Health Psychology
2008, Vol. 27, No. 1(Suppl.), S3–S9

0278-6133/08/$12.00 DOI: 10.1037/0278-6133.27.1.S3

The "Freshman Fifteen" (the "Freshman Five" Actually): Predictors and Possible Explanations

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Objective: To conduct a prospective, longitudinal study examining weight fluctuation and its predictors before and during the first year of college. ***Design:*** Men (n = 266) and women (n = 341) enrolled at Dartmouth College (age range: 16 to 26; body mass index range: 15.0 to 42.9) provided self-reports of weight and height and completed measures of self-esteem, eating habits, interpersonal relationships, exercise patterns, and disordered eating behaviors both in their senior year of high school and either 3, 6, or 9 months into college. ***Main Outcome Measure:*** Self-reported weight was the primary outcome indicator. ***Results:*** Analyses indicated that both men and women gained a significant amount of weight (3.5 and 4.0 pounds, respectively). Weight gain occurred before November of the first academic year and was maintained as the year progressed. College freshmen gain weight at a much higher rate than that of average American adults. For men, frequently engaging in exercise predicted weight gain. Having troublesome relationships with parents also predicted weight gain in men, whereas for women, having positive relationships with parents predicted weight gain. ***Conclusion:*** Understanding the predictors of early college weight gain may aid in the development of prevention programs.

Keywords: weight gain, college students, gender differences, weight, obesity

The "freshman fifteen" refers to the idea that the average college freshman gains as many as 15 pounds during the first year away from home. The concept of the freshman 15 has become legendary in North American society: High school students going to college are afraid that it will happen to them, gyms near universities use the concept to attract new members, and college students themselves speak of the phenomenon axiomatically. Despite the freshman fifteen's status as a potential effect against which students must work hard to fight, little empirical attention has been paid to the phenomenon. Examining if college students gain a significant amount of weight, regardless of whether weight fluctuations mirror those touted by the freshman fifteen notion, is important due to the multiple-adverse medical and societal effects of overweight and obesity.

Previous research (Graham & Jones, 2002; Hodge, Jackson, & Sullivan, 1993) suggests the first year of college does not uniformly bring about a substantial weight gain. Some research has reported no significant weight gain (or loss) occurred for most students during the course of the first year of college. Other researchers, however, have found that most college freshmen gain weight during their first year of college (estimates range from .73 pounds per month, Hovell, Mewborn, Randle, & Fowler-Johnson, 1985, to 4.2 pounds over 12 weeks Levitsky, Halbmaier, & Mrdjenovic, 2004, to 2.5 pounds over a semester Megel et al., 1994). It is noteworthy that early college weight gain has not been examined separately for men and women, although it is possible that gender differences in early college weight fluctuations exist. Most previous researchers have looked at female samples only (Hodge et al., 1993; Hovell et al., 1985; Megel et al., 1994), although some have presented results from mixed samples of men and women (80% female sample, Graham & Jones, 2002; 85% female sample, Levitsky et al., 2004).

Given that overweight and obesity have been linked to increases in the rates of many medical conditions such as diabetes, heart disease, hypertension, and some cancers (National Heart, Lung, and Blood Institute Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults, 1998), and the burden placed on health care systems due to diseases associated with overweight and obesity (Mustet al., 1999), it is important for researchers to identify the contributors to and high risk time periods for weight gain. Most research suggests that American young adults gain approximately 1.5 pounds per year on average (Lewis et al., 2000). Furthermore, Lewis et al. suggested that most weight gain in young adulthood occurs during the early 20s and then levels off. For these reasons, it is important to determine if college freshmen gain more weight per year than would be expected based on national averages for people in their age group. In addition, if the beginning of college signals a high risk weight gain window, it is imperative to determine the contributing factors.

Although most of the empirical literature examining early college weight gain has been descriptive in nature, one recent study

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attempted to explain why the phenomenon may occur.[1] Levitsky et al. (2004) found that the best predictors of weight gain were the consumption of junk food and recent dieting behaviors (24% and 9% of the variance explained, respectively). Interestingly, other behaviors such as consuming late-night snacks and dining in all-you-can-eat environments were not related to weight gain.

The present study examined weight fluctuations among college students as reported both in the spring of participants' senior year of high school as well as in participants' freshman year of college. As part of this investigation, we evaluated predictors of weight fluctuation as identified by Levitsky et al. (2004), and also new predictor variables such as exercise habits and alcohol intake. In addition we examined the influence of specific predictors of weight gain among male and female samples separately. Finally, this study characterized the time course of weight changes by virtue of having the second assessment of participants' weight and lifestyle patterns occur at one of three points during the freshman year of college (i.e., fall, winter, or spring).

Method

Participants

During the spring of their senior year of high school (Time 1, which occurred during the spring of 1995; T1), all students accepted into the college class of 1999 at a northeastern college were sent surveys regarding their health and general well-being (N = 1,029). Students who did not reply to the initial survey were mailed a duplicate 2 weeks later to maximize response rate. Ninety percent of students responded to the high school survey (N = 924), 472 of whom were women (M age = 17.6, range = 16 to 24, SD=.68) and 452 of whom were men (M age = 17.7, range = 16 to 26, SD =.73). Seventy-five percent of the sample was White, 10% Asian, 5% African American, 5% Hispanic, 1% American Indian, 2% multiracial, and 2% other.

Participants were sent a second survey at one of three points during their freshman year of college (Time 2; T2). Equal thirds of participants from T1 were sent follow-up surveys in November of 1995 (N of responders = 200; female n = 114; male n = 86), February of 1996 (N of responders = 203; female n = 115; male n = 88), and May of 1996 (N of responders = 204; female n = 112, male n = 92). No participants were included in more than one T2 group, and the mean time between T1 and T2 was 9 months. This method of measuring eating related behaviors allowed for assessing time-related changes during a high risk time period of adjustment from high school to college. The total number of T1 participants who returned T2 surveys was 607 (overall response rate = 66%; female n = 341; male n = 266; for additional information about the sample characteristics and recruiting methods, please see Vohs, Bardone, Joiner, Abramson, & Heatherton, 1999 and Vohs, Heatherton, & Herrin, 2001).

Analyses indicated no differences between participants who responded only to the high school questionnaires and those who responded to both high school and college questionnaires for the following variables after controlling for Type I error (measures described below): total Eating Disorders Inventory score, $t(917) = -1.91$, p = *ns*; total Revised Restraint score, $t(789) = -1.60$, p = *ns*; high school body mass index, (BMI); $t(916) = .74$, p = *ns*; frequency of dieting, $t(915) = -.51$, p = *ns*; frequency of smoking, $t(916) = .68$, p = *ns*; frequency of eating junk food, $t(909) = 1.30$, p = *ns*; regularity of exercise, $t(883) = 1.62$, p = *ns*; regular alcohol use, $t(901) = 1.75$, p = *ns*.

Measures

HEPRQ. The Health and Eating Patterns Research Questionnaire (HEPRQ) was designed largely for the current project, included items that assessed demographic variables, social relationships, body image, exercise habits, general nutrition, weight history, diet history, substance use, eating problems, and general health. Items in some of these categories were designed for this questionnaire, whereas others were taken from existing assessment tools. The pre-existing assessment tools used in the questionnaire are described below.

EDI. Eating Disorders Inventory (EDI; Garner, Olmsted, & Polivy, 1983) was used to assess problematic eating symptoms. Primary items from five previously validated EDI subscales were used: Perfectionism (T2 M score for men = 23.8, SD = 5.3; T2 M score for women = 23.8, SD = 5.6), Bulimia (T2 M score for men = 9.4, SD = 3.1; T2 I score for women = 11.7, SD = 4.7), Interpersonal Distrust (T2 M score for men = 13.9, SD = 4.5; T2 M score for women = 13.2, SD = 4.7), Maturity Fears (T2 M score for men = 12.3, SD = 3.2; T2 M score for women = 12.3, SD = 3.5), and Drive for Thinness (T2 M score for men = 8.0, SD = 4.3; T2 M score for women = 14.8, SD = 7.0). All items of the EDI were rated on a 6-point scale, with higher scores reflecting greater symptom severity (although EDI scores do not replace measures of clinical psychopathology). The coefficient alpha for each scale was greater than .79, which is comparable to previous estimates of internal reliability (Ebernez & Gleaves, 1994). Short-term (3 week) test–retest reliability measurements range from .90 to .97 (Wear & Pratz, 1987).

SSES. The State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991) is a measurement of short-lived changes in self-esteem. It consists of 20 items that assess three correlated factors: Performance (T2 M score for men = 31.0, SD = 3.4; T2 M score for women = 30.2, SD = 4.1), Social (T2 M score for men = 25.5, SD = 3.9; T2M score for women = 24.7, SD = 4.4), and Appearance (T2 M score for men = 23.5, SD = 3.9; T2 M score for women = 20.7, SD = 5.0). For purposes of this study, participants were instructed to answer the items on a 5-point scale according to how they had felt in the past week (traditional instructions ask participants to report how they are feeling "right now"). Internal consistency for each scale was greater than .80. Test–retest reliability in previous studies of undergraduates has been reported as .70 over a 1 to 2 week period of time (Heatherton & Polivy, 1991).

RRS. The Revised Restraint Scale (RRS; Herman & Polivy, 1980) is a 10-item scale that measures restrained eating, a construct that taps dieting-like behaviors that may lead to binge eating and/or bulimic symptoms (Ruderman, 1986). The RRS was scored and a dichotomous categorization was made, such that scores of 16 or higher identified restrained eaters/dieters, whereas scores of 15 or

[1] In actuality, weight gain is a function of calories taken in versus calories expended. Thus, when we refer to 'predictors of weight gain' in this paper, we are actually discussing 'predictors of what accounts for more calories being taken in than being expended.'

Table 1
Weight by Gender

	T1–All			T2–November			T2–February			T2–May			T2–All		
	N	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*
Women	341	131.1	19.6	115	134.9	22.1	113	136.4	19.2	113	134.1	17.7	341	135.1	19.7
Males	265	162.9	27.6	120	168.5	25.3	115	167.2	32.3	120	164.0	23.7	264	166.4	27.3
Total	606	145.0	28.2	199	149.0	28.7	202	150.0	29.9	204	147.5	25.4	605	148.8	28.0

Note. All weights are given in pounds. To convert weight in pounds into weight in kilograms, multiply weight in pounds by .454. T1 = Time 1; T2 = Time 2.

lower identified unrestrained eaters/nondieters (Polivy, Heatherton, & Herman, 1988). Previous researchers have estimated the 1-month test–retest reliability of this measure to be .64 (Scagliusi et al., 2005).

Weight change. The primary dependent variable in this study was self-reported weight change. Self-reported weight change was defined as the difference in a participant's self-reported weight at T1 and T2. Although objective weight and height measurements are preferable to those that are self-reported, it was not feasible to obtain objective measurements during this study (i.e., traveling to the home town of each incoming college freshman to obtain their height and weight during their senior year of high school was pragmatically impossible). At least one recent study has reported very high concordance rates between self-reported and objective measures of high school student's weights ($r = .95$) and heights ($r = .94$; Goodman, Hinden, & Khandelwal, 2000).

Data Analytic Plan

T tests will be conducted to determine if a significant change in weight occurs from T1 to T2. Assuming that it does, subsequent analyses will be performed. Due to the fact that the HEPRQ produced a large number of potential predictor variables, we conducted a factor analysis on the HEPRQ as well as on other measures to identify groups of items that weighed heavily on a common factor. Each participant received a score for each of the identified factors. These factor scores then were to predict T2 weight changes while controlling for T1 weight. Homogeneity of covariance analyses will be conducted to assess whether factors interact with T1 weight to predict self-reported weight change between T1 and T2.

Results

See Table 1 for average weights and Table 2 for average BMI's of each gender at T1 and T2. The primary outcome variable in this study was weight change from T1 to T2.[2] The weight change distribution for women approximated the normal curve, although the distribution for men was significantly skewed. Thus, subsequent analyses involving men will use a weight change variable that has been subjected to a square root transformation.

When taking into account all T2 data points, both men and women reported that their height was stable from T1 to T2, $t(263) = .72$, $p = ns$ and $t(341) = .26$, $p = ns$, respectively. On average, men reported lower height at T2 than at T1 (by $1/20^{th}$ of an inch, $SD = 1.1$ inches), as did women (by $1/50^{th}$ of an inch, $SD = 1.4$ inches). Thus, self-reported heights remained very stable from T1 to T2 ($r = .94$, $p < .001$ and $r = .89$, $p < .001$ for men and women, respectively).[3]

When taking into account all T2 data points, both men and women reported that they gained a statistically significant amount of weight during the first year of college, $t(263) = 6.6$, $p < .001$ and $t(340) = 11.7$, $p < .001$, respectively, such that men gained an average of 3.5 pounds ($SD = 8.5$) and women gained an average of 4.0 pounds ($SD = 6.3$). Furthermore, the clinical significance of weight gain among men is small ($d = .14$), whereas the clinical significance of weight gain among women is small-to-medium ($d = .21$). The difference in weight gain between men and women was not statistically significant $t(603) = .83$, $p = ns$. When looking at all T2 data points, average BMI also increased from T1 to T2 $t(263) = 6.2$, $p < .001$ and $t(340) = 8.5$, $p < .001$ for men and women, respectively). Further analyses indicated that there was a statistically significant self-reported weight gain and BMI increase between T1 and *each* of the T2 points (i.e., T1 to T2–November, T1 to T2–February, and T1 to T2–May) for both men and women. However, there were no significant differences between any of the T2 self-reported weights, meaning that weight gain appeared to occur early in the year and then remain stable as the year progressed, $F(2, 602) = 41$, $p = ns$ (i.e., the data suggest that weight and BMI did not significantly change between the following times: T2–November and T2–February, T2–February. and T2–May, or T2–November. and T2–May).

Factor Analytic Results

The number of items that could be considered individual predictors of weight gain were too great to include in regression analyses; thus, we conducted a factor analysis. Initially, 101 items were included in the factor analysis; however, 3 items were excluded because of their low variance. Factors were extracted using a Varimax rotation method. Initial analyses indicated a similar factor structure for men and women; therefore, subsequent analyses of the factor structure included both men and women.

[2] BMI change was also examined as a dependent variable. Results remained largely similar to those observed when weight change was used as the dependent variable (i.e., all results remained constant with one exception. The predictive power of the Relationship with Parents factor was slightly attentuated, although still significant, among women).

[3] When height change from T1 to T2 was used a covariate in the regression analyses, the pattern of our results reported in the text of this manuscript remained identical.

Table 2
BMI by Gender

	T1–All			T2–November			T2–February			T2–May			T2–All		
	N	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*
Women	341	21.4	2.7	115	22.2	3.7	113	22.0	2.7	113	22.1	2.4	341	22.1	3.0
Men	265	22.7	3.3	84	23.4	3.3	89	23.5	4.1	91	22.9	2.9	264	23.3	3.5
Total	606	22.0	3.1	199	22.7	3.6	202	22.7	3.4	204	22.5	2.7	605	22.6	3.2

Note. BMI = body mass index; T1 = Time 1; T2 = Time 2.

Eigenvalues greater than 2.0 were apparent for nine factors. No evidence of a general, higher order factor was apparent. The scree plot suggested that a nine-factor solution was most defensible. The factors, in order of magnitude, were labeled (a) Disordered Eating, (b) Exercise/Sports, (c) Negative Affect, (d) Body Image, (e) Interpersonal Concerns, (f) Alcohol and Cigarette Use, (g) Relationship With Parents, (h) Healthy Eating, and (i) Unhealthy Eating (see the Appendix for sample items from each factor). Scores were computed for each participant on each factor. When data were missing from an item on a factor, the missing value was replaced with the participant's mean value on that scale.

Regression Analyses

Regression analyses were conducted separately for men and women. Analyses were conducted that examined whether the factor scores predicted self-reported weight change from T1 to T2 when all T2 data (i.e., November, February, and May) were considered simultaneously and T1 weight was considered a covariate. For men, the following factors significantly predicted self-reported weight change from T1 to T2: Exercise/Sports ($pr = .14$, $p < .05$) and Relationship with Parents ($pr = .13$, $p < .05$). Specifically, men who exercised more frequently and intensely gained weight between T1 and T2. Additionally, men who had troublesome relationships with their parents gained weight during their first year of college.

For women, only the Relationship With Parents factor significantly predicted self-reported weight change from T1 to T2 ($pr = -.11$, $p < .05$). Specifically, women who had positive relationships with their parents gained weight between T1 and T2. It is noteworthy that the Relationships With Parents factor differentially predicted weight change in men and women (i.e., good relationships with parents predicted weight gain in women, whereas negative relationships with parents predicted weight gain in men).[4] A follow-up regression analysis indicated that among women, negative Relationships With Parents at T1 predicted high restraint scores at T2 ($pr = .17$, $p < .05$).

Homogeneity of Covariance

As recommended by Joiner (1994), homogeneity of covariance analyses (Cohen & Cohen, 1983) were conducted to assess the assumption that association of the predictor variables with the dependent variable is constant across levels of the covariate. Homogeneity of covariance analyses were conducted for the two factors that emerged as significant predictors of self-reported weight change among men (Exercise/Sports and Relationship With Parents) and for the one factor that emerged as a significant predictor of self-reported weight change among women (Relationship With Parents). None of these interactions were significant, indicating that the factor scores predict self-reported weight change regardless of initial reported weight.

Discussion

This study examined weight change during the first year of college in a large sample of men and women. The results indicated that men and women reported a significant amount of weight gain (3.5 and 4.0 pounds, respectively) between their senior year of high school and their freshman year of college in the absence of a significant increase in height. The results of the current study support the findings of Megel et al. (1994) and Levitsky et al. (2004), such that the average weight gain on entering college is substantial (i.e., well above national averages for individuals in this age group). Our data mirror those reported by Anderson, Shapiro, and Lundgren (2003) in that participants appeared to gain weight early in the year (i.e., by November), after which time the weight gain was maintained. For men, troublesome relationships with parents and frequent exercise predicted weight gain, whereas for women, positive relationships with parents predicted weight gain.

The current study identified predictors of the weight gain that occurs in early college. For men, Relationship With Parents (which contained items assessing how satisfied participants were with their relationships with their mother and with their father, how critical their mother and their father were of them, and how independent their mother and father let them be) and Exercise/Sports factor (which contained items assessing the frequency and duration of physical activity, participation in competitive sports, and level of physical fitness) were predictors of reported weight change from high school to college. Men who reported frequent and intense workouts, high levels of physical fitness, and frequent participation in sports were more likely to report gaining weight between late high school and early college. In addition, men who reported having critical parents, being unsatisfied with their relationships with their parents, and feeling that their parents did not let them be independent were more likely to gain weight between their senior year of high school and their freshman year of college.

For women, the Relationship With Parents factor was the only significant predictor of reported weight change from high school to

[4] Formal moderating analyses confirm the presence of a gender x Relationship with Parents interaction ($pr = .12$, $p < .01$).

college. Notably, this factor differentially predicted weight change in women and in men. Women who reported having uncritical parents, being satisfied with their relationships with their parents, and feeling that their parents allowed them be independent were more likely to gain weight between their senior year of high school and their freshman year of college.

Thus, descriptively, it appears that relationships with parents that are perceived as difficult may negatively predict weight gain for men, while relationships with parents that are perceived negatively may predict weight loss in women. This finding suggests that under conditions of tension with one's parents, men and women may behave differently. Although our data did not directly examine this possibility, other researchers have suggested that men may engage in acting-out behaviors (e.g., Cummings, Iannotti, & Zahn-Wexler, 1985; Cummings, Vogel, Cummings, & El-Sheikh, 1989) such as increased sociability, increased alcohol intake, and increased food intake when under stress. Women, conversely, are more likely to display internalizing behaviors when stressed (e.g., Burns & Dunlap, 2002; Emery, 1982), which may result in a restriction of food intake, and perhaps other issues such as depression and bulimia in more extreme cases (see Vohs et al., 2001). In fact, our results indicated that women who have more negative Relationships With Parents at T1 are likely to have relatively high levels of dietary restraint at T2 (this pattern does not hold true for the young men in our data set). Given the current results, future researchers should continue to investigate how men and women may behave differently in the presence of stress, including problematic relationships with their parents.

It is also interesting example is that the Sports/Exercise factor predicted reported weight fluctuation in men but not women. Although this possibility was not empirically examined in the current study, it is plausible that college aged men who engage in frequent exercise, such as weight lifting or other weight-bearing activities, may gain muscle mass and therefore weight (Glowacki et al., 2004). Women are less likely than men to engage in weight-bearing activities when exercising (U.S. Department of Health and Human Services, 2006), which may explain why the Sports/Exercise factor predicted weight gain only among men. Future research should directly assess whether types of exercise affect weight changes in this population.

We must also consider the fact that certain factors did not predict self-reported weight change from late high school to early college. For example, based on previous research, it would be expected that unhealthy eating (e.g., eating of junk foods and midnight snacking) would be related to weight gain (Levitsky et al., 2004), whereas healthy eating (e.g., eating of vegetables, fruits, etc.) would lead to weight decrease. It is possible that in this study, the type of food consumed was not the primary determinant of the weight gain among early college, but rather the amount of food consumed was. Future studies should obtain detailed assessments of caloric consumption and food type to more fully examine to specific effects of unhealthy eating actions.

Women reported gaining slightly more weight ($M = 4.0$ lbs.) than men ($M = 3.5$ lbs.), although this difference was not statistically significant. Effect sizes indicate that the clinical significance of the weight gain was small-to-moderate for women and small for men. The average reported weight gain in this sample is much higher than national estimates of American annual adult weight gain, which hover around .92 pounds, and higher than national estimates of annual weight gain for 17 and 18 year olds, which hover around 1.72 pounds (Carey, Cook, & Strachan, 1999; Flegal, Carroll, Kuczmarski, & Johnson, 1998; Gerace & George, 1996; Guthrie, Dennerstein, & Dudley, 1999; Haapanen, Miilunpalo, Pasanen, Oja, & Vuori, 1997; Lewis et al., 2000; Sonneholm, Sorenson, Jenson, & Schnohr, 1990; Will, Denny, Serdula, & Muneta, 1999; Williamson et al., 1994). Thus, individuals entering college can be expected to, on average, gain approximately double the weight that would be expected given national adult weight gain averages. There are many things that could account for this increase in weight among college newcomers, including access to cafeteria-style food, limited campus geographical areas that may prohibit students' general activity level, and freedom to make food choices independent of parents. Of additional concern is the fact that both men and women in this sample appear to gain weight in college rather quickly. Our results indicate that students report a significant weight gain by November, but no additional weight gain during the remainder of the freshman year. Future researchers may benefit from examining the factors that affect this "leveling off" of weight gain as the first year of college progresses.

One limitation to the current study is that it relied solely on participants' self-reports of weight. Some previous research has found people to be accurate reporters of their own weight (e.g., Goodman et al., 2000; Shapiro & Anderson, 2003). For instance, Hovell et al. (1985) compared self-reported and scale-measured weights and found them to be significantly correlated in college women ($r = .95$, $p < .001$). Furthermore, we believe that even if each participant systematically misreports his/her weight (for instance, a participant underreports her true weight by 5 pounds at T1 and by 5 pounds at T2), the actual weight reported might not be valid, but the weight change is likely to reflect reality {the participant may report weighing 5 pounds under her true weight at each point; e.g., T1 = 125 pounds, T2 = 129 pounds, but any weight change that is computed; e.g., 4-pound increase would likely reflect true weight change). However, other researchers such as Graham and Jones (2002) reported that college freshman state that they have gained more weight during the course of their freshman year than actual recorded weights demonstrated. Thus, the current study is valuable insofar as it predicts increases in reported weight during the freshman year of college; however, it would have allowed for more powerful conclusions if the data were not collected solely via self-report. Another limitation of our present work is that because weight was reported late in the spring of the senior year of high school (as opposed to at the very beginning of the freshman year of college), it may be that these participants actually gained weight over the summer between high school and college rather than as the college year began. The current data do not allow us to rule this possibility out, and future researchers should take care to more carefully determine a baseline weight that reflects participants' weight as college begins.

It is also a limitation that body composition was not measured. Therefore, it is unclear as to whether participants may have gained weight due to muscle hypertrophy (which may be a positive weight change indication) or unwanted adipose tissue gains (which may be a negative weight change indication). Future studies should strive to measure the source of weight fluctation via body composition measurements. Another limitation of the study is that the sample was not ethnically diverse. Given that obesity rates are higher among many minority groups than among White Americans

(e.g., Blocker & Freudenberg, 2001), it is important to note that the current results may not generalize to other ethnic groups.

Finally, we failed to include certain important predictors of weight change in this study. First, we did not assess whether eating in a typical college cafeteria (with an "all-you-can-eat" design) predicted reported weight at T2. Previous researchers have identified college cafeteria eating as a factor that accounts for significant variance in weight gain during the first year at college (e.g., Levitsky et al., 2004). Furthermore, we did not ask participants to report on variables such as daily caloric intake, involvement in organized clubs/groups that would encourage physical activity, distance from living quarters to campus, and so forth. Thus, we used an underspecified model in predicting weight change. Despite its limitations, though, this study provides insight into the factors that contribute to early college weight gain in both men and women.

In light of rising obesity rates (e.g., Mokdadet al., 2001) understanding the predictors of weight gain is valuable in developing preventative programs that focus on high risk weight gain periods (e.g., the freshman year of college). Future researchers are encouraged to formulate programs to target the weight change risk factors identified in this study. Additionally, this study is valuable in that it examined the time course of early college weight gain. Specifically, it suggested that weight gain occurs early during the freshman year of college and remains stable as the year progresses. Future researchers are also encouraged to develop a better understanding of how complex topics, such as relationships with parents, contribute to weight changes in young adults.

Related, the data used in this study were collected 10 years ago. It is possible, in light of rising obesity trends (Ogden et al., 2006), that a similar study conducted on more current data would reveal slightly different results. For instance, it is possible that increased reliability on technology (e.g., use of the Internet, enrollment in online courses, assignments that could be emailed), students in recent years have decreased their amount of physical activity on campus. Additional studies on weight gain in early college should be conducted so that researchers, clinicians, and public health officials can determine how to prevent substantial weight gain among first year college students.

This research may be suggestive of broader implications about the nature of students' reactions to the independence that is typically afforded to them during their first year of college. Specifically, the current findings indicate that children may still be significantly affected by troublesome relationships with their parents even after they are out of their parents' home. Future studies should continue to examine the association between weight changes and familial relationships.

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Appendix

Factor Titles and Sample Items

Factor name	Sample item(s)
Disordered eating	I have the thought of trying to vomit in order to lose weight.
Exercise/sports	How often do you exercise?
Negative affect	How often do you experience mild depression? How often do you have trouble concentrating?
Body image	Choose the number [of the body figure] that represents how you would ideally like to look.
Interpersonal concerns	How much are you worried about making friends in college?
Alcohol and cigarette use	How often do you drink alcohol? How often do you smoke cigarettes?
Relationship with parents	How satisfied are you with your relationship with your mother?
Healthy eating	How often do you typically eat salad? How often do you typically eat fruits?
Unhealthy eating	How often do you typically eat candy/chocolate? How often do you typically eat fast foods?