FAMILY ENVIRONMENT IN RELATION TO EATING AND HEALTH RISK BEHAVIORS IN ADOLESCENTS

The present study examines the association between family environment (cohesion and conflict) and healthy eating, unhealthy eating, smoking, physical activity, alcohol consumption and insufficient sleep.

Participants were 799 adolescents (mean age 16.6) from randomly selected high schools in Cyprus. They completed self-report questionnaires measuring family environment (cohesion and conflict), healthy and unhealthy eating, physical activity, smoking behavior, alcohol consumption and insufficient sleep. The correlation between the latter parameters and family cohesion and conflict were examined using bivariate and multiple regression analyses.

Family cohesion was significantly and positively related to healthy eating and physical activity, whereas family conflict was positively related to unhealthy eating, smoking, alcohol consumption and insufficient sleep. Compared to their male counterparts, female adolescents obtain sufficient sleep, engage more in healthy diet and consume alcohol much less.

This study provides a clearer understanding of the importance of family conflict and cohesion in regard to healthy and health-risk behaviors in adolescents. The findings of this study highlight the significance of primary and secondary interventions that for example could primarily be school based, in order to teach adolescents ways to manage and cope with family conflict and thus minimize the adoption of health-compromising behaviors during adolescence, which in part might persist into adulthood.

Keywords: Family cohesion; family conflict; healthy eating; unhealthy eating; smoking; alcohol consumption; physical activity; insufficient sleep.

UDC: 159.9:371+316.3:316.3

Introduction

Eating behavior, and more specifically unhealthy diet and nutrition, are major aspects of modern lifestyle contributing to the risk of premature mortality or disability from chronic Noncommunicable Diseases (NCDs) - obesity, diabetes, cardiovascular disease and some types of cancer (Choudhary, Donnelly, Racadio, and Strife, 2007; Doll and Peto, 1981; Ulbricht and Southgate, 1991; World Health Organization, 2003; WHO, 2009). Four modifiable health related behaviors: unhealthy eating, physical inactivity, use of tobacco and alcohol, are included in the list of the six critical behaviors described by the Centers for Disease Control and Prevention - CDC (2010) as the leading contributors to death and disability. WHO (2001) appraised that 70% of premature deaths in adulthood are largely ascribed to health related behaviors adopted during adolescence and according to the Disease Control Priorities Project - DCPP (2006) approximately 6 in 10 of premature deaths in adulthood can be attributed and associated to behaviors such as tobacco smoking, alcohol use, and unhealthy eating that are maintained during adolescence including conditions such as sexual abuse and risky sexual behaviors.

A sufficient number of studies have indicated the co-occurrence of unhealthy eating behavior with the use of smoking, alcohol and lack of physical activity (Giannakopoulos,
Panayiotakos, Mihas, and Tountas, 2009; Eisenberg, Olson, Neumark-Sztainer, Story, and Bearinger, 2004; Keski-Rahkohnen, Kaprio, Rissanen, Virkkunen, and Rose, 2003). In addition, insufficient sleep (short sleep length) was found to be related with an increased risk of obesity and therefore with unhealthy eating behavior (Cizza, Skarulis, and Mignot, 2005).

Researchers suggested that personal parameters (e.g. emotional distress) and interpersonal parameters (peer influence, family beliefs, family meals, family practices and family environment) are significant factors influencing adolescents’ health related lifestyle patterns (Baker, Little, and Brownell, 2003; De Bourdeaudhuij and Van Oost, 1998b; Lazarou, Kalavana, and Leda-Matalas, 2008; Monge-Rojas, Nunez, Garita, and Chen-Mok, 2002; Van Kooten, De Ridder, Vollebergh, and Van Dorsselaer, 2007; Young and Fors, 2001).

**Family environment and eating behavior**

Doherty and Allen (1994) argued that the poorer the quality of family relationships is, the more adolescents are apt to adopt a negative health habit or behavior. Specifically in regard to eating behavior family environment perceived as high in conflict and low in cohesion and warmth contribute to adolescents’ low perception of self body image and dieting problems. In addition, girls’ perceptions of more negative family relations significantly predicted problematic dieting behavior (Byely, Archibald, Graber, and Brooks-Gunn, 2000).

Fonseca, Ireland, and Resnick (2002) demonstrated that family connectedness, positive family communication and parental monitoring were significant protective factors against extreme dieting, vomiting and laxative use. Furthermore, teenage students consuming healthy breakfast and lunches had better communication with their parents on personal matters, were closely monitored by their parents, lived with one or both parents, and spent less time in the house without other adults (Young and Fors, 2001). Similarly, poorer family function was related to chronic dieting among Asian and Hispanic adolescents (Cachelin, Weiss, and Garbanati, 2003).

**Family environment and health related behaviors**

Besides eating, previous studies supported that low parental involvement in their children’s life (school) and poor child bonding to parents predicted smoking behavior (Flemming, Kim, Harachi, and Catalano, 2002), while family cohesion and communication were found as protective factors against adolescent smoking (O’Byrne, Haddock, and Poston, 2002; Jackson, Bee-Gates, and Henriksen; 1994). Shucksmith, Glendinning and Hendry (1997) showed that supportive family environment was related to lower prevalence of alcohol consumption in adolescents; whereas unsupportive family environment, including extreme parental control was associated with higher levels of alcohol consumption. Additionally, non systematic communication and lesser time spent between parent and child was associated both with an increase of alcohol consumption and tobacco use (Cohen, Richardson, and LaBree, 1994).

Regarding family environment and its relation to insufficient sleep and physical exercise, a study (DeBourdeaudhuij and Van Oost, 1998a) examining general family characteristics such as family cohesion and adaptability with numerous health related behaviors (smoking, alcohol use, food choice, sleeping, Body Mass Index and physical activity) found that adolescents in the healthiest clusters reported higher levels of family cohesion.

**Objective of current study**

The present study examines how family cohesion and conflict are related to healthy and unhealthy eating, physical activity, smoking, alcohol consumption and insufficient sleep. The benefit of such an examination is that it allows the description of parent-adolescent
interaction across two opposite family environments (cohesion, conflict) and the relation of this interaction on the health related behaviors investigated in the current study. Cohesion refers to the degree of commitment, help and support family members provide to each other whereas conflict refers to the amount of openly expressed anger and conflict among family members (Moos and Moos, 2002).

In accordance to the aim of the present study to explore the relative importance of family environment (cohesion and conflict) in relation to eating behavior, smoking, physical activity, alcohol consumption and insufficient sleep; the following hypotheses were examined:

1. Family cohesion is expected to be positively related to healthy eating behavior and physical activity, and negatively related to unhealthy eating, smoking, alcohol consumption and insufficient sleep.

2. Family conflict is expected to be positively related to unhealthy eating, smoking, alcohol consumption and insufficient sleep, and negatively related to physical activity and healthy eating behavior.

3. Gender is expected to have a moderator role between family environment (cohesion and conflict) and the health related behaviors investigated in the present study.

**Method**

**Participants**

**School selection**

Permission for this study was granted by the Cyprus Ministry of Education and Culture and the approval of the Cyprus National Bioethics Committee for ensuring that ethical standards are followed. This was a nationwide study in which two-stage random sampling frame was used. Specifically, during the first stage a random sample of all the Cyprus secondary schools (34 schools) was selected using as main criteria the type of community (urban-rural) and the average socioeconomic status of the families they serve. Response rate at school level was 27% resulting in a sample of 9 schools. Non response of schools was mainly related to lack of time (73%).

**Student recruitment**

At the second stage each school proposed a number of second grade classes (US=grade 8) and two classes from each school were randomly selected for participation in the study. A total of 1100 second grade senior high school students (US=grade 8) were selected and a month before the questionnaires were to be given, consent forms were sent to the parents of the participants. Only students who returned signed consent forms to the school were included in the study (N=912). There was a 15.89% of missing cases (151 students).

The final sample consisted of 799 eighth grade students with a mean age of 16.6 (SD=4.8). The participants were weighted according to urbanization grade, gender and SES so that it is representative for the Cyprus population of adolescents who are 16 years of age.

**Procedure**

The students (n=799) did not complete the Questionnaire in their classrooms but instead in multiple activity classrooms without any of their teachers present. Trained investigators assured the students that their participation in this research was anonymous and voluntary, adding that those who did not wish to participate could withdraw freely. Time needed for questionnaire completion was approximately 30 minutes. Data were collected over a period of 6 months during school year 2008-2009.
Measures

Socio-demographic characteristics

Gender, age, parental education, and annual family income were assessed by means of a self-report. Out of all students, 61% were female. In terms of their family income, 16.5% had a high family income (>3420 Euro), 51.1% a medium (1712-3420 Euro) and 32.4% a low family income (855-1710 Euro). Parental education consisted of higher education (26.7%), high school education (57.1%) and elementary school education only (16.2%). Finally, 57% of the respondents lived in urban areas and 43% in rural areas.

Food frequency questionnaire

This scale is based on the Youth/Adolescents Questionnaire (YAQ) (Rockett, Berkey, and Colditz, 2003; Rockett, Wolf, and Colditz, 1995). The instrument was adjusted to the Mediterranean diet and consists of 60 different types of Mediterranean food. The YAQ includes foods that are not customarily consumed in Cyprus such as onion rings and tacos. It measures two main categories “healthy food” and “unhealthy food”. “Healthy food” includes: e.g. dairy products low in fat, vegetables, fruit, carbohydrates and white meat. “Unhealthy food” includes: e.g. dairy products high in fat, sweets, red meat and junk food. Likert scales ranging from ‘never’ (1) to ‘very frequently’ [5-7 times per week] (5), indicate how often respondents consume each type of food. The nutrient score was basically the sum of the products that they were categorized as healthy products of the specific frequency (i.e. 5-7 times per week) and the sum of the products categorized as unhealthy products of the specific frequency. Therefore, participants’ responses on the ‘healthy food’ category were added to obtain a total nutrient score, called 'healthy eating behavior' (range=1.53-4.37, mean=2.89). Responses on the ‘unhealthy food’ category were added to obtain a total nutrient score, called ‘unhealthy eating behavior’ (range=1.00-4.66, mean=2.73). Pearson correlation coefficients between the two nutrient scores (“Healthy” and “Unhealthy”) was -0.28, p<0.01.

Family environment scale

This instrument was used to measure family environment perceived by adolescents and its influence on eating behavior and health–risk behaviors. The instrument was based on the Relationship Dimensions of the Family Environment Scale - FES (Moos and Moos, 2002). Internal consistencies of previous research (Moos, 1990) on the 10 subscales of the FES have shown an acceptable range and vary from moderate for some FES subscales (i.e. independence) to substantial (i.e. cohesion). Specifically, in a 2-month and 4-month test retest reliability and stability with a 1067 sample Cronbach’s Alphas for “cohesion” subscale were 0.78, 0.86 (2 month test-retest reliability) and 0.72 (4-month test-retest reliability). Cronbach’s Alphas for “conflict” subscale were 0.75, 0.85 (2 month test-retest reliability) and 0.66 (4-month test-retest reliability). The FES consists of 10 subscales which assess three sets of dimensions (relationship dimensions, personal growth and system maintenance dimensions). Cohesion and conflict are the two of the three subscales from the relationship dimension that were administered to the students. The subscales of the FES can be used individually and independently from one another (Rickett, Berkey, and Colditz, 2003; Rockett, Wolf, and Colditz 1995). Every subscale consists of a total of nine statements in each one, which are evaluated by means of five point Likert scales, ranging from ‘not true at all’ (1) to ‘absolutely true’ (5). In the present study Confirmatory Factor Analysis (CFA) was obtained and has verified the construct validity of the two factors (cohesion and conflict). Cohesion refers to the degree of commitment, help and support family members provide to each other. One example is “Family members really help and support one another”. Conflict refers to the amount of openly expressed anger and conflict among family members. An example is “Family members sometimes get so
angry they throw things”. Both factors had an acceptable internal consistency. “Family cohesion” alpha was 0.76 and “family conflict” alpha was 0.74.

**Lifestyle behaviors**

Physical activity scale is based on the 60min Moderate-to-Vigorous Physical Activity measure (MVPA) (Prochaska, Sallis, and Long, 2001) The following question was used to assess physical activity: “Over the past month how often were you physically active for at least 60 minutes per day?” [5-point Likert scale: never, rarely (once a month), sometimes (1-2 days per week), often (3-4 days per week), very often (5-7 days per week)].

The following two measures were based on the Addictive Behaviours used by Van Kooten, De Ridder, Vollebergh, and Van Dorsselaer (2007) in a study about unhealthy diet in adolescents, health-related behaviors and the role of emotional distress.

Tobacco use was assessed based on the following question “How often do you smoke at this period of your life?” [5-point Likert scale: never, rarely (once a month), sometimes (once a week), often (3-4 days per week), very often (5-7 days per week)].

Alcohol consumption was assessed using the following question “During this period how often do you consume alcoholic beverages such as beer, spirits, wine and other alcoholic drinks?” [5-point Likert scale: never, rarely (once a month), sometimes (once a week), often (3-4 times per week), very often (5-7 times per week)].

Insufficient sleep was assessed by asking: “How often do you have lack of sleep?” [5-point Likert scale: never, rarely (once a month), sometimes (once a week), often (3-4 times per week) and very often (5-7 times per week)].

**Results**

Bivariate correlations were used to explore associations between demographic variables, family cohesion/conflict and health related behaviors. The correlations are shown in Table 1. Although the magnitude of coefficients is not very high, significant relations have been identified. Specifically, significant positive correlations were found between gender, unhealthy eating behavior (r=0.33, p<0.01) and physical activity (r=0.34, p<0.01). At the same time gender was significantly and negatively related to smoking behavior (r=-0.15, p<0.01), insufficient sleep (r=-0.34, p<0.01) and alcohol consumption (r=-0.21, p<0.01).

Area of residence was related only and negatively to family income (r=-0.19, p<0.01). On the other hand, family income was positively associated with healthy eating behavior (r=0.12, p<0.01), physical activity (r=0.17, p<0.01), insufficient sleep (r=0.10, p<0.01) and negatively associated with family conflict, (r=-0.07, p<0.05). Furthermore, family cohesion was significantly related with most of the adolescents’ health related behaviors such as healthy eating behavior (r=0.20, p<0.01), physical activity (r=0.10, p<0.01) and negatively related to smoking behavior (r=-0.15, p<0.01) and insufficient sleep (r=-0.07, p<0.05). Family cohesion was negatively related to family conflict (r=-0.41, p<0.01). In contrast, family conflict was significantly and positively correlated with unhealthy eating behavior (r=0.17, p<0.01), smoking behavior (r=0.14, p<0.01), insufficient sleep (r = 0.25, p<0.01) and alcohol consumption (r=0.18, p<0.01). Additionally, healthy eating was related positively to physical activity (r=0.11, p<0.01) and negatively to the following behaviors: unhealthy eating behavior (r=-0.27, p<0.01), smoking behavior (r=-0.07, p<0.05) and insufficient sleep (r=-0.10, p<0.01). Similar but positive relations appeared with unhealthy eating behavior and the following behaviors: smoking behavior(r=0.07, p<0.05), insufficient sleep (r=0.34, p<0.01) and alcohol consumption (r=0.27, p<0.01).

1 Only significant correlation coefficients are described in the text. All the coefficients (significant and non significant) are presented in Table 1.
There was only one negative significant correlation between unhealthy eating behavior and physical activity \((r=-0.07, p<0.05)\). Finally, smoking behavior was positively related to insufficient sleep \((r=0.30, p<0.01)\) and alcohol consumption \((r=0.29, p<0.01)\). In contrast, physical activity was negatively related to insufficient sleep \((r=-0.21, p<0.01)\) and alcohol consumption \((r=-0.17, p<0.01)\) and insufficient sleep was positively related to alcohol consumption \((r=0.50, p<0.01)\).

**Table 1. Correlations, Means and Standard Deviations for Demographics, Family Cohesion/Conflict and Health-related Behaviors (Pearson’s \(r\))**

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<td>Gender</td>
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<td>-0.17</td>
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<td>0.33**</td>
<td>-0.15**</td>
<td>0.34**</td>
<td>-0.34**</td>
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<td>-0.06</td>
<td>0.03</td>
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<td>Conflict</td>
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<td>Healthy eating</td>
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<td>Unhealthy eating</td>
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<td>Smoking</td>
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<td>Physical activity</td>
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<td>Insufficient sleep</td>
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Note: *\(p\leq0.05\); **\(p\leq0.01\)

**Regression Analyses**

Two Multiple Linear Regression analyses were conducted to examine how demographics (such as gender, area of residence, family income) and health related behaviors are associated with family cohesion and family conflict. The analyses have revealed some weak but significant relations.

**Table 2. Linear Regression Models with Family Cohesion and Family Conflict**

<table>
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<tr>
<th>Predictors</th>
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<th>Error</th>
<th>Beta</th>
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<td>Family cohesion</td>
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<tr>
<td>Family conflict</td>
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<td>Unhealthy eating</td>
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<td>Family conflict</td>
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<td>Physical activity</td>
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<td>Smoking</td>
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<td>Family cohesion</td>
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<td>-1.3**</td>
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<td>Family conflict</td>
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<td>Alcohol consumption</td>
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<td>Family conflict</td>
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Note: **\(p\leq0.01\)
Specifically, analyses showed that family cohesion was positively related to healthy eating behavior (Beta=0.26, p<0.01) and physical activity (Beta=0.07, p<0.01). Also, family cohesion had weak but negatively significant relation with unhealthy eating behavior (Beta=-0.01, p<0.01), smoking behavior (Beta=-0.06, p<0.01) and insufficient sleep (Beta=-0.07, p<0.05).

On the other hand, analyses between family conflict and the rest variables presented a totally different view. Family conflict had a weak but positively significant relation with unhealthy eating (Beta=0.07, p<0.01), smoking behavior (Beta=0.03, p<0.05), and insufficient sleep (Beta=0.18, p<0.01) and negative significant relation with gender (Beta=-0.13, p<0.05).

Furthermore, Multivariate Analyses of Variance were executed in order to examine interaction effects between gender, family cohesion/ conflict and health-related behaviours. Unfortunately, the analyses showed no significant interaction effects. The only main effects that were detected considered female adolescents that appeared to, consume fewer unhealthy products, less alcohol and obtain more sufficient sleep compared to male counterparts ($X_1=2.57$, $X_2 = 2.98$, ($F(1,798)= 100.3$, $p<.001$))(Figure 1); ($X_1=1.98$, $X_2 = 2.92$, ($F(1,798)= 36.31$, $p<0.001$) (Figure 2); ($X_1=2.24$, $X_2 = 3.18$, ($F(1,798)= 41.47$, $p<0.001$)(Figure 3).

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**Figure 1. Differences between gender and unhealthy eating behavior**

![Graph showing differences between gender and unhealthy eating behavior](image-url)
**Figure 2. Differences between gender and alcohol consumption**

![Graph showing differences between gender and alcohol consumption.](attachment:image.png)

\[(F(1,798)= 36.31, p<.001)\]

**Figure 3. Differences between gender and insufficient sleep**

![Graph showing differences between gender and insufficient sleep.](attachment:image.png)

\[(F(1,798)= 41.47, p<0.001)\]
Summarizing, hypothesis 1 that family cohesion would be positively related to healthy eating and physical activity is confirmed. It is also confirmed that family cohesion would be negatively associated to unhealthy eating, smoking, alcohol consumption and insufficient sleep. Moreover, family conflict was positively related to unhealthy eating, smoking, insufficient sleep and negatively associated to healthy eating and physical activity, supporting hypothesis 2. Hypothesis 3 is partially confirmed since there were no significant differences between male and female adolescents on family cohesion/conflict and healthy eating. But there were significant differences on unhealthy eating, alcohol consumption and insufficient sleep.

Discussion

The present study indicates that there is an association between family environment (cohesion and conflict) healthy and unhealthy eating, physical activity, smoking, alcohol consumption, and insufficient sleep. Family cohesion was related positively to healthy eating and physical exercise while family conflict was positively related to unhealthy eating, smoking, alcohol consumption and insufficient sleep. The results of the regression analysis on family cohesion, healthy eating and physical activity were significantly and inversely related to family conflict and the rest of the health related behaviors examined in this study. These findings are in line with the first two hypotheses of the present study and with previous research (Cooper, Whelan, Woolgar, Morrell, and Murray, 2004; Kiesner and Kerr, 2004; Resnick, Harris, and Blum, 1993; Swarr and Richards, 1996).

The finding that family cohesion and conflict influence the eating behavior of adolescents has been supported by previous research on family communication, cohesion, connectedness and eating behaviors (Kalavna, Maes, and De Gucht, 2010; Rodriguez Martin, Novalbos, Martinez Nieto, Escobar Jiménez, and Castro de Haro, 2004; Shakib, Moottapa, and Johnson, 2003). In addition, the outcome of this study presenting that family environment (cohesion and conflict) is also correlated to physical activity, smoking, alcohol consumption and insufficient sleep adhere to previous research (Flemming, Kim, Harachi, and Catalano, 2002; O’byrne, Haddock, and Poston, 2002; Shucksmith, Glendinning, and Hendry, 1997; Skakib, Mouttapa, and Johnson, 2003; Simons-Morton, Crump, and Haynie, 1999); generally, adolescents who are less likely to smoke reported positive relationships, communication and support within their families, lowered prevalence of alcohol consumption, more sufficient sleep and were more physically active compared to those experiencing unsupportive family environment and non systematic communication. Although there is no clear evidence in the literature to support the association and moderator role gender had on three out of the health related behaviors examined in this study, female adolescents of the current study were found to eat healthier, consume alcohol much less and obtain more sufficient sleep compared to male adolescents.

The findings of the present study should be interpreted taking into account some limitations. The current study’s design is cross-sectional and therefore it is not possible to infer conclusions concerning the direction of the association between family environment (cohesion and conflict) and the health related behaviors examined in this study. Perhaps a longitudinal design with the same or more family and school climate variables (e.g. control, expressiveness) would provide further knowledge on causal relationships between family environment, school environment and adolescents’ health related behaviors. Another limitation was the reliance on self-report questionnaires completed by the students. Food-diaries in which the students could record their daily diet and the completion of questionnaires on family cohesion and conflict by the adolescents’ parents would have provided valuable data for further analysis.

Nevertheless, the association between family environment (cohesion and conflict) and health related behaviors - eating behavior, tobacco smoking, alcohol use, insufficient sleep, physical activity highlights the importance of addressing family cohesion and conflict, exploring the family environment of the adolescents and thus propose interventions.
Perhaps an intervention that could primarily be school based in order to teach adolescents ways to manage and cope with family conflict and thus consequently minimize the adoption of negative health behaviors. Additionally, in light of how family cohesion is positively associated with healthy behaviors, it is of great importance to focus future research and offer interventions to adolescents with less cohesive family backgrounds. Organized group workshops within school grounds that are designed to promote and teach self-regulation skills to students would be beneficial for adolescents and their health. Realizing such activities and including them into a school’s program would in one aspect be an intervention that would enable adolescent students to better manage family conflict, but also encourage students to maintain or engage in health-enhancing behaviors that could continue to persist in adulthood.

References


