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Parental Monitoring and Family Relations: Associations with Drinking Patterns among Male and Female Mexican Students

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Abstract

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Contributors

Lee Strunin facilitated the collaboration with UNAM, defined the study objectives, oversaw the analytic process, prepared the first draft of the manuscript and managed all subsequent revisions. Lee Strunin, L. Rosa Díaz-Martínez, Alejandro Díaz-Martínez and Carlos A. Hernández-Ávila designed the alcohol survey. Héctor Fernández-Varela and Cuauhtémoc Solís-Torres assisted with study design and collection of data. Timothy Heeren and Michael Winter conducted the statistical analysis, wrote the methods section and contributed to subsequent drafts of the manuscript. Seth Kuranz conducted literature searches and contributed to all drafts of the manuscript. All authors contributed to the final edits and approved the final manuscript.

Conflict of Interest

All authors declare they have no conflicts of interest

Introduction—Parental monitoring and family relations are recognized as protective factors for youth alcohol use. The purpose of this study was to investigate perceived parental monitoring and family relations among subgroups of Mexican youths with different patterns of drinking behaviors and consequences.

Methods—A Latent Profile Analysis (LPA) identified profiles of drinking behavior in a cross-sectional survey of entering first year university students. Multinomial regression examined associations between parental monitoring, family relations and drinking profiles among 22,224 students.

Results—Both lower perceived parental monitoring and weaker perceived family relations were associated with heavier drinking profiles among males and females, but more strongly associated with female than male heavier drinking profiles. Being older, having parents with lower education, and not living with parents were also associated with lower parental monitoring and weaker family relations. There was a general trend of lower parental monitoring and weaker family relations as the profiles increased from Non/Infrequent-No Consequences to Excessive-Many Consequences drinkers. Lower perceived parental monitoring and weaker perceived family relations were more strongly associated with drinking profiles among females than among males. Both the parental monitoring and family relations scales had similar associations with drinking profiles.

Conclusions—Findings suggest drinking norms and values may contribute to any protective influences of parental monitoring and family relations on Mexican youths' drinking. Research about changes in drinking norms, contextual factors, and youth-parent trust would inform the utility of parental monitoring or family relations as protective strategies against alcohol misuse among Mexican and Mexican American youths and also youths from other backgrounds.

Keywords

Alcohol use; Mexican youths; Parental monitoring; Family relations; Gender; Cultural factors

1. Introduction

The influence of parenting factors on youth alcohol use is well-documented in the literature with both parental monitoring and family relations recognized as protective factors for alcohol use among young people (1,2). Parental monitoring is characterized as skills used by parents to remain informed and aware of a child's whereabouts, activities and associations (3,4). Family relations refers to family connectedness and functioning including familial bonding, cohesion, support, communication and conflict (2,5). Studies in many countries show decreased alcohol use among adolescents and young adults associated with either higher levels of parental monitoring (1,6–16) or good family relations (1,2,9–11,17–21). A few studies also show higher levels of parental monitoring or stronger family relations protective for alcohol-related consequences among young people (15,22,23).

There is limited research, however, about parenting factors and youth alcohol use in Latin America, a region in which alcohol use is a serious public health problem (24–26). In Mexico, more males aged 18–65 report harmful and hazardous drinking than in other countries in the region (24) and the proportions of females with abuse or dependence have increased substantially (27). Although a recent general population alcohol and drug use

household survey in Mexico found 1% of the general population drank daily, over half (53.6%) of young adults aged 18-35 consumed 5+ drinks on a single occasion in the past year, and among the 42.9% of 12-17 year olds who ever used alcohol, 31.8% of males and 28.1% of females drank in the past year (28). The few studies about parental monitoring or family relations and alcohol consumption among young people in Mexico show inconsistent results including parental monitoring not associated with adolescent alcohol use (29), family unity and intimacy associated with adolescents being less likely to ever use alcohol or binge drink (30), and higher parental monitoring associated with less drinking among females but not males (31).

The present study is from a project investigating patterns of alcohol use including risk and protective factors among students entering first year university in Mexico City. The project used a mixed method approach in two phases. In Phase 1, ethnographic interviews explored the influence of the Mexican drinking culture with students identified from an ongoing general health survey prior to the start of the academic year. In Phase 2, an alcohol survey supplement to the general health survey was administered to incoming first year students to assess prevalence and correlates of alcohol use. This paper focuses on data from Phase 2. The purpose of the study was to investigate perceived parental monitoring and family relations among subgroups of Mexican youths with different patterns of drinking behaviors and consequences. In an earlier study of Mexican youths at the same university, we found lower perceived parental monitoring associated with an earlier age of onset, more frequent drinking, and more harmful and hazardous drinking. Further, females reported higher parental monitoring than males and older students reported lower parental monitoring than younger students (13). The data also indicated that other factors may play an important role in the relationship and we recommended future research consider the influence of gender norms and *familismo*, a fundamental value in Mexican culture (13).

Based on our previous research, the literature on drinking among Mexican and Mexican American youths, and an earlier Latent Profile Analysis (LPA) that identified subgroups of drinkers from their patterns of alcohol use and consequences (32), we hypothesized that lower perceived parental monitoring and weaker perceived family relations would be associated with heavier drinking profiles, and the associations would be stronger in females than males. Based on other previous findings (33) and the literature (34–37), we also expected student age, parental education, and living situation to be associated with parental monitoring and family relations. This is the first study to examine Mexican youths' perceptions of parental monitoring and family relations and their associations with membership in drinking subgroups experiencing alcohol-related consequences.

2. Materials and Methods

2.1. Procedure

The study design is a cross-sectional survey of entering first year students at a large public university in Mexico City conducted during registration when the university Medical Services routinely administers a non-anonymous general health survey to all entering students. At the time of the survey, students are told that identifiable data is only accessible to the person responsible for the student's health care at UNAM's General Directorate of

Medical Services. In 2012, an alcohol survey supplement to the general health survey was administered to collect detailed information about alcohol use. The alcohol survey supplement questions were developed from both the Phase 1 ethnographic interviews and our earlier research. The study was approved by the university IRB for the PI in the U.S. and the IRB in Mexico City.

2.2. Sample

In 2012, 29,677 of the 37,077 students enrolled in nine campuses of the university in the Mexico City metropolitan area completed the surveys. Of those who completed the surveys 13% had missing data on age and 3.5% had missing or inconsistent data on drinking status. This study focuses on 22,224 students ages 17-20 of whom 14,663 were current drinkers, 1,727 former drinkers, 5,834 never drank.

2.3. Measures

The alcohol supplement included questions about frequency and quantity of alcohol use, alcohol-related consequences in the past year, and perceived parental monitoring. The general health survey queried frequency of drinking 5+ drinks in a single occasion, perceived family relations, and socio-demographics.

2.3.1. Alcohol Consumption—Questions assessed frequency of drinking, frequency of drinking 5+ in a single occasion, quantity of alcohol use and alcohol-related consequences in the past year. Students were shown a chart with picture equivalents for a single drink of different types of alcoholic beverages to assist with calculation of quantity of alcohol consumed; for example a 330 ml. bottle or can of beer equaled one drink. Our primary measure of alcohol consumption and consequences was based on an LPA (32). LPA is a person-centered method (38,39) that identified subgroups of individuals with similar patterns of drinking behaviors and consequences which we labelled Non/Infrequent-No Consequences, Occasional-Few Consequences, Regular-Some Consequences, Heavy-Many Consequences, and Excessive-Many Consequences drinkers (32). The majority of Non/Infrequent-No Consequences drinkers never drank and Excessive-Many Consequences drinkers had the highest prevalence of frequency, quantity, and heavy drinking. Excessive-Many Consequences drinkers experienced the most alcohol-related consequences and Non/Infrequent-No Consequences drinkers experienced none. There was an increase in frequency, quantity, frequency of heavy drinking, and alcohol-related consequences by each successive profile. In Mexico the legal drinking age is 18 and we assessed differences between underage 17 year olds and of age 18–20 year olds. An earlier analysis of age and drinking status (ever and current) showed a steady increase in drinking with increase in age, with 68% of 17 year olds, 72% of 18 year olds, 79% of 19 year olds and 81% of 20 year olds reporting being ever drinkers. There were no gender differences by age (32).

2.3.2. Perceived Parental Monitoring—Perceived parental monitoring was assessed using a 4-item scale adapted from Kerr and Stattin (2000) and shown to have good reliability among Mexican youths ($\alpha = 0.82$) (31). The four parental monitoring questions with Likert scale response options ('almost all of the time,' 'half of the time,' 'sometimes,' 'never') ask: "Does your mother/female guardian or father/male guardian know what you do with your

free time?" "Does your mother/female guardian or father/male guardian know with what friends you are with on your free time?" "Does your mother/female guardian or father/male guardian ask you where you are going when you leave the house?" "Does your mother/female guardian or father/male guardian know what you do after school?"

2.3.3. Perceived Family Relations—Perceived family relations was assessed using the Intra-family Relations Scale-Short Version with three sub-scales addressing dimensions of unity and support, communication and problems (40). Each sub-scale comprises four questions with Likert scale response options ("totally agree," "agree," "neither agree nor disagree," "disagree," "totally disagree"). Studies with Mexican youths have shown good reliability with Cronbach's alphas for each sub-scale: unity and support ($\alpha = 0.81$); communication ($\alpha = 0.88$); and problems ($\alpha = 0.78$) (40). Unity and support questions ask: "The members of my family usually do things together," "My family is 'warm' [caring] and supportive of me," "In my family, there is a feeling of togetherness," "The members of my family really help and support each other," Communication questions ask: "My parents encourage me to openly express my views," "In my family, it is important for everyone to express our opinions," "My family listens to me," "In my family we openly express our love for one another," and Problems questions ask: "In my family, nobody cares about each other's feelings," "The atmosphere in my family is usually unpleasant/disagreeable," "When I have a problem I don't talk to my family about it," "Conflicts in my family are never resolved."

2.3.4. Socio-demographic Measures—Students provided information on age; sex; parental education of "secondary school or less," "high school or technical degree," "undergraduate degree or more," and living situation with "mother," "father," "siblings or step siblings," "other family," "non family," "alone," "with a partner."

2.4. Analysis

For analysis, the distribution of the parental monitoring scale was highly skewed and categorized as low (0-9), medium (10-11) and high (12). Chi-square tests and Wilcoxon rank sum tests were used to compare males and females on demographics, family characteristics, drinking behaviors, perceived parental monitoring, and family relations using SAS 9.3 (SAS Institute, Inc., Cary, NC). The Intra-family Relations Scale was categorized into the lowest 25%, middle 50% and highest 25% (40).

As described above, LPA identified five distinct profiles using seven variables and students were assigned to their most likely drinking profile (32). Multinomial regression adjusting for age, parental education, and living situation was conducted using the R3STEP method in MPLUS to assess the association between the categorical versions of the parental monitoring and family relations scales and latent profile membership. This analysis technique adjusts for the measurement error obtained when assigning individuals to the most likely latent profile (41). The MPlus Mixture Complex feature was used to account for clustering by school or department because surveys were administered during orientation at 21 schools and departments at the nine university campuses.

3. Results

Over half the sample were female (55.6%) and almost 60% were 18 years old (57.6%). Over one third of students had a father (37.6%), and over one quarter a mother (27.1%), with an undergraduate or higher degree. Over 95% of both males and females lived with one or both parents or other family members (Table 1).

3.1. Parental Monitoring and Family Relations Scales

There were gender differences in both the parental monitoring and family relations scales with females more likely than males to score higher on both. Females also scored higher than males on the family relations subscales of unity and support and communication, but lower than males on the problems subscale (Table 1). Being older, having parents with lower education, and not living with parents were associated with lower parental monitoring and weaker family relations.

The overall proportions, and the proportions of males and females in each profile, reporting lower/higher perceived parental monitoring and weaker/stronger family relations are presented in Table 2a and 2b. Unadjusted associations between parental monitoring and family relations and drinking profile were all significant at $p < 0.0001$, with a general trend of lower parental monitoring and weaker family relations as the groups increased from Non/Infrequent-No Consequences to Excessive-Many Consequences drinkers. Although both males and females followed similar trends across drinking profile, more females than males in all groups reported higher perceived parental monitoring and stronger overall family relations and unity and support. A higher proportion of males than females reported problems.

3.2. Multinomial Regression Models

A multinomial regression model was used to examine associations between parental monitoring, family relations, and drinking profile in Table 3a. Two gender specific models are presented in Table 3b. The analysis treated the group reporting higher perceived parental monitoring and stronger perceived family relations as the reference for each scale (independent variable) and Occasional-Few Consequences drinkers as the reference category for drinking profile (dependent variable). The model controlled for age, mother's and father's education, and living situation because these variables were significantly associated with both scales.

3.2.1. Overall Model—Both lower perceived parental monitoring and weaker perceived family relations were consistently associated with increased odds of being Regular-Some Consequences, Heavy and Excessive-Many Consequences drinkers, and decreased odds of being Non/Infrequent-No Consequences drinkers. Weaker unity and support, weaker communication, and more problems were associated with increased odds of being Heavy and Excessive-Many Consequences drinkers. Medium scores on parental monitoring, and on each family relations sub-scale, were associated with increased odds of being Regular-Some Consequences and Heavy-Many Consequences drinkers.

3.2.2. Gender-specific Models—There were gender differences in both parental monitoring and family relations by drinking profile. Lower parental monitoring and weaker family relations were more strongly associated with drinking profiles among females than among males. Females reporting lower parental monitoring had significantly higher odds than males of being Regular-Some Consequences and Excessive-Many Consequences drinkers, females reporting medium parental monitoring had significantly higher odds than males of being Regular-Some Consequences and Heavy-Many Consequences drinkers, and females reporting weaker overall family relations and weaker communication had significantly higher odds than males of being Heavy-Many Consequences drinkers.

3.3. Scale Correlations

We examined Spearman correlation coefficients between the parental monitoring and family relations scales. There was a moderate correlation between the parental monitoring scale, the overall family relations scale, and the three family relations subscales with Spearman correlations ranging from 0.34 to 0.39.

4. Discussion

This study is the first to examine the associations between perceived parental monitoring, family relations, and drinking profiles among young people in Mexico or Latin America. By utilizing a multidimensional measure of drinking behavior and assessing measures of parental monitoring and family relations, and the influence of gender and other factors, this study expands upon our previous parental monitoring findings from the same university (13).

As hypothesized, the findings show both lower perceived parental monitoring and weaker perceived family relations associated with male and female heavier drinking-more consequences profiles. However, lower parental monitoring, weaker overall family relations, weaker unity and support and weaker communication were more strongly associated with female heavier drinking-more consequences profiles, while problems were more strongly associated with male heavier drinking-more consequences profiles. One explanation for the weaker associations observed among males than females may be the influence of culture specific gender drinking norms and values endorsing more freedom and fewer restrictions for males than females (42). If the traditional pattern of more frequent and heavier alcohol use among males than females is tacitly approved by parents, then perceived parental monitoring and family relations may have a weaker influence on male drinking than on female drinking (12,13,42). That males in the heavier-more consequences drinking profiles reported more problems may reflect broader male youth-parent relationship issues. Other research in Mexico and among Mexican Americans suggests parenting behavior can impact male and female drinking behavior differently (31,42), and our previous study found lower parental monitoring more strongly associated with alcohol use and hazardous and harmful drinking among females than males (13).

In our study, although the proportion of students having at least one drink in the past month was similar to the proportion of current drinkers aged 15-19 in Mexico in a recent WHO report (43), we found a higher proportion of heavy drinkers, particularly female heavier

drinkers. Our study also found more males than females experienced alcohol-related consequences of trouble with parents, problems with friends, physical fights and regretted sexual situations; the WHO report found more males than females experienced alcohol-related harm. Among both males and females in our study, Heavy and Excessive-Many Consequences drinkers were more likely than Non/Infrequent-No Consequences to report lower parental monitoring and weaker family relations. Our findings suggest parental monitoring and family relations represent an opportunity to intervene and prevent alcohol-related consequences among male and female young people in Mexico (43).

The moderate correlation found between the parental monitoring scale, the overall family relations scale, and the three family relations subscales supports other research showing an association between parental monitoring and aspects of family relations (11,44). The magnitude of the association between overall family relations and drinking profiles was larger than the association of the subscales and drinking profiles, and both the parental monitoring and overall family relations scales had similar associations with drinking profiles. Our findings of associations between higher and lower perceived parental monitoring and stronger or weaker perceived family relations with the same drinking profiles suggest parental monitoring and family relations as working in tandem. Other research warns of limited usefulness in changing parental monitoring behaviors if family interactions and context are ignored (11) because parental monitoring is linked with parent-child interaction, communication, and child disclosure (45). Studies on the nature of youth behavior show trusting youth-parent relationships associated with good communication and youth disclosure about behaviors including substance use (46–49). Questions in both the parental monitoring and family relations scales used in this study assess youths' perceptions of parents' knowledge about their daily activities, but not how parents learn the information. Although questions in the two scales do not overtly ask about trust, many of them query behaviors that infer a trusting youth-parent relationship for sharing of information. In our Phase 1 qualitative study trust was an important factor in youths' relationships with parents and only heavier drinkers referred to a lack of trust (21). We suggested that heavier drinkers may be resisting or breaking with traditional norms of parental respect and authority, and these factors may also apply to Heavy and Excessive-Many Consequences drinkers in this study. The youth-parent trust factor has implications for the utility of both parental monitoring behaviors and family relations interactions in alcohol-related prevention efforts for Mexican, Mexican American youths, as well as youths from other Hispanic backgrounds or of any racial and/or ethnic background.

Another factor that may have implications for the utility of parental monitoring and family relations and alcohol-prevention efforts is *familismo* which is described as a potential protective cultural value in Hispanic cultures (50–53), and refers to strong identification and attachment to immediate and extended family including expectations of familial support, close proximity, and behavior that reflects honorably on the family (53–55). In our Phase 1 study we found dimensions of attachment and identification to family and proximity protective for moderate drinking (13) and longitudinal research among Mexican American youths found parental monitoring and the *familismo* dimension of family proximity associated with later parental monitoring (53). Dimensions of *familismo* could be well

applied to parental monitoring and family relations scales and may have relevance for Mexican, Mexican American or other Hispanic youths, and for youths from other backgrounds.

Our findings also indicate an association between older age, lower parental education, and not living with parents and lower parental monitoring and weaker family relations. In our previous study, older age was associated with lower parental monitoring (13). Other studies found higher parental education associated with different family relations (36), different parental support (37), different parental monitoring, and parental trust (34). Research also shows students living with family reported higher supervision and maternal warmth (35). Future research is needed about other parental influences on alcohol use among young people in Mexico including whether parental restrictions/supervision play an important role in students' drinking behaviors, and whether students in families with higher parental education have different communication about alcohol (56), drink for different reasons (57), or have different levels of trust (21).

This study has a number of limitations. The scales only measure students' perceptions of parental monitoring and family relations and may differ from parents' perceptions. A study of U.S. college students and their parents found parents reported higher levels of alcohol monitoring than their children perceived, and student-reported data was more consistently associated with their drinking (39). However, only one parent was surveyed and the majority of students did not live at home. Whether there is a relationship between the perceptions of parental monitoring and family relations of Mexican youths living at home and their parents needs confirmation. To our knowledge there are no published data of Mexican, Mexican-American or other Hispanic youths' and parents' self-reports about parental monitoring or family relations and associations with youth drinking and consequences. Although the results are from a large, comprehensive sample of young people completing a survey as they transition into their first year of university with very high participation rates, the alcohol use of these students may differ from students entering private universities or from young people not attending university. Also, surveys were not anonymous. However, findings from a study of private and public university students (57) and of non-university Mexican youths in the same age group as participants in this study (58,59) report similar prevalence of ever drinkers suggesting that our findings are similar to Mexican youths of the same age group. Another limitation is that we do not have data on parental employment or other socioeconomic indicators that may affect parental monitoring and family relations.

Cultural values may act as either protective or risk factors for substance use and behavior (13,42). This research suggests that any protective influence of parental monitoring behaviors or family relation interactions on Mexican youths' drinking is shaped, in part, by cultural gender drinking norms and other cultural variables. More research about changing cultural drinking norms, contextual factors, and youth-parent trust would help determine the usefulness of parental monitoring behaviors or family relations interactions as protective strategies for alcohol use among Mexican, Mexican American youths, and also youths from other ethnic and/or racial backgrounds.

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Highlights

- First study to examine parental monitoring, family relations, drinking in Mexico.
- More females reported high parental monitoring and strong overall family relations.
- Associations with drinking profiles were stronger among females.
- Lower perceived parental monitoring was associated with heavier drinking profiles.
- Weaker perceived family relations was associated with heavier drinking profiles.

Table 1

Socio-demographics, alcohol use, alcohol-related consequences, parental monitoring and family relations

	Overall (N=22,224)		Male (N=9,860)		Female (N=12,364)	
	N	%	N	%	N	%
Demographics						
Age ^a						
17	2,698	(12.1)	1,080	(11.0)	1,618	(13.1)
18	12,811	(57.6)	5,389	(54.7)	7,422	(60.0)
19	4,746	(21.4)	2,298	(23.3)	2,448	(19.8)
20	1,969	(8.9)	1,093	(11.1)	876	(7.1)
Living situation ^a						
One or both parent(s)	19,606	(92.1)	8,451	(90.1)	11,155	(93.6)
Other family (no parents)	1,088	(5.1)	571	(6.1)	517	(4.3)
Non-family/partner	384	(1.8)	213	(2.3)	171	(1.4)
Alone	217	(1.0)	145	(1.6)	72	(0.6)
Maternal education ^a						
Secondary school or less	6,795	(32.9)	2,912	(32.1)	3,883	(33.5)
High school / technical degree	8,267	(40.0)	3,483	(38.4)	4,784	(41.3)
Undergraduate degree or more	5,608	(27.1)	2,678	(29.5)	2,930	(25.3)
Paternal education ^a						
Secondary school or less	5,886	(29.6)	2,440	(27.9)	3,446	(30.9)
High school / technical degree	6,545	(32.9)	2,781	(31.8)	3,764	(33.8)
Undergraduate degree or more	7,475	(37.6)	3,535	(40.4)	3,940	(35.3)
Alcohol use						
Frequency of any drinking ^a						
I never drink	5,834	(26.3)	2,456	(24.9)	3,378	(27.3)
I used to drink but not anymore	1,727	(7.8)	699	(7.1)	1,028	(8.3)
Once a month or less	8,922	(40.2)	3,599	(36.5)	5,323	(43.1)
2-4 times a month	5,201	(23.4)	2,750	(27.9)	2,451	(19.8)
2+ times a week	540	(2.4)	356	(3.6)	187	(1.5)
Number of drinks on a typical drinking day in past month ^a						
Did not drink in the past month ^c	9,928	(44.7)	4,044	(41.0)	5,884	(47.6)
1	2,222	(10.0)	816	(8.3)	1,406	(11.4)
2	2,588	(11.7)	1,006	(10.2)	1,582	(12.8)
3	2,057	(9.26)	881	(8.9)	1,176	(9.5)
4	1,542	(6.9)	751	(7.6)	791	(6.4)
5	1,272	(5.7)	653	(6.6)	619	(5.0)
6-10	1,995	(9.0)	1,253	(12.7)	742	(6.0)
11+	620	(2.8)	456	(4.6)	164	(1.3)

	Overall (N=22,224)		Male (N=9,860)		Female (N=12,364)	
	N	%	N	%	N	%
Mean (SD) ^d	2.3	(3.4)	2.9	(4.0)	1.8	(2.7)
Frequency of 5+ drinks in a single occasion ^a						
Never in past year	10,806	(48.8)	4,117	(41.8)	6,689	(54.3)
At least once in past year	6,420	(29.0)	2,929	(29.8)	3,491	(28.3)
Once in past month	2,951	(13.3)	1,564	(15.9)	1,387	(11.3)
2-3 times in past month	1,711	(7.7)	1,045	(10.6)	666	(5.4)
1+ times in past week	278	(1.3)	187	(1.9)	91	(0.7)
Alcohol-related consequences						
In the past 12 months, which of the following consequences happened to you? (responded "yes")						
You got into trouble with your parents because you drank ^b	3,440	(15.5)	1,609	(16.3)	1,831	(14.8)
You got into a sexual situation you later regretted because you had been drinking ^a	559	(2.5)	332	(3.4)	227	(1.8)
You had problems with friends because of the way you drink ^a	577	(2.6)	344	(3.5)	233	(1.9)
You got into a physical fight with a friend or stranger(s) because you had drunk ^a	381	(1.7)	322	(3.3)	59	(0.5)
Family and parental variables						
Parental Monitoring ^a						
Low	4,666	(21.4)	2,843	(29.4)	1,823	(15.1)
Medium	5,171	(23.8)	2,667	(27.6)	2,504	(20.1)
High	11,931	(54.8)	4,169	(43.1)	7,762	(64.1)
Family relations scale						
Overall scale ^a						
Weak	5,732	(25.8)	2,765	(28.1)	2,967	(24.0)
Medium	10,543	(47.5)	4,875	(49.5)	5,668	(45.9)
Strong	5,906	(26.6)	2,200	(22.4)	3,706	(30.0)
Unity and Support subscale ^a						
Weak	5,483	(24.7)	2,513	(25.5)	2,970	(24.0)
Medium	10,708	(48.2)	4,911	(49.8)	5,797	(46.9)
Strong	6,021	(27.1)	2,429	(24.7)	3,592	(29.1)
Communication subscale ^a						
Weak	5,062	(22.8)	2,358	(23.9)	2,704	(21.9)
Medium	11,445	(51.6)	5,241	(53.2)	6,204	(50.2)
Strong	5,691	(25.6)	2,250	(22.8)	3,441	(27.9)
Problems subscale ^a						
Low	6,646	(29.9)	2,415	(24.5)	4,231	(34.3)
Medium	9,879	(44.5)	4,619	(46.9)	5,260	(42.6)
High	5,674	(25.6)	2,817	(28.6)	2,857	(23.1)

^a $p < 0.0001$

^b $p < 0.01$

^c Students not drinking in past month were coded as 0.

^d Means presented include students not drinking in past month coded as 0; among students who drank in the past month the mean number of drinks was 4.2 (SE 3.6); among males 5.0 (SE 4.1) and among females 3.5 (SE 2.9).

Table 2a

Parental Monitoring and Family Relations Scales by drinking profile – Overall proportions^a.

	Non/Infrequent-No Consequences		Occasional-Few Consequences		Regular-Some Consequences		Heavy-Many Consequences		Excessive-Many Consequences	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Total										
Parental monitoring scale										
Low	1,045	(16.2)	1,733	(19.8)	1,263	(26.9)	472	(33.1)	153	(37.1)
Medium	1,415	(21.9)	1,968	(22.4)	1,283	(27.3)	401	(28.1)	104	(25.2)
High	3,988	(61.9)	5,075	(57.8)	2,158	(45.9)	554	(38.8)	156	(37.8)
Family relations scale										
Overall scale										
Weak	1,525	(22.9)	2,279	(25.6)	1,292	(27.1)	475	(32.8)	161	(38.3)
Medium	3,011	(45.2)	4,212	(47.4)	2,420	(50.8)	714	(49.3)	186	(44.3)
Strong	2,121	(31.9)	2,400	(27.0)	1,054	(22.1)	258	(17.8)	73	(17.4)
Unity and Support subscale										
Weak	1,464	(22.0)	2,201	(24.7)	1,250	(26.2)	430	(29.7)	138	(32.9)
Medium	3,093	(46.4)	4,305	(48.3)	2,401	(50.3)	714	(49.3)	195	(46.4)
Strong	2,112	(31.7)	2,399	(26.9)	1,119	(23.5)	304	(21.0)	87	(20.7)
Communication subscale										
Weak	1,378	(20.7)	1,998	(22.5)	1,139	(23.9)	406	(28.0)	141	(33.6)
Medium	3,295	(49.4)	4,620	(51.9)	2,562	(53.8)	772	(53.3)	196	(46.7)
Strong	1,994	(29.9)	2,279	(25.6)	1,065	(22.4)	270	(18.7)	83	(19.8)
Problems subscale										
Low	2,384	(35.8)	2,702	(30.4)	1,189	(24.9)	293	(20.2)	78	(18.6)
Medium	2,776	(41.7)	3,957	(44.5)	2,288	(48.0)	683	(47.2)	175	(41.7)
High	1,502	(22.6)	2,241	(25.2)	1,292	(27.1)	472	(32.6)	167	(39.8)

^aFor all comparisons of scales by drinking profile, p<0.0001

Table 2b

Parental Monitoring and Family Relations Scales by drinking profile – Gender specific proportions.

	Non/Infrequent-No Consequences				Occasional-Few Consequences				Regular-Some Consequences				Heavy-Many Consequences				Excessive-Many Consequences			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Total	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Parental monitoring scale																				
Low	660 (24.7)	385 (10.2)	946 (27.9)	787 (14.6)	754 (32.2)	509 (21.6)	361 (37.2)	111 (24.3)	122 (39.9)	31 (29.0)										
Medium	737 (27.6)	678 (18.0)	910 (26.9)	1,058 (19.6)	673 (28.7)	610 (25.8)	273 (28.1)	128 (28.0)	74 (24.2)	30 (28.0)										
High	1,276 (47.7)	2,712 (71.8)	1,530 (45.2)	3,545 (65.8)	917 (39.1)	1,241 (52.6)	336 (34.6)	218 (47.7)	110 (35.9)	46 (43.0)										
Family relations scale																				
Overall scale																				
Weak	707 (25.9)	818 (20.9)	982 (28.6)	1,297 (23.8)	642 (27.0)	650 (27.2)	314 (32.0)	161 (34.5)	120 (38.5)	41 (38.0)										
Medium	1,287 (47.1)	1,724 (43.9)	1,690 (49.2)	2,522 (46.2)	1,261 (53.1)	1,159 (48.5)	495 (50.5)	219 (47.0)	142 (45.5)	44 (40.7)										
Strong	740 (27.1)	1,381 (35.2)	766 (22.3)	1,634 (30.0)	472 (19.9)	582 (24.3)	172 (17.5)	86 (18.5)	50 (16.0)	23 (21.3)										
Unity and Support subscale																				
Weak	638 (23.3)	826 (21.0)	897 (26.1)	1,304 (23.9)	594 (25.0)	656 (27.4)	287 (29.2)	143 (30.7)	97 (31.1)	41 (38.0)										
Medium	1,306 (47.7)	1,787 (45.5)	1,719 (49.9)	2,586 (47.3)	1,241 (52.2)	1,160 (48.5)	493 (50.2)	221 (47.4)	152 (48.7)	43 (39.8)										
Strong	796 (29.1)	1,316 (33.5)	826 (24.0)	1,573 (28.8)	542 (22.8)	577 (24.1)	202 (20.6)	102 (21.9)	63 (20.2)	24 (22.2)										
Communication subscale																				
Weak	614 (22.4)	764 (19.4)	815 (23.7)	1,183 (21.7)	550 (23.1)	589 (24.6)	272 (27.7)	134 (28.8)	107 (34.3)	34 (31.5)										
Medium	1,392 (50.8)	1,903 (48.4)	1,855 (53.9)	2,765 (50.7)	1,323 (55.7)	1,239 (51.8)	530 (54.0)	242 (51.9)	141 (45.2)	55 (50.9)										
Strong	732 (26.7)	1,262 (32.1)	771 (22.4)	1,508 (27.6)	503 (21.2)	562 (23.5)	180 (18.3)	90 (19.3)	64 (20.5)	19 (17.6)										
Problems subscale																				
Low	800 (29.2)	1,584 (40.4)	851 (24.7)	1,851 (33.9)	527 (22.2)	662 (27.7)	185 (18.8)	108 (23.2)	52 (16.7)	26 (24.1)										
Medium	1,221 (44.6)	1,555 (39.6)	1,611 (46.8)	2,346 (43.0)	1,181 (49.7)	1,107 (46.3)	473 (48.2)	210 (45.1)	133 (42.6)	42 (38.9)										
High	717 (26.2)	785 (20.0)	981 (28.5)	1,260 (23.1)	668 (28.1)	624 (26.1)	324 (33.0)	148 (31.8)	127 (40.7)	40 (37.0)										

^aFor all gender-specific comparisons of scales by drinking profile, $p < 0.0001$

Table 3a
Odds of latent profile membership by Parental Monitoring and Family Relations Scales – Overall models

	Non/Infrequent-No Consequences ^a		Regular-Some Consequences ^a		Heavy-Many Consequences ^a		Excessive-Many Consequences ^a	
	OR ^b (95% CI)		OR ^b (95% CI)		OR ^b (95% CI)		OR ^b (95% CI)	
<u>Parental monitoring scale^c</u>								
Low	0.69 (0.63, 0.76)		1.62 (1.43, 1.84)		2.01 (1.74, 2.32)		1.85 (1.45, 2.36)	
Medium	0.86 (0.79, 0.93)		1.48 (1.35, 1.63)		1.58 (1.31, 1.92)		1.28 (0.92, 1.79)	
<u>Family relations scale</u>								
<u>Overall scale^d</u>								
Weak	0.72 (0.64, 0.81)		1.25 (1.03, 1.52)		1.79 (1.40, 2.30)		1.95 (1.39, 2.73)	
Medium	0.77 (0.72, 0.83)		1.27 (1.15, 1.41)		1.44 (1.26, 1.64)		1.31 (0.88, 1.94)	
<u>Subscales</u>								
<u>Unity and Support^d</u>								
Weak	0.74 (0.66, 0.82)		1.19 (0.98, 1.45)		1.49 (1.18, 1.88)		1.49 (1.10, 2.01)	
Medium	0.79 (0.72, 0.86)		1.16 (1.00, 1.34)		1.22 (1.05, 1.42)		1.04 (0.74, 1.47)	
<u>Communication^d</u>								
Weak	0.75 (0.68, 0.83)		1.17 (0.98, 1.40)		1.61 (1.27, 2.04)		1.60 (1.16, 2.21)	
Medium	0.76 (0.70, 0.83)		1.13 (1.01, 1.26)		1.25 (1.07, 1.46)		1.06 (0.79, 1.44)	
<u>Problems^e</u>								
Medium	0.76 (0.69, 0.83)		1.26 (1.16, 1.37)		1.48 (1.27, 1.74)		1.33 (1.04, 1.69)	
High	0.73 (0.65, 0.81)		1.25 (1.07, 1.46)		1.77 (1.46, 2.14)		2.11 (1.59, 2.81)	

^a Reference category = Occasional drinkers

^b Adjusted for age, sex, mother's education, father's education, living situation

^c Reference category = High

^d Reference category = Strong

^e Reference category = Low

Odds of latent profile membership by Parental Monitoring and Family Relations Scales – Gender specific models

Table 3b

	Non/Infrequent-No Consequences ^a		Regular-Some Consequences ^a		Heavy-Many Consequences ^a		Excessive-Many Consequences ^a	
	Males	Females	Males	Females	Males	Females	Males	Females
OR^b (95% CI)	OR^b (95% CI)	OR^b (95% CI)	OR^b (95% CI)	OR^b (95% CI)	OR^b (95% CI)	OR^b (95% CI)	OR^b (95% CI)	OR^b (95% CI)
Parental monitoring scale^c								
Low	0.77 (0.68, 0.88)	0.60 (0.50, 0.70)	1.35 (1.15, 1.58)	1.95 (1.61, 2.36)	1.83 (1.56, 2.15)	2.30 (1.72, 3.09)	1.60 (1.24, 2.07)	2.54 (1.59, 4.04)
Medium	0.90 (0.78, 1.03)	0.83 (0.75, 0.91)	1.26 (1.10, 1.44)	1.67 (1.44, 1.94)	1.36 (1.05, 1.75)	2.00 (1.53, 2.61)	1.03 (0.69, 1.54)	2.00 (1.07, 3.76)
Family relations scale								
Overall scale^d								
Weak	0.70 (0.61, 0.79)	0.72 (0.63, 0.83)	1.09 (0.85, 1.40)	1.38 (1.12, 1.72)	1.40 (1.01, 1.94)	2.66 (1.97, 3.59)	1.90 (1.33, 2.73)	1.87 (1.12, 3.14)
Medium	0.74 (0.65, 0.85)	0.79 (0.71, 0.87)	1.25 (1.08, 1.45)	1.26 (1.10, 1.45)	1.24 (1.01, 1.53)	1.82 (1.44, 2.30)	1.38 (0.89, 2.15)	1.09 (0.70, 1.71)
Subscales								
Unity and Support ^d								
Weak	0.72 (0.61, 0.86)	0.73 (0.66, 0.82)	1.03 (0.78, 1.37)	1.33 (1.06, 1.66)	1.29 (0.99, 1.68)	1.83 (1.29, 2.59)	1.35 (0.99, 1.82)	1.72 (1.01, 2.91)
Medium	0.74 (0.62, 0.89)	0.81 (0.73, 0.90)	1.09 (0.88, 1.35)	1.20 (1.04, 1.39)	1.12 (0.95, 1.31)	1.38 (1.10, 1.71)	1.03 (0.71, 1.50)	0.96 (0.60, 1.53)
Communication ^d								
Weak	0.74 (0.63, 0.88)	0.74 (0.66, 0.84)	1.02 (0.77, 1.35)	1.29 (1.10, 1.51)	1.37 (1.00, 1.87)	2.05 (1.57, 2.68)	1.42 (0.95, 2.11)	1.94 (1.03, 3.64)
Medium	0.70 (0.63, 0.78)	0.80 (0.70, 0.91)	1.05 (0.88, 1.26)	1.16 (1.03, 1.31)	1.07 (0.86, 1.33)	1.57 (1.17, 2.10)	0.87 (0.60, 1.27)	1.62 (0.99, 2.64)
Problems ^e								
Medium	0.77 (0.67, 0.89)	0.75 (0.67, 0.83)	1.18 (1.07, 1.31)	1.32 (1.14, 1.52)	1.40 (1.13, 1.74)	1.61 (1.26, 2.06)	1.46 (0.95, 2.24)	1.06 (0.55, 2.06)
High	0.76 (0.67, 0.87)	0.70 (0.61, 0.81)	1.12 (0.98, 1.29)	1.36 (1.11, 1.68)	1.58 (1.25, 2.00)	2.13 (1.62, 2.78)	2.24 (1.61, 3.12)	1.84 (1.11, 3.05)

Bolded ORs and 95% CI describe significant difference between males and females (p<0.05)

^aReference category = Occasional drinkers^bAdjusted for age, mother's education, father's education, living situation^cReference category = High^dReference category = Strong

Reference category = Low_e

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