

# Frequent Dieting among Adolescents: Psychosocial and Health Behavior Correlates

## ABSTRACT

**Objectives.** The present study examined correlates of frequent dieting in 33 393 adolescents. It was hypothesized that frequent dieting would be correlated with negative psychosocial and health behavior outcomes.

**Methods.** A comprehensive, school-based health behavior survey was administered in 1987 to public school students in grades 7 through 12 in Minnesota. Students self-reported dieting behavior; substance use; suicidal, sexual, and delinquent behavior; family and peer concerns; sick days; and abuse history. Differences on psychosocial and health behavior risk factors by dieting frequency and by purging status were assessed with multivariate logistic regression, with body mass index and demographic variables controlled.

**Results.** Dieting frequency was associated with history of binge eating (females: odds ratio [OR] = 1.46, males: OR = 1.53); poor body image (females: OR = 0.56, males: OR = 0.63); lower connectedness to others (females: OR = 0.79); greater alcohol use (females: OR = 1.17); and greater tobacco use (females: OR = 1.08). Purging status was independently associated with negative risk factors in both males and females.

**Conclusions.** These findings suggest that frequent dieting efforts in adolescents should not be viewed in isolation, but rather in the broader context of health and risk-taking behaviors. (*Am J Public Health*. 1995; 85:695-701)

Simone A. French, PhD, Mary Story, PhD, Blake Downes, Michael D. Resnick, PhD, and Robert W. Blum, MD, PhD

## Introduction

Dieting to lose weight has been increasing in prevalence and has recently become a focus of concern among health professionals.<sup>1-4</sup> Prevalence estimates of dieting range from 14% to 77% and are highest in young women.<sup>1</sup> Concerns about dieting include the belief that it is associated with (1) cycles of weight loss and regain that increase the likelihood of developing eating disorders such as binge eating, anorexia, and bulimia nervosa, (2) decreases in self-esteem, and (3) increases in cardiovascular risk factors and mortality.<sup>1</sup> Of particular concern is that dieting to lose weight occurs most frequently in young women, most of whom are of normal weight and for whom the health benefits of weight loss are questionable.<sup>1</sup>

Theoretical and empirical research on the etiology of eating disorders in adolescents is not well developed.<sup>4-7</sup> Current theoretical conceptions view eating disorders as heterogeneous and multifactorially determined.<sup>4,5</sup> Specific risk factors may combine additively or interact to produce eating disorders.<sup>8,9</sup> In addition to female gender, risk factors include body dissatisfaction, low self-esteem, high need for social approval, depression, and a history of substance abuse, physical abuse, or sexual abuse.<sup>4,5,7,10</sup> Delinquent behaviors such as stealing have also been observed to be more frequent in some studies of bulimia nervosa patients.<sup>11-13</sup> Little is known about the family characteristics that might be related to the development of eating disorders.<sup>4</sup> However, low levels of family support have been linked to greater problem behaviors in girls.<sup>14</sup> In addition, high levels of disconnectedness and low levels of emotional support have been shown to characterize families of

bulimic patients<sup>14</sup> and families of adolescents who engage in high-risk health behaviors (e.g., early sexual intercourse, substance use, fighting).<sup>15</sup>

Dieting may be characterized as a continuum of eating behaviors that range from fasting and severe restriction of food intake on one extreme to overeating and binge eating on the opposite extreme.<sup>9</sup> If the continuum model is correct, excessive or frequent dieting and eating disorders may share common risk factors. Support for this idea includes the finding that chronic dieters resemble persons with eating disorders in their preoccupation with body weight and shape, body dissatisfaction, and perfectionistic tendencies.<sup>16,17</sup> However, those with eating disorders show a greater level of psychopathology that is not specific to eating and body weight compared with chronic dieters.<sup>16</sup> In addition to its links with eating disorders, frequent dieting in adolescents may be harmful because of its association with higher levels of smoking initiation,<sup>18</sup> alcohol or other drug use,<sup>19</sup> and, in the case of chronic, extremely restrictive dieting, persistent irritability, poor concentration, sleep disturbances, menstrual irregularities, growth retardation, and delayed sexual maturation.<sup>20-22</sup>

Simone A. French and Mary Story are with the Division of Epidemiology, School of Public Health, University of Minnesota, Minneapolis. Blake Downes is with Central Computing Services, University of Minnesota. Michael D. Resnick is with the Division of Health Management and Policy, School of Public Health, University of Minnesota. Robert W. Blum is with the Department of Pediatrics, School of Medicine, University of Minnesota.

Requests for reprints should be sent to Simone A. French, PhD, Division of Epidemiology, School of Public Health, University of Minnesota, 1300 S 2nd St, Suite 300, Minneapolis, MN 55454-1015.

This paper was accepted January 5, 1995.

In the present study we examined the psychological, social, and health behavior correlates of frequent dieting in adolescents. The first purpose of the study was to determine whether frequent dieting is related to specific eating-disorder risk factors previously identified in clinical samples, such as body dissatisfaction, peer approval concerns, physical or sexual abuse, low levels of family connectedness, and substance use. A related purpose was to characterize frequent dieters on several psychological and social variables to facilitate theoretical development in the dieting and eating-disorders area. To the extent that dieting and eating disorders exist on a continuum, understanding the variables related to frequent dieting should inform theoretical conceptions of eating disorders.<sup>16</sup> Furthermore, we hypothesized that a greater proportion of frequent dieters who purged would report negative psychosocial and health behaviors compared with those who did not purge. Dieting was also hypothesized to be related to psychological, social, and health variables more strongly or perhaps exclusively in females, because dieting, concerns about body weight and shape, and physical appearance differ in meaning and importance in males and females.<sup>4</sup>

## Methods

The data presented in this report are derived from a health behavior survey administered in 1987 to 36 320 public school students in grades 7 through 12 in the state of Minnesota.<sup>23-27</sup> The survey inquired about a broad range of subject areas related to adolescent health, such as health care utilization, sexuality, emotional stress, suicide attempts, and substance use. Only a subset of the 148 items that comprised the survey are examined in the present report.<sup>23</sup> Schools were selected to elicit participation from different ethnic groups and geographic locations after stratifying by school district size. Oversampling was done for schools with a higher proportion of ethnic-minority and lower-income students. The achieved sample closely resembles the population of Minnesota high school students. The survey is, to our knowledge, the largest study ever conducted on youth in America. After the exclusion of obvious errors and incomplete data, usable data were obtained for 33 393 subjects.

The present sample was comprised of 17 135 females and 16 258 males aged 12 through 20 years (mean  $\pm$  SD = 15.0  $\pm$  1.8 years). The sample was approximately

86% White, 8% Black, 1% Hispanic, 2% Native American, and 3% Asian American. Survey completion was evenly distributed across grades 7 through 12, with a slightly greater percentage of 10th and 11th graders completing the survey. Based on educational attainment and employment status, parental socioeconomic status was 14% low, 56% medium, and 30% high. Approximately 49%, 17%, and 34% of the sample resided in urban, suburban, and rural geographic locations, respectively.

## Measures

The measures of dieting and eating-disorders risk factors examined in the present study are briefly described below (a complete description of the measures is available from the authors). Risk factors were selected based on previous research.

**Dieting measures.** Dieting behavior was assessed with a single question: "How often have you gone on a diet during the last year? By 'diet,' we mean changing the way you eat so you can lose weight." Response options were "Never," "1-4 times," "5-10 times," "More than 10 times," or "Always." Purging behaviors were assessed with two questions: "How often do you vomit (throw up) on purpose after eating?" and "Do you use any of the following to lose weight: laxatives, Ipecac, diuretics (water pills) not just for your period?" Those who reported vomiting on purpose at any frequency or who responded "Yes" to any of the laxative, Ipecac, or diuretic items were defined as purgers. Those who reported never vomiting on purpose and who did not report using laxatives, Ipecac, or diuretics for weight control were defined as nonpurgers. In this study, the intent was not to attempt to classify individuals according to DSM-IV eating-disorder criteria,<sup>28</sup> but rather to examine dieting without purging behaviors as distinct from dieting with purging behaviors. Thus, the purging definitions used were thought to be liberal compared with clinical diagnostic criteria.

**Risk factor measures.** The following psychosocial and health behavior risk factor measures were assessed with one or more Likert-scale items. The measures have adequate internal reliability and have been used in previous surveys of adolescent health and social behavior.<sup>23-27</sup>

## Psychosocial Variables

Family connectedness assessed perceptions of family and parental care, attention, and understanding (e.g., "your

parents care about you"). Other connectedness measured perceptions of caring and connectedness by nonfamily members (e.g., at school or church; "school people care about you"). Peer acceptance concerns measured concerns with peer relationships such as treatment by friends, being liked by others, losing a best friend, and one's appearance. Emotional stress measured perceptions of stress, feelings of nervousness, discouragement, satisfaction, fatigue, and energy during the past month. Family stress measured the occurrence of stressful events within the family during the past year (e.g., moving, a parent losing his or her job, a family member attempting suicide or being treated for a serious mental or emotional problem). Body image measured body pride and satisfaction with weight.

## Health Behaviors

Prevalence of binge eating was measured with the question "Have you ever eaten so much in a short period of time that you felt out of control and would be embarrassed if others saw you (binge eating, gorging, or bulimia)?" Out-of-control eating was measured with the question "Are you ever afraid to start eating because you think you won't be able to stop?" Suicide risk measured history of suicide attempts and thoughts about suicide in the past month. Frequency of regular tobacco and alcohol use was measured with the question "How often do you use the following (without a doctor telling you to): tobacco (alcohol)?" A cumulative drug use measure was created by summing the frequency of use of nine drug families (tobacco, alcohol, marijuana, hallucinogenics, cocaine, amphetamines, inhalants, opiates, and barbituates). Delinquent behaviors were measured with questions about involvement in acts that would be considered illegal for juveniles (e.g., destruction of property, stealing, gang fights, prostitution, running away from home). The number of sick days from school were measured. History of sexual intercourse was measured with the question "Have you ever had sexual intercourse (gone all the way)?" History of sexual abuse was measured with the question "Have you ever been sexually abused? Sexual abuse is when someone in your family or someone else touches you in a place you did not want to be touched, or does something to you sexually which they shouldn't have done." History of physical abuse was measured with the

**TABLE 1—Unadjusted Percentages for Psychosocial and Health Behavior Variables in Adolescent Females (n = 17 135), by Dieting and Purging Status**

	Nonpurgers, %					Purgers, %				
	Never Diet (n = 6110)	Diet 1–4 Times (n = 6109)	Diet 5–10 Times (n = 1078)	Diet > 10 Times (n = 531)	Always Diet (n = 711)	Never Diet (n = 411)	Diet 1–4 Times (n = 969)	Diet 5–10 Times (n = 395)	Diet > 10 Times (n = 285)	Always Diet (n = 536)
<b>Psychosocial variables</b>										
Family connected (high)	59.4	56.7	55.0	48.9	51.0	54.5	47.9	40.5	42.9	39.2
Other connected (high)	97.7	97.5	97.3	97.6	95.8	95.4	95.9	97.3	89.8	91.7
Peer concerns (high)	50.1	58.3	66.4	73.4	70.2	54.0	64.8	71.5	71.5	72.8
Emotional stress (high)	69.0	70.8	75.6	77.4	78.3	81.0	78.7	80.3	75.4	79.1
Family stress (high)	19.0	19.9	24.5	20.7	24.1	26.3	26.2	28.6	25.1	24.6
Delinquent behaviors (any)	35.0	39.1	44.2	45.0	42.2	51.9	52.2	53.9	59.0	52.9
Body image (positive)	85.0	62.4	48.5	33.1	34.7	81.1	50.5	37.6	28.5	22.7
<b>Health behaviors</b>										
Binge eating (ever)	15.4	28.3	38.5	46.2	43.4	34.7	52.5	62.9	62.5	74.0
Fear can't stop eating (ever)	5.6	15.2	23.2	32.3	35.9	18.5	32.5	39.4	46.3	59.7
Alcohol use (weekly or daily)	13.4	15.6	18.6	20.5	22.1	14.1	27.7	34.4	38.4	37.9
Tobacco use (weekly or daily)	16.4	18.1	21.0	20.5	23.3	25.7	31.0	32.2	32.5	34.4
Cumulative drug use (≥ 2 drugs)	49.8	60.5	69.7	69.4	68.4	56.9	76.2	86.7	83.5	86.1
Suicide risk (high)	13.1	15.3	17.9	23.8	21.0	28.7	34.0	39.3	44.2	44.3
Sick days (≥ 1 day)	39.7	45.5	47.2	53.6	49.8	48.6	56.2	57.3	61.5	59.7
Sexual intercourse (ever)	29.7	33.5	38.2	41.8	41.6	39.9	52.8	58.5	56.8	56.5
Physical abuse (ever)	10.7	12.1	14.9	17.7	18.8	16.1	21.5	27.3	26.3	30.3
Sexual abuse (ever)	12.7	14.5	17.8	20.5	19.6	14.2	21.8	29.4	28.7	28.4

Note. All P values < .00001.

question “Have you ever been physically abused or mistreated by anyone in your family or by anyone else?”

**Demographic Variables**

Age, grade in school, race, height, weight, and mother’s and father’s educational attainment and occupational status were self-reported on the survey. The latter variables were combined to create a measure of parental socioeconomic status. Body mass index (weight in kilograms/height in meters squared) was computed based on self-reported height and weight.

**Statistical Analysis**

To examine risk factor differences in dieters who purge vs dieters who do not purge, dieting frequency was crossed with purging status to create 10 dieting/purging groups. Chi-square analysis was used to examine bivariate relationships between these dieting/purging groups and each of the psychosocial and health behavior variables described above. Because of their skewed distribution (i.e., very few “yes” responses to many of the health risk questions), the risk factor variables were dichotomized before analy-

sis. Males and females were examined in separate analyses.

To determine whether the observed relationships remained significant when demographic variables were controlled, we conducted separate multivariate logistic regressions for each of the risk factor measures using the five-level dieting-frequency measure and the dichotomized purging-status measure as predictor variables, risk factor as the dependent variable, and age, grade in school, race, parental socioeconomic status, and body mass index as covariates. Odds ratios associated with dieting frequency reflect

**TABLE 2—Unadjusted Percentages for Psychosocial and Health Behavior Variables in Adolescent Males (n = 16 258), by Dieting and Purging Status**

	Nonpurgers, %					Purgers, %				
	Never Diet (n = 12 145)	Diet 1–4 Times (n = 2536)	Diet 5–10 Times (n = 222)	Diet > 10 Times (n = 155)	Always Diet (n = 136)	Never Diet (n = 706)	Diet 1–4 Times (n = 238)	Diet 5–10 Times (n = 53)	Diet > Times (n = 32)	Always Diet (n = 35)
<b>Psychosocial variables</b>										
Family connected (high)*	55.8	56.6	52.7	52.6	45.5	55.6	55.9	37.8	40.0	40.6
Other connected (high)†††	96.4	97.6	96.0	95.1	94.2	93.0	94.3	93.8	90.0	82.1
Peer concerns (high)†††	38.3	46.9	49.1	57.9	44.2	38.1	47.4	57.1	54.8	51.5
Emotional stress (high)††	65.9	68.3	74.8	69.7	72.1	69.5	74.8	81.1	87.5	71.4
Family stress (high)†††	18.6	19.6	21.4	25.9	20.3	29.7	26.9	21.7	38.7	20.7
Delinquent behaviors (any)†††	59.7	62.8	72.7	66.7	51.3	65.8	69.6	78.4	63.3	71.0
Body image (positive)†††	90.3	75.7	71.8	75.3	65.2	87.5	72.2	62.3	71.9	61.8
<b>Health behaviors</b>										
Binge eating (ever)†††	9.6	18.7	30.9	24.0	22.4	20.8	33.2	43.4	37.5	54.3
Fear can't stop eating (ever)†††	2.2	8.9	18.0	13.5	14.9	7.7	21.4	26.4	40.6	31.4
Alcohol use (weekly or daily)***	20.9	19.6	17.6	18.7	16.9	22.7	17.2	13.2	40.6	33.3
Tobacco use (weekly or daily)**	21.3	19.4	14.5	23.2	20.6	23.5	19.3	26.4	18.8	36.4
Cumulative drug use (≥ 2 drugs)***	61.0	62.3	61.3	66.2	61.4	56.2	56.2	68.0	80.0	77.4
Suicide risk (high)†††	10.9	11.0	19.1	21.8	18.3	21.4	23.3	41.0	33.3	42.4
Sick days (≥ 1 day)†††	33.5	36.9	33.3	32.1	27.8	43.6	57.3	55.6	27.8	41.2
Sexual intercourse (ever)†	42.7	41.6	42.2	50.7	50.4	49.9	39.7	54.2	64.5	58.6
Physical abuse (ever)†††	4.6	5.1	8.1	8.1	9.2	7.7	11.7	16.7	6.9	6.5
Sexual abuse (ever)***	2.0	2.6	2.9	3.4	3.1	3.5	5.0	6.3	6.9	3.1

\**P* < .03; \*\**P* < .02; \*\*\**P* < .01; †*P* < .0001; ††*P* < .00004; †††*P* < .00001.

the average change in the risk factor per unit change in dieting frequency (e.g., the average increase in risk from never diet to diet 1–4 times). This analysis assumes an interval scale (i.e., a constant change in the risk factor from one level to the next for dieting frequency).<sup>29</sup> Additional models were run to examine possible interactions between dieting frequency and purging status, dieting status and body mass index, dieting status and socioeconomic status, and dieting status and grade in school. These interaction models did not significantly increase the amount of explained variance above that explained by a main-effects-only model; therefore,

the results of these analyses are not discussed.

### Results

Tables 1 and 2 show the unadjusted percentages for each risk factor by frequency of dieting in the past year and purging status. About 12% of the females and 2.2% of the males dieted 10 or more times during the past year (Tables 1 and 2). About 38% of the females and 79% of the males never dieted in the past year. Fifteen percent of the females and 6.5% of the males reported purging behavior of some type. About 6.3% of the females and

5.5% of the males who had never dieted in the past year reported purging behavior of some type.

Both dieting frequency and purging status were independently associated with increased psychosocial and health behavior risk factors. For most of the psychosocial and health behavior variables, the most negative patterns were found in frequent dieters (i.e., 5–10 times, 10 or more times, or always dieting), whereas the most positive patterns were found in the never dieters. The largest differences between never dieters and frequent dieters occurred for the eating and body image variables. Among female nonpurg-

ers, 85% of the never dieters reported a positive body image compared with 33.1% and 34.7% of those who dieted 10 or more times and who always dieted, respectively. Binge eating was reported by almost half of the females who dieted 10 or more times or always, whereas only 15% of never dieters had ever binged. Fears of being unable to stop eating were about seven times more prevalent in frequent dieters compared with never dieters.

A similar pattern of findings was observed for other risk factor variables. Weekly or daily alcohol or tobacco use was about one and a half times more prevalent in those who always dieted compared with never dieters. Suicide risk, sexual intercourse, and physical or sexual abuse each increased in prevalence with increasing frequency of dieting. Dieting was inversely associated with family and other connectedness and was positively associated with peer acceptance concerns, emotional stress, family stress, and delinquent behaviors.

In purging females, absolute levels of the risk factors were higher than in nonpurging females. However, the pattern of relationships was similar, with increasing frequency of dieting associated with increased risk factor prevalence. For example, about 68% of females who purged and dieted 10 or more times during the past year also reported binge eating, compared with about 45% of females who dieted 10 or more times but did not purge. Binge eating was about twice as prevalent in frequent dieters who purged compared with purgers who never dieted. Alcohol use, tobacco use, suicide risk, sick days from school, history of sexual intercourse, physical or sexual abuse, emotional and family stress, and low feelings of connectedness to others increased in prevalence with increasing frequency of dieting. The pattern of findings described above was maintained in multivariate analyses controlling for demographic variables (Table 3).

Purging behaviors were independently associated with increased risk factors. Compared with nonpurgers, purgers were half as likely to have a positive body image, three times as likely to have a history of binge eating or to fear out-of-control eating, twice as likely to regularly use alcohol, tobacco, or drugs, about three times as likely to score high on suicide risk, and about twice as likely to report a history of sexual intercourse or physical or sexual abuse (Table 3).

Similar but less consistently significant relationships between dieting fre-

**TABLE 3—Odds Ratios, Based on Logistic Regression, for Psychosocial and Health Behavior Variables in Females, by Dieting Frequency and Purging Status**

	Dieting Frequency		Purging Status	
	OR	95% CI	OR	95% CI
<b>Psychosocial variables</b>				
Family connectedness (high)	0.92	0.89, 0.95	0.67	0.57, 0.77
Other connectedness (high)	0.79	0.70, 0.88	0.56	0.30, 0.82
Peer acceptance concern (high)	1.30	1.26, 1.34	1.35	1.24, 1.46
Emotional stress (high)	1.08	1.04, 1.12	1.31	1.19, 1.43
Family stress (high)	1.07	1.03, 1.11	1.23	1.10, 1.36
Delinquent behaviors (any)	1.13	1.10, 1.16	1.71	1.60, 1.82
Body image (positive)	0.56	0.52, 0.59	0.60	0.49, 0.71
<b>Health behaviors</b>				
Binge eat (ever)	1.46	1.43, 1.49	3.02	2.92, 3.12
Fear can't stop eating (ever)	1.64	1.60, 1.68	2.76	2.65, 2.87
Alcohol use (weekly or daily)	1.17	1.13, 1.21	2.20	2.08, 2.32
Tobacco use (weekly or daily)	1.08	1.04, 1.12	2.01	1.89, 2.13
Cumulative drug use (≥ 2 drugs)	1.25	1.21, 1.29	2.45	2.32, 2.58
Suicide risk (high)	1.19	1.15, 1.23	2.84	2.72, 2.96
Sick days (≥ 1 day)	1.12	1.08, 1.16	1.48	1.34, 1.62
Sexual intercourse (ever)	1.12	1.08, 1.16	2.16	2.05, 2.27
Physical abuse (ever)	1.16	1.12, 1.20	1.93	1.80, 2.06
Sexual abuse (ever)	1.14	1.10, 1.18	1.60	1.47, 1.73

Note. The odds ratios for each psychosocial and health behavior variable have been adjusted for age, socioeconomic status, body mass index, grade in school, and race. P values are from Wald chi-square tests. OR = odds ratio; CI = confidence interval.

**TABLE 4—Odds Ratios Based on Logistic Regression, for Psychosocial and Health Behavior Variables in Males, by Dieting Frequency and Purging Status**

	Dieting Frequency		Purging Status	
	OR	95% CI	OR	95% CI
<b>Psychosocial variables</b>				
Family connectedness (high)	0.95	0.89, 1.01	0.90	0.74, 1.06
Other connectedness (high)	0.93	0.78, 1.08	0.54	0.19, 0.89
Peer acceptance concern (high)	1.27	1.21, 1.33	1.07	0.91, 1.22
Emotional stress (high)	1.08	1.02, 1.14	1.21	1.05, 1.37
Family stress (high)	1.05	0.98, 1.12	1.41	1.22, 1.60
Delinquent behaviors (any)	1.07	1.01, 1.13	1.29	1.11, 1.47
Body image (positive)	0.63	0.57, 0.70	0.73	0.52, 0.94
<b>Health behaviors</b>				
Binge eat (ever)	1.53	1.46, 1.60	2.23	2.05, 2.41
Fear can't stop eating (ever)	1.95	1.87, 2.03	3.02	2.77, 3.27
Alcohol use (weekly or daily)	0.93	0.86, 1.00	1.88	1.68, 2.08
Tobacco use (weekly or daily)	0.98	0.91, 1.05	1.68	1.49, 1.87
Cumulative drug use (≥ 2 drugs)	1.06	1.00, 1.12	1.47	1.30, 1.64
Suicide risk (high)	1.29	1.21, 1.37	2.02	1.81, 2.23
Sick days (≥ 1 day)	1.02	0.94, 1.10	1.56	1.35, 1.77
Sexual intercourse (ever)	1.07	1.01, 1.13	1.61	1.44, 1.78
Physical abuse (ever)	1.15	1.03, 1.27	1.74	1.44, 2.04
Sexual abuse (ever)	1.13	0.96, 1.30	1.23	0.74, 1.72

Note. The odds ratios for each psychosocial and health behavior variable have been adjusted for age, socioeconomic status, body mass index, grade in school, and race. P values are from Wald chi-square tests. OR = odds ratio; CI = confidence interval.

quency, purging status, and risk factor variables were found in males (Tables 2 and 4). Increases in dieting frequency were related to increasingly negative psychosocial and health behavior risk factors. Purging status was independently associated with increased risk. These effects were strongest for the body image, binge-eating, out-of-control-eating, and suicide risk variables. Alcohol and tobacco use, cumulative drug use, history of sexual intercourse, physical or sexual abuse, and psychosocial variables such as other connectedness, emotional or family stress, and delinquent behaviors were consistently associated with purging status (Table 4).

## Discussion

The purpose of the present study was to characterize adolescent dieters from a general population sample on several eating-disorders risk factors previously identified in clinical samples. Not surprisingly, dieting frequency was most strongly related to poor body image, fears of being unable to control eating, and more prevalent history of binge eating. Dieting status was also associated in a dose-response pattern with psychosocial and health behavior variables. Never dieters reported the most healthy pattern of psychosocial and health behaviors, whereas those who dieted frequently (10 or more times or always) reported the most negative pattern. Purging status was positively and independently associated with increased risk. The pattern of results was similar in both females and males.

Many have hypothesized eating disorders to be a qualitatively distinct phenomenon from chronic dieting.<sup>4,9,16</sup> The present findings are not inconsistent with this model. It is likely that a subset of purging dieters in the present study would meet clinical criteria for an eating disorder. However, we believe that the present findings support the idea of a continuum of dieting behaviors, with the use of increasingly severe weight control behaviors associated with greater involvement with other substance use and with a more general pattern of negative social and psychological perceptions. Future studies are needed to determine how individuals with clinically diagnosable eating disorders differ on psychosocial variables and health behaviors from those individuals who diet with differing levels of severity at a subclinical level. The present findings, however, support the idea that dieting at subclinical levels is widespread in the

general population of adolescent females and is associated with wide-ranging negative risk factors.

Although the results are correlational, variables that are important for future study can be identified, and they are consistent with previous theoretical conceptions of risk factors for eating disorders.<sup>4,5</sup> The results from the present study suggest that an important variable for future study is feelings of connectedness with others. Dieters may engage in a variety of high-risk behaviors in an effort to establish connection with and gain approval from peers (e.g., dieting to achieve a socially esteemed body shape, early sexual intercourse, alcohol, tobacco, or drug use, delinquent behaviors). In addition, low levels of family connectedness or a family social environment in which physical or sexual abuse occurs may reflect lack of family social support that is then sought from others, including peers. The higher suicide risk among dieters may also reflect their feelings of disconnectedness from others and the lack of a supportive social environment. Alternatively, or in addition to the reasons already mentioned, dieters might be engaging in unhealthy behaviors such as binge eating and alcohol, tobacco, or other drug use to reduce feelings of negative affect directed toward the self.<sup>4,30,31</sup> Prospective studies are needed to determine the specific pathways through which these risk factors might influence the development of chronic dieting and eating disorders.

Strengths of the present study include its large, population-based sample and the broad range of variables examined. Very few data sets of this size and sample heterogeneity contain such rich information on adolescent health behavior and on the psychological and social perceptions of adolescents. Important limitations were present, in addition to those described above, including the inability to distinguish the direction of causation, the exclusive reliance on self-report data, and the lack of a technically representative sample. Despite these limitations, we believe that the data are of sufficient quality to allow meaningful interpretation and to inform research on adolescent health behavior.

An additional important area for future research is the measurement of dieting behavior. "Dieting to lose weight" may refer to (1) weight concern or a desire to lose weight; (2) behaviors that would be considered healthy for weight control, such as avoiding sweets, increasing fruit

and vegetable intake, and increasing physical-activity levels; or (3) behaviors that would be considered unhealthy, such as fasting, use of diet pills or laxatives, and intentional vomiting. Furthermore, specification of the time frame, intensity, and duration of dieting and purging behaviors is important. In the present study, for example, 6.3% of the females and 5.5% of the males who never dieted reported purging behaviors of some type (primarily intentional vomiting). Interpretation of this group is difficult due to the lack of agreement in time frame for the dieting and vomiting questions (i.e., dieting during the last year vs intentional vomiting, no specified time frame). Thus, it is unclear whether this group represents individuals who (1) purge but don't diet, (2) diet but not during the last year, or (3) have purged at least one time in the past, but who are currently not purging or dieting. An acknowledged limitation in the present study, and in most population-based studies of health behavior, is the lack of validated measures of dieting and the specific behaviors associated with self-reported dieting. Future research on dieting needs to specify the behaviors, their intensity and duration, and the time frame in question.<sup>1</sup>

These results suggest that frequent dieting and eating-disordered behaviors are not isolated behaviors, but occur in the broader social context of adolescent health and risk-taking behaviors and should be included in theoretical models relating social-psychological variables to adolescent health and risk taking.<sup>32,33</sup> Frequent dieting in adolescents is related to many negative health behaviors found to cluster together in previous studies (e.g., alcohol, tobacco, and drug use, early sexual intercourse<sup>34-36</sup>). Social and psychological variables hypothesized to be of etiologic significance in these theoretical models (e.g., conventionality,<sup>34,36</sup> family cohesion<sup>15</sup>) may also be important predictors of frequent dieting. To the extent that frequent dieting and eating disorders exist on a continuum,<sup>9,16</sup> these variables may be important indicators of future risk of developing a range of health-compromising behavior patterns, including eating disorders. □

## Acknowledgments

Preparation of this article was supported in part by a grant from the Bureau of Maternal and Child Health, Health Resources and Services Administration, (MCJ 273A03-03-0).

The authors would like to thank Robert W. Jeffery, Cheryl L. Perry, and three anonymous

mous reviewers for their editorial suggestions on a previous version of this manuscript and David Murray for statistical consultation.

## References

- French SA, Jeffery RW. The consequences of dieting to lose weight: effects on physical and mental health. *Health Psychol.* 1994;13:195-212.
- Garner DM, Wooley SC. Confronting the failure of behavioral and dietary treatments for obesity. *Clin Psychol Rev.* 1991;11:729-780.
- Polivy J, Herman CP. Dieting and bingeing. *Am Psychol.* 1985;40:193-210.
- Striegel-Moore RH, Silberstein LR, Rodin J. Toward an understanding of risk factors for bulimia. *Am Psychol.* 1986;41:246-263.
- Garner DM. Pathogenesis of anorexia nervosa. *Lancet.* 1993;341:1631-1634.
- Gross J, Rosen JC. Bulimia in adolescents: prevalence and psychosocial correlates. *Int J Eating Disord.* 1988;7:51-61.
- Rosen JC, Gross J, Vara L. Psychological adjustment of adolescents attempting to lose or gain weight. *J Consult Clin Psychol.* 1987;55:742-747.
- Johnson C, Connors ME. The Etiology and Treatment of Bulimia Nervosa: A Biopsychosocial Perspective. New York, NY: Basic Books; 1987.
- Schlundt DG, Johnson WG. *Eating Disorders: Assessment and Treatment.* Boston, Mass: Allyn & Bacon; 1990.
- Connors ME, Morse W. Sexual abuse and eating disorders: a review. *Int J Eating Disord.* 1993;13:1-11.
- Casper RC, Eckert ED, Halmi KA, Goldberg SC, Davis JM. Bulimia: its incidence and clinical importance in patients with anorexia nervosa. *Arch Gen Psychiatry.* 1980;37:1030-1035.
- DaCosta M, Halmi KA. Classification of anorexia nervosa: question of subtypes. *Int J Eating Disord.* 1992;11:305-313.
- Mitchell JE, Pyle RL. The bulimic syndrome in normal weight individuals: a review. *Int J Eating Disord.* 1982;1:61-73.
- Striegel-Moore RH. Etiology of binge eating: a developmental perspective. In: Fairburn CG, Wilson GT, eds. *Binge Eating: Nature, Assessment and Treatment.* New York, NY: Guilford Press; 1993:144-172.
- Turner RA, Irwin CE, Tschann JM, Millstein SG. Autonomy, relatedness, and the initiation of health risk behaviors in early adolescence. *Health Psychol.* 1993;12:200-208.
- Polivy J, Herman CP. Diagnosis and treatment of normal eating. *J Consult Clin Psychol.* 1987;55:635-644.
- Leon GR, Fulkerson JA, Perry CL, Cudeck R. Personality and behavioral vulnerabilities associated with risk status for eating disorders in adolescent girls. *J Abnorm Psychol.* 1993;102:438-444.
- French SA, Perry CP, Leon GR, Fulkerson JA. Weight concerns, dieting behavior and smoking initiation in adolescents: a prospective epidemiologic study. *Am J Public Health.* 1994;84:1818-1820.
- Killen JD, Barr-Taylor C, Telch MJ, Robinson TN, Maron DJ, Saylor KE. Depressive symptoms and substance use among adolescent binge eaters and purgers: a defined population study. *Am J Public Health.* 1987;77:1539-1541.
- Kirkley BG, Burge JC. Dietary restriction in young women: issues and concerns. *Ann Behav Med.* 1989;11:66-72.
- Lifshitz F, Moses N. Nutritional dwarfing: growth, dieting and fear of obesity. *J Am Coll Nutr.* 1988;7:367-376.
- Mallick MH. Health hazards of obesity and weight control in children: a review of the literature. *Am J Public Health.* 1983;73:78-82.
- Blum RW, Harris LJ, Resnick MD, Rosenwinkel K. Technical report on the Adolescent Health Survey. Minneapolis, Minn: University of Minnesota, Adolescent Health Program; 1989. Unpublished manuscript.
- Blum RW, Resnick MD, Geer L, Rosenwinkel K, Hutton L. The Minnesota Adolescent Health Survey: implications for physicians. *Minnesota Med.* 1988;71:143-146.
- Resnick MD, Chambliss S, Blum RW. Health and risk behaviors of urban adolescent males involved in pregnancy. *Families in Society.* 1993;7:366-374.
- Resnick MD, Harris LJ, Blum RW. The impact of caring and connectedness on adolescent health and well-being. *J Paediat Child Health.* 1993;29 (suppl): S1-S10.
- Story M, Rosenwinkel K, Himes JH, Resnick MD, Harris LJ, Blum RW. Demographic and risk factors associated with chronic dieting in adolescents. *Am J Dis Child.* 1991;145:994-998.
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders.* 4th ed. Washington, DC: American Psychiatric Association; 1994.
- Hays WL. *Statistics.* 3rd ed. New York, NY: CBS College Publishing; 1981.
- Heatherton T, Polivy J. Chronic dieting and eating disorders: a spiral model. In: Crowther JH, Hobfall SE, Stephens MA, Tennenbaum DL, eds. *The Etiology of Bulimia: The Individual and Familial Context.* Washington, DC: Hemisphere; 1993:133-155.
- Heatherton TF, Baumeister RF. Binge eating as an escape from self-awareness. *Psychol Bull.* 1991;110:86-108.
- Jessor R. Successful adolescent development among youth in high-risk settings. *Am Psychol.* 1993;48:117-126.
- Perry CL, Kelder SH, Komro A. The social world of adolescents: family, peers, schools and the community. In: Millstein SG, Petersen AC, Nightingale EO, eds. *Promoting the Health of Adolescents.* New York, NY: Oxford University Press; 1993:73-96.
- Donovan JE, Jessor R. Structure of problem behavior in adolescence and young adulthood. *J Consult Clin Psychol.* 1985;53:890-904.
- Donovan JE, Jessor R, Costa FM. Adolescent health behavior and conventionality-unconventionality: an extension of Problem Behavior Theory. *Health Psychol.* 1991;10:5261.
- Jessor R, Jessor SL. *Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth.* New York, NY: Academic Press; 1977.