthood (Fagan, Brook, Rubenstone & Zhang, 2005).

Many factors differentiate groups of smokers and non-smokers, such as lack of stability in the family context, suicidal ideation, suicide attempts, attitude towards harmful effects of smoking, low involvement in sports and frequency of substance abuse (Altobelli et al., 2005; Pinilla et al., 2002; Tomori, Zalar, Plesnicar, Zihlerl & Stergar, 2001). Moreover, to have a smoker as a best friend and to live with a smoker makes the probability of youth becoming a smoker higher (Hestick, Perrino, Rhodes & Sydnor, 2001; Pinilla et al., 2002). In the same direction, it was found that adolescents living with both of their biological parents smoke less than those who live with only one parent. Also, the quality of communication about smoking was associated with higher probability of smoking (Barrett & Turner, 2006; Harakeh, Scholte, De Vries & Engels, 2005). Also, Doherty & Allen (1994) found that low family cohesion and parents who smoke were predictors of smoking among adolescents.

Besides family aspects, literature has shown that schooling also seems to influence smoking and can work as a protective factor. Adolescents who were not at school or had low formal education, low achievement at school or a period of attendance of school at night have greater probability to become smokers (Barbosa et al., 1989; Horta et al., 2001; Malcon et al., 2003). In the same vein, Pinilla et al. (2002) found that some factors related to school, like complying with non-smoking rules, affect the smoking behavior of youth.

Use of tobacco was also related to religiosity and spirituality. Religiosity is related with specific beliefs and practices within an institution, and its definition can also include the concept of spirituality, defined as a more individualized practice of worship (Longo & Peterson, 2002). Religiosity has been associated with lower levels of tobacco use among older adults (Roff, Klemmack, Parker, Koenig, Sawyer-Baker & Allman, 2005). Similar results were found by Pirkle and Richter (2006), in which low levels of religiosity were associated with tobacco use among females. Regarding religiosity affiliation, Ahmed et al. (1994) studied African Americans and found that Pentecostal women have a lower chance of becoming smokers, compared with those who belong to other religious denominations. In contrast with Pirkle and Richter, these authors did not find any significant association between smoking and ones level of religiosity. Regarding spirituality, researchers have found a relation between lower levels of spirituality and smoking, suggesting that this life aspect can work as a protective factor (Hestick et al., 2001; Leigh, Bowen & Marlatt, 2005).

Since smoking is a risk factor for youth that decreases their quality of life, it is important to know which factors can increase its probability of occurrence. Unfortunately most research in Brazil is linked to the prevalence of smoking behavior among groups, emphasizing variables such as gender, age, and illicit drugs use. Relations between smoking behavior in Brazil and its risk and protective factors have not been explored yet. The effects of those predictors related to gender also need to be investigated.

The aim of this research was to explore the relation between some psychosocial characteristics (positive family climate, well-being at school and religiosity/spirituality) and Brazilian youth groups of smokers and non-smokers. Moreover, it examines how these characteristics may act together with demographic variables, such as period of school attendance and mother education, as protective factors against smoking behavior.

## Method

This article is part of a large research study concerning the protective and risk factors of Brazilian youth. The research was approved by the Ethics Commission of the second author's institution, and was supported by the World Bank.

### Sample

A non-random sample of 1.232 participants (631 males and 601 females) from three different Brazilian state capitals (Porto Alegre, São Paulo, and Recife) completed the questionnaire of this study. These cities are located in different regions of Brazil (South, Southeast, and Northeast respectively). Ages ranged from 14 to 18 years (mean = 15.68; SD = 1.26). All adolescents were living in poor urban areas of cities during the data collection period. The criteria to be classified as a smoker was to have smoked more than four cigarettes in last month (Noto et al., 2004).

Among the participants, it was found that their mothers had very few years of formal education. Of the mothers, 151 (12.3%) were illiterate or could only read; 615 mothers (49.9%) had attended school for eight years or less, and 373 mothers (30.2%) had more than eight years of formal education, from which 57 (4.6%) had finished or were currently in college).

Regarding the period of day participants attended school, it was found that most of them went to school during the day –at morning or in the afternoon (n = 1.127; 91.5%). The remaining group of adolescents (n = 105; 8.5%) attended school at night.

### Measures

Data was gathered by a questionnaire with, two basic groups of questions. The first group had questions that were related to socio-demographic aspects of participants (gender, age, and mother's formal education, etc.). The second group was presented in Likert format (varying from 1 to 5) and was related to three psychosocial characteristics (adapted from Koller, Cerqueira-Santos, Morais & Ribeiro, 2005):

**Positive Family Climate:** Nine questions concerning positive family relation (e.g. People help each other in my family). High scores in this scale indicate the perception of wellness and social support among family members. This sub-scale had a Cronbach's alpha of 0.80.

**Well-being in School:** Fourteen items related to well-being in school (e.g. I feel well at school). High scores indicate that students perceived school as a good way of improving their lives and had a feeling of wellness in this environment. This sub-scale had a Cronbach's alpha of 0.74.

**Spirituality/Religiosity:** Seven items about religious behavior at church and individual worship (e.g. Religion has been important in my life; I usually thank God). High scores in spirituality/religiosity were linked to individual religious behavior and attendance at church. This scale had a Cronbach's alpha of 0.87.

Items of each dimension were summed and transformed in Z-Scores before the analysis.

## Procedures

Participants in this study were selected according to some socio-economic indicators within neighborhoods in the three Brazilians state capitals. The neighborhoods were characterized by five indicators: (1) salary of the head of household; (2) educational level of the head of household; (3) construction material of the family home; (4) whether the house has running water; and (5) whether the house has indoor plumbing. According to this criteria, 10 neighborhoods in poverty situations were selected by chance in each city, and one school, also by chance, in each neighborhood.

Participants completed the self-report questionnaire at school. The data collection was supervised by two psychologists, and the participants took about 45 minutes to complete the survey. Participation in this research was voluntary and anonymous.

## Data Analysis

Statistical analysis was performed with SPSS® 13.0 for Microsoft Windows®. Analyses were divided in three steps. First, Chi-square Tests were used to assess the difference in frequencies of smokers and non-smokers compared with other binary variables, like gender. Second, T Tests were used to verify the difference between smokers and non-smokers according to psychosocial characteristics (positive family climate, well-being at school, and spirituality/religiosity). Finally, a logistic regression was completed with an Enter method to investigate the predictive relation of demographic variables and of psychosocial characteristics to smoking behavior.

## Results

### *Differences regarding smokers and non-smokers*

Distribution of participants according to smoker and non-smoker groups and among cities is described in Table 1. Prevalence of smokers in all three cities varied from 8.7% to 17.3% of the total sample. The prevalence of smokers in the sample was 175 (14.2%), from which 82 were males (13.6%) and 93 were females (14.7%). Regarding gender, there was no significant difference between smokers and non-smokers ( $X^2 = 0.30$ ; ns). In the analyses made for each of the three cities, gender was significant in only one. In Recife there was a significant lower number of female smokers and a higher number of male smokers than what was statistically expected ( $X^2 = 9.63$ ;  $p < 0.001$ ). More details can be seen in Table 1.

The relation between smokers and non-smokers and the time of day the participants attended school was also assessed. A significant relation between these variables was found ( $X^2 = 14.63$ ;  $p < 0.001$ ). There was a higher frequency of smokers who attended school at night ( $n = 28$ ; 26.7% from 105 students) compared to the frequency of smokers who went to school during the day ( $n = 147$ ; 13.0% from 1127 stu-

TABLE 1  
Frequencies and Percentages of Smokers and Non-Smokers according their City of Origin and Gender (n = 1232) <sup>1</sup>

		Group		Total
		Smokers	Non-Smokers	
Porto Alegre	Females	47 (20.3%)	184 (79.7%)	231
	Males	37 (14.5%)	218 (85.5%)	255
	Total	84 (17.3%)	402 (82.7%)	486
São Paulo	Females	37 (18.2%)	166 (81.8%)	203
	Males	28 (12.2%)	165 (87.8%)	188
	Total	66 (15.9%)	350 (84.1%)	416
Recife	Females	9 (4.6%) <sup>b</sup>	188 (95.4%)	197
	Males	22 (13.9%) <sup>a</sup>	136 (86.1%)	158
	Total	31 (8.7%)	324 (91.3%)	355
Total	Females	93 (14.7%)	538 (85.3%)	601
	Males	82 (13.6%)	519 (86.4%)	631
	Total	175 (14.2%)	1057 (85.8)	1232

Note:

<sup>1</sup> Comparisons were made using the Chi-square Test (2x2 – Smokers/Non-smokers X Gender) for each city.

<sup>a</sup>Frequency is higher than expected (p < 0.001); <sup>b</sup> frequency is lower than expected (p < 0.001).

dents). Even considering that the mean age of students who attend school at night was higher than other students (T=9.92; p < 0.001) and that 87.6% of this sub-sample is older than 16, the percentage of smokers at night was higher than students who attend school during the day (at night: 23.5%, 37.1% and 21.7% of smokers age 16, 17 and 18 respectively; during the day: 13.0%, 13.7% and 14.8% of smokers age 16, 17 and 18 respectively).

The frequency of smokers and non-smokers was also compared to the formal education of participants' mothers. There was no significant relation between smokers and non-smokers for this variable ( $X^2 = 4.11$ ;  $df = 1$ ; ns).

### Psychosocial Characteristics between Smokers and Non-smokers

In this section, the mean difference of psychosocial characteristics was compared between smokers and non-smokers. Table 2 shows the mean scores and the standard deviation of protective factors (positive family climate, well-being at school and spirituality/religiosity) divided by gender and smoking behaviors.

There were significant differences between smoking and non-smoking girls for all psychosocial characteristics. Non-smoking girls showed significantly higher scores in positive family climate, well-being at school, and spirituality/religiosity than smoking girls. Smoking boys pre-

TABLE 2  
Factor-Scores Means (Standard Deviation), T-Values and Significance between Youth Smokers and Non-Smokers (n = 1232)

		Group		T (sig.)
		Smokers	Non-Smokers	
Positive family climate	Females	-0.48 (1.10)	0.12 (0.93)	5.01***
	Males	-0.32 (1.21)	0.01 (0.98)	2.28*
Well-being at school	Females	-0.31 (0.87)	0.23 (0.79)	5.96***
	Males	-0.55 (1.40)	-0.09 (1.07)	2.78**
Spirituality/religiosity	Females	-0.25 (0.81)	0.30 (0.90)	5.51***
	Males	-0.42 (0.94)	-0.20 (1.05)	1.92 <sup>+</sup>

Note. <sup>+</sup>p < 0.10; \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001

sented lower scores in positive family climate, well-being at school, and tended to have lower scores in spirituality/religiosity than non-smoking boys.

### Logistic Regression

To verify the role of the psychosocial characteristics as a protective factor against smoking behavior, a logistic model was completed using the Enter method separated by gender. The aim of this regression was to analyze some predictors of smoking for this sample of Brazilian adolescents. Results of this analysis are described in Table 3.

Logistic regression analyses showed different patterns of smoking prediction for girls and boys (see Table 3). Age and formal education of the participants' mothers showed similar results for both gender. These variables did not play any significant influence on smoking behaviors for this sample.

The time of the day participants attended school tended to significantly change Beta-scores among smoking girls, and had a significant effect

among boys on predicting smoking behavior. According to these results, youth who go to school at night have a greater probability of smoking than those who go to school during the day.

Results among girls showed that there were three variables that function as protective factors of smoking behavior. Positive family climate, spirituality/religiosity and well-being at school showed negative influences, decreasing the probability of smoking. As described, age and the formal education of the mothers did not have any significant influence on smoking in this sample, while time of day at school tended to have some significance on smoking.

A regression equation for boys showed a significant influence of the time of day at school on the probability of smoking. Positive family climate and spirituality/religiosity did not have significant beta-scores associated with smoking behavior for boys. In contrast, these same variables did have negative association with smoking behavior among girls. On the other hand, well-being at school seemed to be a protective factor

TABLE 3  
Logistic Regression Model among all Variables and Smoking Behavior (n = 1232)

Variables	Females					Males						
	$\beta$	S.E.	p	Exp. ( $\beta$ )	95% C.I. Exp( $\beta$ )		$\beta$	S.E.	p	Exp. ( $\beta$ )	95% C.I. Exp( $\beta$ )	
					Lower	Upper					Lower	Upper
Age	0.10	0.11	0.35	1.10	0.90	1.36	0.07	0.11	0.56	1.07	0.85	1.33
Period of school attendance	0.72	0.42	0.08	2.04	0.90	4.63	0.93	0.38	0.01	2.53	1.20	5.33
Positive family climate	-0.33	0.12	0.01	0.72	0.57	0.91	-0.18	0.14	0.18	0.83	0.63	1.09
Well-being at school	-0.49	0.15	0.001	0.61	0.46	0.81	-0.27	0.12	0.02	0.76	0.60	0.96
Spirituality/religiosity	-0.54	0.14	0.001	0.59	0.44	0.77	-0.05	0.14	0.74	0.96	0.73	1.26
Mother's formal education												
Illiterate/could only read	-	-	0.56				-	-	0.14			
Four years	-0.47	0.47	0.32	0.63	0.25	1.57	-0.71	0.52	0.17	0.49	0.17	1.36
More than four years	-0.03	0.30	0.91	0.97	0.54	1.73	0.23	0.31	0.47	1.25	0.68	2.31
Constant	-4.09	1.65	0.01	0.01			-4.18	1.76	0.02	0.01		

Note. Smoking: 0 = non-smokers; 1 = smokers  
 School attendance: 0 = during the day; 1 = at night  
 R<sup>2</sup> Nagelkerke (females): 17.0%  
 R<sup>2</sup> Nagelkerke (males): 8.0%

of smoking behavior among boys. A comparison between the explained variance of both model (boys and girls) shows that the selected independent variables work better as girls' predictors to smoke (17.0%) than for boys ( $r^2 = 8.0\%$ ).

## Discussion

This research investigated the behavior of smoking in Brazilians' youth. Results of the current study confirmed, in part, the research findings of other literature. The prevalence rates of smoking behavior found in this study did not differ much from former research (Carlini et al., 2002; Malcon et al., 2003; Muza et al., 1997; Pinilla et al., 2002). Also, there was no difference found between gender and smoking behavior for the total Brazilian sample. Only in the city of Recife was a difference noted, with there being more male smokers than female.

Different from others studies (Ahmed et al., 1994; Barbosa et al., 1989; Ivanovic et al., 1997; Malcon et al., 2003; Muza et al., 1997), age did not influence the smoking behavior of this sample. This result may suggest that youth in Brazil who are living in poor areas are beginning to smoke early in life, since the frequency of smoking behavior did not change much from 14 to 18 years of age.

On the other hand, attending school at night does seem to be a risk factor of smoking, mainly for boys. This higher frequency of smoking behavior might be related to a higher permissiveness by the school with the use of tobacco during this period of the day (Pinilla et al., 2002). On the other side, it is common in Brazil that youth who attend school at night hold a job during the day, perhaps giving them financial freedom to be smokers. Moreover, attending school at night provides this youth segment the possibility of making contact with older young people, which may mean a new status of adulthood in their life. However, further research is needed to analyze this hypothesis in depth.

The psychological aspects investigated in this study (positive family climate, well-being at school, and spirituality/religiosity) showed different patterns for girls and boys. These results may indicate that public policies should take gender into consideration.

Past research has concentrated more on the risk factors associated with living with a smoker. In this research, the positive wellness among family members as protective factor was evaluated. Different than expected, this aspect did not show influence for both genders. Family wellness was a protective factor only for girls within this sample.

Current results about spirituality/religiosity support the influence of this variable for smoking among girls (Hestick et al., 2001; Pirkle & Richter, 2006). But differently from Hestick et al., the smoking behavior among Brazilian boys does not seem to be influenced by their level of spirituality/religiosity.

One's well-being at school was the only psychological characteristic that appeared to be a protective factor for both girls and boys, when related to smoking behavior. This result is supported by a large number of other studies that found a similar relation between both variables (Barbosa et al., 1989; Horta et al., 2001; Malcon et al., 2003) and should be explored in future intervention programs.

This research contributed to the understanding of risk behaviors among Brazilian youth and can be useful in the elaboration of public policies like prevention and intervention programs to reduce smoking. However, it is important to note that smoking is a complex behavior that is also affected by other variables such as parents who smoke, the use of alcohol and others that were not included in this study. Further research is needed to enlarge knowledge about the smoking behavior of Brazilian adolescents.

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