Influences of College Students’ Weight Management:  
A Systematic Review Using the Social Ecological Framework  

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Abstract

The purpose of this systematic review is to examine the available literature for the influences of college students’ involvement in physical activity and healthful eating, using the social ecological model as a framework. This paper seeks to answer three research questions: 1) What is known about the barriers and facilitators of healthy eating and physical activity in college students? 2) What are college student’s own perspectives on healthful weight management? and, 3) What are the implications for weight management interventions at the campus level? Garrard’s (2014) matrix method was utilized to systematically abstract information from individual articles, organize the information into a logical structure known as the matrix, and then interpret the findings. Barriers and facilitators of college students’ weight management at the individual, interpersonal, institutional, community, and policy are described. Students’ perceptions of healthful weight management are also shown. Implications for weight management interventions within the college student population and areas for further research are discussed.

Keywords: College students, university students, weight management, physical activity, exercise, nutrition, diet, influences
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Obesity is a global public health problem with a threatening social and economic impact. “Currently, worldwide, there are 1 billion overweight people, 300,000 whom are obese, and more than two-thirds of the US population who are overweight or obese” (Moore & Pi-Sunyer, 2012, p. 5). Overweight and obesity are defined by using the body mass index (BMI), calculated as weight in kilograms divided by height in meters squared. Obesity is an important risk factor in common diseases such as diabetes mellitus, hypertension, the metabolic syndrome, cardiovascular disease, and some cancers (Albu, 2012, p. 209). Globally, heart disease is the leading cause of death, stroke second, and diabetes sixth (World Health Organization [WHO], 2015). Economically, in 2008, the direct and indirect medical care costs of obesity was estimated to be $147 billion annually, and work-related absenteeism costs were between $3.38 and $6.38 billion (Centers for Disease Control and Prevention [CDC], 2016).

Obesity prevalence can be examined by looking at various populations, grouped by factors such as socioeconomic status, race, ethnicity, location, and age. When looking at age, nationally representative cross-sectional survey data from the Behavioral Risk Factor Surveillance System indicated that from 1991 to 1998, the greatest magnitude of increase in obesity prevalence was among 18–29-year olds (increasing from 7.1 to 12.1%; Mokdad, Serdula, Dietz, et al., 1999). Reasons for weight gain in the transitional period from adolescence to adulthood is not widely understood; however, several dramatic life changes occur during this time period: moving away from home, full time employment, childbirth, and in recent years, attending a postsecondary institution. In
2014, 40% of persons aged 18-24 years-old were enrolled in college, compared to 35.5% in 2000 (US Department of Commerce, 2015). Thus, universities, colleges, and postsecondary institutions can be a practical platform for targeting weight-related behaviors in this population. Additionally, this time period is when people are establishing lifelong habits that will impact their health and quality of life. As a young adult, developing healthy behaviors related to weight management is critical to preventing the onset of chronic diseases. Healthy behaviors related to weight management are indicated as a combination of physical activity and nutrition. Successful treatment of overweight and obesity in adults requires adoption and maintenance of lifestyle behaviors contributing to both dietary intake and physical activity (Academy of Nutrition and Dietetics [Academy], 2012). These behaviors are influenced by many factors; therefore, interventions incorporating more than one level of the socioecological model and addressing several key factors in each level may be more successful than interventions targeting any one level and factor alone (Academy, 2012).

However, most interventions promoting weight management strategies for college students, such as nutrition and physical education, have focused on individual-level factors such as knowledge, attitudes, skills and behaviors (Plotnikoff et al., 2015). While these health education interventions have been partially successful (Plotnikoff et al., 2015) multifaceted health education and promotion interventions that incorporate individual, interpersonal, organizational, community and policy levels are likely to be more effective because of the significant and dynamic relationships that exist between the population-level and individual-level health determinants (U.S. Department of Health and Human Services [HHS], 2008, para 18). Socioecological interventions focusing on
physical activity and diet on university campuses could increase the efficacy of weight gain prevention interventions and increase young adults’ use of weight management strategies.

Additionally, there is baseline data to support the need for enhancing weight management strategies in college students. As part of the Healthy Campus 2020 initiative, the American College Health Association (ACHA, 2012) developed goals and corresponding objectives for improving physical activity and nutrition outcomes within the college student population. The goals and objectives are written below.

- Increase the proportion of students who are at a healthy weight by 6.2%. In 2010, 61.6% percent were at a healthy weight.
- Reduce the proportion of students who are obese by 1.2%. In 2010, 11.6% of students were obese.
- Increase the proportion of students who report eating five or more servings of fruits and vegetables per day by 0.6%. In 2010, 6.0% ate five or more servings of fruit and vegetables.
- Increase the proportion of students who report meeting current federal guidelines for aerobic physical activity by 4.8%. In 2010, 48.7% met the current federal guidelines for aerobic physical activity.
- Increase the proportion of students who report meeting current federal guidelines for muscle-strengthening activity by 3.8%. In 2010, 37.6 percent of students met federal guidelines for muscle-strengthening activity.

Furthermore, the complexity of environmental conditions on university campuses that influence weight management is understudied. Little is known about students’
perspectives of environmental determinants on weight management. Building an understanding of university or college campus environmental structures and students’ reasoning for participating in physical activity and healthful eating could improve socioecological interventions for campus-wide weight management initiatives. Thus, the purpose of this systematic review is to examine the available literature for the influences of college students’ involvement in physical activity and healthful eating, using the social ecological model as a framework. This paper seeks to answer three research questions:

1) What is known about the barriers and facilitators of healthy eating and physical activity in college students? 2) What are college student’s own perspectives on healthful weight management? and, 3) What are the implications for weight management interventions at the campus level?

The social ecological model, or socioecological model, is a framework that recognizes individuals as embedded within larger social systems, and describes the interactive characteristics of individuals and environments that underlie health outcomes (Golden & Earp, 2012, p. 364). The constructs of the social ecological model as outlined by McLeroy, Bibeau, Steckler and Glanz, (1988, p. 355) are a) Individual or interpersonal: “characteristics of the individual such as knowledge, attitudes, behavior, self-concept, skills, and developmental history”; b) Interpersonal: “Formal and informal social networks and social support systems, including family, work group, and friendship networks”; c) Institutional or organizational: “Social institutions with organizational characteristics and formal (and informal) rules and regulations for operations”; d) Community: “Relationships among organizations, institutions, and informational networks within defined boundaries”; and e) Public policy: “Local, state, national, and
global laws and policies.” The importance of using this model as a framework for interventions is that the levels not only exist, but they are interacting and reinforcing. Thus, Stokols (as cited in Golden & Earp, 2012, p. 364) argued, creating sustainable health improvements are most effective when targeting all levels simultaneously. Examples of each level specific to college student’s weight management will be examined in the results section of the review.

**Methods**

Systematic reviews identify, critically evaluate, and integrate findings of all relevant, high-quality individual studies addressing the research question(s) (Siddaway, n.d). According to Baumeister and Leary, 1997; Bem, 1995; Cooper, 2003 (as cited in Siddaway, n.d), systematic reviews aim to:

- Establish to what extent existing research clarifies a particular problem;
- Identify relations, contradictions, gaps, and inconsistencies in the literature, and explore reasons for these (e.g., by proposing a new conceptualization or theory);
- Formulate general statements or an overarching conceptualization;
- Provide implications for practice and policy;
- Describe directions for future research.

The systematic review conducted in this paper utilized the Matrix Method (Garrard, 2014). The matrix method process is implemented by systematically abstracting information from individual articles, organizing the information into a logical structure known as the matrix, and then interpreting the findings based on the selected framework.
Search and Inclusion Criteria

PubMed and the UF library database were used to identify articles for inclusion in this review. The search terms “college students” or “university students” and “weight management” were entered into the PubMed database, resulting in 669 returned articles. Of these, the titles and abstracts of 52 articles were read in full to examine the population and content of the study. Based on this examination, 19 articles did not meet the inclusion criteria; thus 33 articles were printed and read in full for further examination. Of these, 19 articles met the full inclusion criteria, listed below, and were included in this review. The search terms “college students” or “university students” and “weight management” and “physical activity” or “exercise” and “nutrition” or “diet” and “influences” were entered in the UF library database, returning 2,818 articles when excluding terms: “children,” “animal models,” “children & youth,” “pediatrics,” “middle aged,” “brain,” “child,” “endocrinology & metabolism,” “cancer,” “adolescents,” “biochemistry & molecular biology,” “adolescent,” and “rats.” Within this search, the titles and abstracts of 105 articles were read in full, 20 of which were duplicates of the PubMed search. For further examination, 40 articles were printed and read in full, yielding 5 articles that were included in this review. In total, 24 articles are included in this review.

To be included in this review the reported study had to a) addresses social ecological influences of U.S. college students’ weight management; b) focus on weight management to include either physical activity and nutrition; c) be a peer-reviewed manuscript or article available in the English language; d) be published between January 2007 and June 2017; and e) focus on a population of students attending a four-year
college or university. For the scope of this paper, only four-year colleges and universities were considered due to their traditional aged population of 18-25 years, also known as ‘emerging adulthood’ (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008). Many obesity studies control for demographic variables such as gender, BMI, race, and year in school. Studies including 100% of one race/ethnicity were excluded due to the significant cultural factors that potentially play into health outcomes. On the other hand, since there was an abundance of studies that controlled for gender and year in school variability, studies with subjects that were only freshmen, women, and men were included. Studies including body image or eating disorders, as well as other health factors, like alcohol and stress, were only included if the main objective of the research paper was concerning physical activity and nutrition (e.g., students often included alcohol intake affecting their nutrition intake, but the alcohol variable was not directly studied). While such health issues influence college student’s weight management practices, the complexity of the relationships between such variables was beyond the scope of the review. This literature review was a study on the perceived or actual socioecological influences on student’s weight management strategies, therefore weight management interventions were not included.

Results

In total, 17 articles addressed individual factors, 10 addressed interpersonal factors, 16 addressed community factors, 1 addressed institutional factors, and 6 addressed policy factors. For each level, themes are synthesized and arranged according to the research questions.
Barriers and Facilitators to Healthful Weight Management

A majority of the studies indicated barriers and facilitators for healthful weight management, however, it is clear that what may be considered a barrier for one student is considered a facilitator for another.

**Individual factors.** Individual, or intrapersonal, characteristics include “knowledge, attitudes, behavior, self-concept, skills, and developmental history” (McLeroy et al., 1988). The most prominent themes related to individual differences in college students’ weight management were knowledge, motivation, and self-regulatory skills.

**Knowledge.** Overall, students were able to define benefits of a healthy diet, regular exercise, and weight management, suggesting that students understand these behaviors result in good health (Das & Evans, 2014; Strong, Parks, Anderson, & Davy, 2008; Yahia et al., 2016). However, some students’ knowledge about how to carry out these behaviors healthfully may be lacking (Keating et al., 2010), creating a barrier in their ability to eat a healthful diet and exercise regularly. For example, male students cited eating unhealthful foods to gain weight for the purpose of turning this weight into muscle (LaCaille, Dauner, Krambeer, & Pedersen, 2011). Students also cited engaging in physical activity to compensate for eating unhealthful foods (Cluskey & Grobe, 2009; Walsh, White, & Greaney, 2009). Students also mentioned a lack of knowledge regarding how to shop for and prepare healthful foods (Greaney et al., 2009). On the contrary, some students know what a healthful diet consists of and they know how to improve their physical activity, but knowledge alone was not enough to reflect behavior (Strong et al., 2008). Female students stated a lack of knowledge of how to use machines at the fitness
centers on campus, which dissuaded them from going (LaCaille et al., 2011; Nelson et al., 2009). Female students also indicated they would be more physically active if they knew what classes were offered at the rec center and if they knew how to use equipment (Greaney et al., 2009). Therefore, dietary and physical activity interventions could focus on improving knowledge related to how to eat a healthy diet and the various ways to meet physical activity guidelines, while incorporating mechanisms for how to overcome individual, social and environmental barriers.

**Self-regulatory skills.** Students indicated time management skills and prioritizing other activities as a significant barrier to healthful eating and physical activity (Childers, Haley, & Jahns, 2011; Das & Evans, 2011; LaCaille et al., 2011; Nelson, Kocos, Lytle, & Perry, 2009; Strong et al., 2008; Walsh et al., 2009). Students often choose to complete schoolwork, consume quick unhealthy meals, or sleep instead of engaging in physical activity (Nelson et al., 2009; Childers et al., 2011). Socializing was also prioritized over healthy eating and physical activity (Strong et al., 2011). Some students viewed themselves as having effective time management skills; however, planned exercise is the one of the first things to be eliminated off their schedule when busy (Strong et al., 2008). Students cited that “working out is not difficult when part of a routine but becomes a challenge with other responsibilities, lack of accountability and laziness” (Strong et al., 2008, p. 1713). Students reported that setting a daily plan, tracking or monitoring food intake and exercise facilitated healthy eating and exercise (Greaney et al., 2009; LaCaille et al., 2011; Walsh et al., 2009). Dietary strategies to consume healthful diets such as regulating energy intake, fruit and vegetable intake, planning or tracking was associated with consuming diets lower in fat, added sugars, and sodium, and higher intake of fiber,
fruits, and vegetables (Strong et al., 2008, p. 1711). Students also realized that their healthful habits have decreased since attending college, and indicated a desire to maintain physical health, but have not implemented, planned or tracked exercise and eating (Strong et al., 2008). Thus, students who prioritize healthful eating and physical activity have implemented time management skills successfully. Students lacking self-regulatory skills could benefit from an intervention focusing on time management. The focus of this intervention could emphasize the importance of prioritizing health and how to utilize monitoring and tracking strategies to account for physical activity and healthy eating in their daily schedule.

**Motivation.** In several studies, motivation was indicated as a facilitator for healthful eating and physical activity (Cluskey & Grobe, 2009; Das & Evans, 2014; Greaney et al, 2009; LaCaille et al., 2011; Walsh, et al, 2009). Some students stated having a lack of motivation as a barrier to physical activity and healthful eating (Greaney et al., 2009; LaCaille et al., 2011). Several other studies examined what motivates college students to engage in exercise, as well as the differences in motivators between men and women (Egli, Bland, Melton & Czech, 2011; Lauderdale, Yli-Piipari, Irwin, & Layne, 2015; Nehl et al., 2012; Pauline, 2013). Egli et al. (2011) and Pauline (2013) used the Exercise Motivations Inventory-2 (EMI-2), which is composed of 51 items and 14 subscales (i.e., affiliation, appearance, challenge, competition, enjoyment, health pressures, ill-health avoidance, nimbleness, positive health, revitalization, social recognition, strength and endurance, stress management and weight management), to rank exercise motives from least important to most important. These studies indicate that both intrinsic and extrinsic motivation are important when considering physical activity.
In both studies, women were motivated by appearance, ill-health avoidance and weight management; whereas men tended to be motivated by strength, challenge, endurance, competition, affiliation and social recognition. Tapping into what motivates college students individually may be critical to personal goal setting for improving physical activity levels. Motivation seems not to be a significant barrier eating healthfully, and it is a significant facilitator of physical activity.

**Interpersonal factors.** Interpersonal characteristics refer to the individual’s social networks and support systems. Recent studies suggest obesity is partially a social phenomenon, placing an importance on utilizing social networks in the process or intervention of weight management (Harmon, Forthofer, Bantum, & Nigg, 2016). How an individual perceives their support system and environment, sometimes called social, perceived, or descriptive norms, can influence health behavior regardless if the perception is true (Harmon et al., 2016). Examination of the articles revealed key themes related to interpersonal factors: life transition, social support, peer influence and social norms, including alcohol use.

**Life transition.** The shift from support at home to support in college causes instability in routines and tends to have a negative influence on healthy eating and regular physical activity in college students. Students often had access to healthy, balanced, and structured meal times living at home, as well as structured, planned physical activity (Cluskey & Grobe, 2009; Strong et al., 2008; Walsh et al., 2009). Strong et al. (2008, p. 1712) found that “in high school, students had fewer responsibilities. In college they play fewer organized sports, exercise less, and eat more. They also now sleep more, wake up later, and stay up later.” Students believed this made it more difficult to take up self-
regulation practices and develop stability in their exercise and eating behaviors (Cluskey & Grobe, 2009; Walsh et al., 2009). Students also believed that having a home life where healthy behaviors were emphasized facilitated better health outcomes in college (Cluskey & Grobe, 2009) or they felt like they could only eat healthy at home because of the positive support it provided (Childers et al., 2011). Other students cited unhealthful eating and overconsumption while visiting home, which some students did often (Childers et al., 2011). Overcoming this transition period is a significant barrier for students who lack skills or support for healthy behaviors, especially for those whose healthy behaviors were not cultivated prior to college (Cluskey & Grobe, 2009). Students who had created “stability in their current behaviors spoke of greater independence in establishing active lifestyles and more responsibility for food and meal preparation prior to college” (Cluskey & Grobe, 2009, p.327). Students seem to be heavily influenced by their parents and past lifestyle behaviors and attain the desire to improve physical activity and eating behaviors (Strong et al., 2008), but the lack of family structure and support creates an overwhelming barrier. Developing skills related to independent healthy eating and physical activity would be an important factor in a weight management intervention at the university level, especially for first year students.

**Social support and peer influence.** The influence of friends on weight management was identified to be a barrier and facilitator of healthful eating and exercise behavior (Cluskey & Grobe, 2009; Das & Evans, 2014; Greaney et al., 2009; LaCaille et al., 2011; Strong et al., 2008; Walsh et al., 2009; Yukasheva, Kapinos, & Weiss, 2011). Although social support has not been specifically examined as a predictor of weight gain in college students (LaCaille et al., 2011), Yukasheva et al. (2011) found that the amount...
of weight gained during freshman year is strongly and negatively associated to the roommate’s initial weight, and that women may adopt some of their roommate’s weight loss behaviors, resulting in decreased weight gain. While this is interesting, more research is needed to better understand the reasons for peers’ influence on actual weight gain.

Furthermore, students report unhealthy eating and overconsumption when socializing (Cluskey & Grobe, 2009; Childers et al., 2011; Nelson et al., 2009) and that generally, students eat two or more meals per day with friends (Strong et al., 2008). Students eat in order to socialize, even in the absence of hunger (Childers et al., 2011; Nelson et al., 2009). Students report that avoiding negative influence is a challenge because “someone always wants to go have ice cream or something terrible to eat” (Cluskey & Grobe, 2009, p. 328).

On the contrary, students report increasing their physical activity when friends workout with them because it helps them stay motivated and accountable (Greaney et al., 2009; LaCaille, 2011). Participation in team sports, particularly for men, supports regular physical activity (Das & Evan, 2014; Walsh et al., 2009). Female students reported that friends can also have a positive influence on eating behaviors, citing that friends or roommates making healthy choices prompted them to do so (LaCaille et al. 2011). Men were more likely to indicate that their friend circle negatively influenced eating habits (Das & Evan, 2014). Social support from friends was also positively correlated with daily step count and intake of healthier foods such as fruit, vegetable and fiber, while it was negatively correlated with sedentary activity (Strong et al., 2008). Students also cited the desire to meet new people and expand their social network, and that they would have less
confidence doing so if they didn’t maintain healthy behaviors (Das & Evans, 2014, p. 490-91).

Although not included in this review due to the unknown student status of the young adults population sampled, it is important to address that two studies (Berge, MacLehose, Eisenberg, Laska, & Neumark-Sztainer, 2012; Larson, Laska, Story, & Neumark-Sztainer, 2012, as cited in Harmon et al., 2016) support the identification of the significant others’ role in weight management within this age group. They found associations between increased fruit and vegetable intake and physical activity among young adults whose significant other had positive healthy attitude.

Overall, the influence of social networks and social support on college students’ weight management behaviors is understudied. Including college students’ relevant social networks in improving physical activity and healthy eating could be efficacious if students are held accountable together.

**Social norms.** Social norm is the construct that suggests people behave the way they perceive others to behave (Okun et al., 2003, as cited in Strong et al., 2008). The perception that others were engaging in physical activity around them was associated with less time spent in sedentary behaviors (Shaffer, Bopp, Papilia, Sims, & Bopp, 2017). Shaffer et al. (2017) examined the relationship of neighborhood and living environment with behavioral (physical activity and sedentary behavior) and fitness outcomes by sex. Perception of others’ physical activity was significantly related to students' engagement in physical activity. Males seeing or perceiving others exercising, either in their neighborhood or apartment complex, was associated with a greater number of push-ups, lower cholesterol and active travel. For women, seeing or perceiving others to be active
was associated with curl-ups, moderate and vigorous physical activity, and total cholesterol (p. 337).

Nelson et al. (2009) discovered that some students observed weight gain of others after they had attended college, and they cited not wanting weight gain to happen to them. Others displayed no concern of weight gain, although they acknowledged awareness of the concept of the “Freshman 15”. The concept of gaining weight as a freshman is a social norm that could prevent students from engaging in unhealthy behaviors. Normalizing regular physical activity and healthful eating could have a positive impact on weight management strategies within the college student population. Strong et al. (2008) describes that health behavior messages could aim to influence social norms within students' social network, rather than the campus itself, in order to target individual change.

*Alcohol use.* While alcohol was not directly studied, students mentioned the role of alcohol use as a barrier to healthful eating (Childers et al., 2011; Greaney et al., 2009; Nelson et al., 2009; Strong et al., 2008). Drinking behaviors were almost always associated with socializing or partying. Drinking large quantities of alcohol induced "drunk eating," a term used to describe eating fattening food while intoxicated (Greaney et al., 2009). Some students reported consuming “like 5 times more calories than we would if we didn’t drink anyway” because they would eat before going out and then eat again after going out, usually a high calorie food such as pizza or fast food (Nelson et al., 2009, p. 289). Although it is unclear of how much drinking episodes affect weight management in this current study, this theme would be important to address in an intervention for college students.
Institutional. Institutional characteristics are “social institutions with organizational characteristics and formal (and informal) rules and regulations for operations” (McLeroy et al., 1988).

Oswalt, Lederer, and Schrader (2015) examined six institutional characteristics (public versus private, region, religious affiliation, campus size, community size, and Carnegie classification) and their association with health behavior and outcomes among college students. Students in the Midwest region had the highest number of fruit and vegetable intake. Participants at school with a campus size less than 2,500, a community size of less than 10,000, or classified as baccalaureate, had the most rates of both PA and fruit and vegetable consumption. Students at private schools, schools in the Northeast, and research institutions had significantly better weight status than their counterparts (Oswalt et al., 2015, p. 479).

Community. Community influences are the “relationships among organizations, institutions, and informational networks within defined boundaries” (McLeroy et al., 1988). Themes at the community level related to students’ weight management were living arrangements, the food environment and the physical activity environment.

Living arrangements. Students’ eating and physical activity behaviors were influenced by their living situation, with differences shown between on-campus housing and off-campus housing (Brunt & Rhee, 2008; Kapinos & Yakusheva, 2011; Peachey & Baller, 2015; Small, Bailey-Davis, Morgan, & Maggs, 2013).

Brunt and Rhee (2008) investigated dietary variety in relation to college student residency: on campus, off campus, or living with parents. Compared to students who lived off campus, those who lived on campus consumed a wider variety of fruits,
vegetables, fruits and vegetables combined, dairy products and grains. Small et al. (2013) found that students’ consumption of fruits and vegetables declined from their first semester to their seventh semester. Almost all students lived on campus their first semester, yet by their seventh semester, 71% were living off campus. Compared to when students lived on campus, they consumed fruits and vegetables on 7% fewer occasions each day and engaged in moderate to vigorous activity 30 minutes or more on 21% fewer occasions living off campus. These findings suggest that living off campus can worsen dietary intake and decrease physical activity levels.

For on campus first-year students, access to dining halls and cafeterias plays a role, too. Kapinos and Yakusheva (2011) examined whether there were weight-related behaviors and weight gain differences among first year students associated with the presence of an on-site cafeteria in their dorm halls. Female students living in a dorm with an on-site dining hall weighed .85kg more and exercised less in the spring than those living in a dorm without a dining hall. Male students living in a dorm with an on-site dining hall reported having more snacks and meals than males who did not. Additionally, dorm room characteristics were described as unsuitable for cooking healthy meals due to storage issues and lack of kitchen equipment (LaCaille et al., 2011, Nelson et al., 2009; Strong et al., 2008). Although this raises a potential concern for students living on campus, no studies compared characteristics of off campus housing that would make it easier to prepare and store healthy foods. While living off campus has been shown to significantly decrease healthy eating for college students, living on campus may make foods more accessible. Considering living arrangements, individual differences may make an impact to whether students choose to eat healthy or have access to healthful
foods. For example, some students indicated a liking towards grocery shopping and cooking for themselves, where others indicated that moving off campus increased purchase of convenience foods (LaCaille et al., 2011).

Additionally, location of residency appears to be associated with physical activity levels. Peachey and Baller (2015) identified differences in neighborhood environment and their association with physical activity levels of on campus compared with off campus students. Moving from on campus to off campus may produce barriers to active transportation and a subsequent decrease in physical activity (p. 339). Leisure physical activity and active transportation were significantly lower among off campus students and the total physical activity level of off campus students was lower than that of on-campus students (p. 340).

**Physical activity environment.** Aspects of the physical activity environment that increase physical activity are walkability, access to exercise facilities, parks, and trails; and low crime (Bell et al., 2008; Ewing et al., 2006; Franzini et al., 2009; Sallis et al., 1998, as cited in Kapinos et al., 2014). Kapinos and Yukasheva (2011) and Kapinos et al. (2014) examined gym proximity to freshmen students’ dorm rooms in relation to their weight related behaviors. Kapinos et al. (2011) found that female students who lived farther from central campus reported greater exercise per week, but female students who lived farther from campus gyms reported exercising less. However, Kapinos and Yukasheva (2011) found no effect on exercise behaviors in males or females.

For off campus students, the proximity is also an issue. Schaffer et al. (2017) found that college students’ physical activity was associated with the support of their physical environment, mostly the resources available at their apartment complex. The
perception that one’s apartment complex offers physical activity resources was negatively associated with weekend sitting time for men, and greater physical activity for women. For women, the number of reported sidewalks was negatively associated with weekday sit time (p. 337).

Students reported having access, diverse options and support for physical activity opportunities on campus, which students perceived to be a facilitator of physical activity (Boyle & LaRose, 2008; Cluskey & Grobe, 2009; Greaney et al., 2009; LaCaille et al., 2011; Peachey & Baller, 2015; Strong et al., 2008; Walsh et al., 2009). Students reported that maintaining a healthful weight is “easy” because parking shortages forced them to walk/bike from their homes/dorms to class (Greaney et al., p. 284). Additionally, compared to off campus residents, on campus residents reported more active transportation and leisure time physical activity (Peachey & Baller, 2015).

Boyle and LaRose (2008) found that among overweight students, greater satisfaction with physical activity services on campus was associated with greater physical activity. Male students reported enjoying the intramural or team sports that their university has to offer (Greaney et al., 2009; Walsh et al., 2009), while some students mentioned being confused by how to get involved in intramurals (Nelson et al., 2009). Some students reported needing closer access to the on campus recreation center (Das & Evans, 2014) and that facilities can become overcrowded (Das & Evans, 2014; LaCaille et al., 2011; Nelson et al., 2009).

**Food environment.** A majority of the studies indicated that the university food environment, including restaurants and shops near or on campus, was one that made unhealthy food accessible and abundant (Childers et al., 2011; Cluskey & Grobe, 2009;
Students reported cost being a barrier to eating healthy, so cheaper food, such as fast food, was consumed more often than healthier foods (Childers et al., 2011; Cluskey & Grobe, 2008; Greaney et al., 2009; Nelson et al., 2009). Students cited that cheap deals for items, such as pizza, were marketed towards college students (Nelson et al., 2009). Lack of nearby grocery stores (Greaney et al., 2009; Nelson et al., 2009) and access to convenience stores located near dorms (Nelson et al., 2009) increased purchasing of convenience foods for students. Kapinos, Yakusheva, and Eisenberg (2014) found that among women, decreased access to campus dining and increased access to grocery stores resulted in less weight gain over the course of one year. Women living in dorms where the nearest campus dining facility was closed on the weekends gained one pound less over the course of a year. Non-significant weight changes were found in men.

Characteristics of all-you-can-eat style dining halls (Cluskey & Grobe, 2008; LaCaille et al., 2011; Nelson et al., 2009) was reported as a barrier to eating healthy due to the availability of many options, resulting in overconsumption. In one study, a student cited that “so many good tasting foods resulted in decreased self-control” (LaCaille et al., 2011, p. 534). It was also mentioned that some dining halls are a-la-carte style, so students would have to wait in line for certain foods, specifically healthier options (Strong et al., 2008). Students reported that the way some foods were prepared on campus were unappetizing, especially vegetables or vegetarian options (Childers et al., 2011). Lack of nutrition labels created difficulty for students to know what they were eating (Nelson et al., 2009) and hours of operation seem to be a barrier for some students (Childers et al., 2011).
On the contrary, some students believe campus dining provides a variety of healthful options (Greaney et al., 2009; Strong et al., 2008) and students reported that their meal plan for the dining halls made healthy eating affordable (Strong et al., 2008). Evidently, the availability of unhealthy options across campuses created a significant barrier for students’ weight management, especially first year students who live in dorm rooms and have meal plans. While on-campus dining may be convenient and offer healthy foods for students, challenging barriers exist that may need to be addressed at a policy level.

**Policy.** Universities can shape the culture of health on campus by promoting or discouraging certain behaviors via regulated campus policies. Only one study directly measured the outcomes of policy, and it was related to health advertising on campus. The other studies mentioned policies for first year students to live on campus and/or purchase a meal plan, but did not study the effect of these policies.

**On-campus housing and dining.** First year students in some of the studies were required by universities to live in on campus dormitories (Kapinos & Yukasheva, 2011; Small et al., 2013; Yukasheva et al., 2011). Living in a dorm with limited access to facilities where meals can be made is a challenge to healthy eating presented in the current literature.

Students living on campus in dormitories are often required to purchase a meal plan to the on-campus dining facilities (LaCaille et al., 2011; Small et al., 2013). As described above, dining halls may pose many significant barriers for students to make healthy choices. Students who have meal plans feel pressured to get their “money’s worth” (LaCaille et al., 2011, p. 534). Dining halls seem to lack policies for point-of-
purchase nutrition labels (Nelson et al., 2009) and regulation for unhealthy, processed, or convenience foods. Students are aware of nutrition labels, use them for purchasing items and pay attention to the caloric and fat content (Kolodinsky, Green, Michahelles, & Harvey-Berino, 2008). If policies for purchasing a meal plan and living on campus are in place, universities should address the barriers to healthy eating that students face when eating on campus by establishing food service policies such as nutritional labeling, the regulation of sweets, convenience and processed foods, and number of fast food restaurants in proximity to the university. On campus housing could establish policies for full kitchens and access to cooking equipment. They could also include on-site facilities designated specifically for physical activity such as exercise rooms.

**Health advertising and regulation.** Several universities may lack policies for health advertising, especially for promoting and encouraging positive physical activity and eating behavior (Szymona et al., 2012). Szymona et al. (2012) studied the health-related advertising environment and policies on 10 university campuses. A health-related advertisement was considered as anything that promoted a specific health behavior that could result in behavior change. None of the universities had policies related to healthy food options at campus functions, only 20% of universities had policies for having food labels at point of purchase and only 60% had healthy food available by campus food services. All on-campus exercise/fitness advertisements were positive even though only one university had a written policy on promoting physical activity (Szymona et al., 2012, p. 501). Diet/nutrition and physical activity were the top two most frequently observed health-related advertisements. Overall, it seems that universities lack policies for promotion of physical activity and healthful eating.
Student Perspectives on Weight Management

The second research question aims to describe college students’ perspectives on weight management. Themes of students’ perspectives were about their weight goals, weight concerns and suggestions for interventions.

Weight goals and concerns. When students were asked to identify goals for the semester, the most frequently cited goals were 1) improving or maintaining academic standing, 2) being healthy, including increasing physical activity and/or improving diet, 3) maintaining or developing an active social life and 4) gaining, losing or maintaining weight (Greaney et al., 2009, p.283).

Men and women often differentiated in their weight goals (Cluskey & Grobe, 2009; Greaney et al., 2009; LaCaille et al., 2011). Men spoke of weight concerns and weight management strategies less than women (Cluskey & Grobe, 2009). This could be because men reported that they want to “bulk up” or gain weight for the purpose of “turning it into muscle” (Greaney et al., 2009; LaCaille et al., 2011), whereas women spoke about wanting to “tone” and cited a fear of “getting fat” (Greaney et al., 2009, p. 283). Although several female students indicated they wanted to maintain their weight, they were more likely to mention losing weight as a goal, typically 5-20 pounds (Greaney et al., 2009, p. 283).

Some studies indicated that students, in general, do have concerns about weight changes during the first year of college (Childers et al., 2011; LaCaille et al., 2011). Specifically, LaCaille et al. (2011, p. 533) found that students experienced a pattern of weight fluctuations during their first year at college, as well as subsequent years for those students further along in their college experience. Two studies mentioned students
wanting to avoid the “Freshman 15” (Childers et al., 2011; LaCaille et al., 2011), while students in another study (Nelson et al., 2009) recognized the concept but did not seem concerned about their weight.

At least one study indicated that students may not correctly perceive their weight status. Boyle and LaRose (2009) found that in their sample, 40% of students were considered overweight and obese, yet only 51% of those students reported that they viewed themselves as overweight. The BMI data was self-reported and while some students fall into the overweight or obese category, they may have higher muscle mass. However, students’ perceived severity of their weight status could be an important factor in their participation of physical activity and healthful eating.

**Suggested interventions.** Students suggested various ways that the university could incorporate interventions or promotion strategies for increasing physical activity and improving diet (Das & Evans, 2014; Greaney et al., 2009). When students were asked what techniques would motivate them to be physically active and eat right, students responded that they would like to see 1) increased use of social support and social media to encourage healthy lifestyles; 2) the use of incentives to promote behavior change; and 3) the inclusion of a weight management course in the university curriculum (Das & Evans, 2014, p. 492). These suggestions provide critical insight about what strategies appeal most to college students. Also, students indicated they would need more time to be physically active, as academic responsibilities and coursework made it difficult to exercise (Greaney et al., 2009).
Discussion

This study sought to identify the influences on college students’ weight management using the social ecological model as a framework. The purpose of incorporating all levels of the social ecological model was to emphasize the nature of how individual, social and environmental characteristics interact to influence health perceptions and outcomes. The findings of this study emphasize the need for improving interventions at all levels and the need to implement multi-level interventions.

Individual

Studies appear to indicate that students lack the time management skills necessary to cultivate positive, healthy habits related to physical activity and eating behaviors. Students reported that to improve physical activity levels and healthy eating, they would need more time, since their time is spent with academic and work obligations. This provides support for a time management course at the university, focusing on healthy lifestyles. Furthermore, students deprioritize physical activity and nutrition compared to studying and socializing. If interventions are to be successful, it seems they will need to incorporate a segment about how to prioritize health and schedule time for healthy activities between other obligations. Teaching self-regulatory skills can be built into these time management courses to offer techniques to students, such as tracking diet and exercise. Lack of skills in regard to healthy eating and physical activity, such as cooking and using gym equipment, should be addressed at the university level. The university could provide a first year wellness course for students to learn independent skills related to weight management. Based on students’ goals for the semester, improving health, diet, and exercise levels are important to them. This indicates that students have the
desire to improve behaviors, but may lack skills and a sense of motivation to carry them out. Thus, it would be important to address motivational factors in men and women when considering weight management interventions. Studies show exercise motivator differences between women and men. Women may be more motivated by ill-health avoidance and appearance, while men are motivated by factors such as strength and challenge. When assessing students, it would be necessary to identify what motivates individuals because the presence of motivation was described to be the main facilitator of physical activity.

**Interpersonal**

Students find the social aspect of their lives to both facilitate and act as a barrier to physical activity and healthy eating. Students struggle with developing stability in their everyday routines in college, avoiding negative influences from friends, and drinking alcohol. Students also reported that social support facilitates regular physical activity, making healthier food choices, and helping them stay accountable to their goals. An intervention incorporating the social transition of students’ lives would need to teach independent skills related to eating and physical activity. Interventions could also incorporate the role of friends by holding educational group courses on the topic of healthful weight management. Social norms could be influenced through social media. For example, the recreational center could post and share photos of diverse students performing workouts or the dining hall could advertise healthy menu items.

**Community**

Findings from this review reveal that there are several differences between college students living on and off campus. Living on campus is commonly associated
with owning a meal plan for on campus dining halls, which can provide an abundance of unhealthy food options. Students living on campus explained that dorms are not well suited for preparation and storage of healthful foods, making convenience foods easier to eat more often. On the other hand, living off campus has been associated with purchasing convenience foods and reduced physical activity. The contradictory findings between students who live on and off campus, in relation to weight management strategies, displays the significant interaction between the individual and the environment. Individual differences (e.g., cooking skills or nutrition beliefs) or environmental factors (e.g., access to healthful grocery stores) may moderate the association between living situation and weight management among college students (LaCaille et al., 2011, p. 536). Off campus built environment structures seem to be just as important as the on campus environment for increasing physical activity, when considering students who live off campus. University campuses could partner with municipal leaders and developers of off campus student housing to integrate planning efforts that are focused on creating an environment conducive to physical activity and healthful eating.

There are contradictory findings about campus dining facilities and how they influence college students’ eating behaviors. Most tend to believe that the all-you-can eat style of U. S. dining halls promotes over consumption and higher intake of unhealthy foods. Others contend that the dining halls improve nutrition outcomes because students have access to a variety of healthy options and the meal plans make it affordable. Meal plans and on campus dining halls are meant to make students’ transition to college easier, providing students with prepared food that is ready to eat when they need it. It appears that this solution for students’ eating behavior may actually worsen nutrition because
students perceived the food environment on campus to be one that made unhealthy food readily available. More work can be done to improve the conditions and characteristics of dining halls and on campus dining to make healthy eating more accessible to students. Additionally, students indicated that cost, convenience, and availability of unhealthy foods are significant barriers to eating healthy. Improvements to on campus dining and restaurants could be the addition of nutrition labeling on all point of purchase items, the regulation of sweet, processed, and salty snacks, and lowered prices for healthy foods.

Access to a variety of physical activity opportunities on campus increased college student’s participation in physical activity. Thus, it’s important that universities consider these factors and resources when planning for a healthy campus environment. Additional structures such as sidewalks, streetlamps, biking lanes, bike repair shops, neat landscapes, and facilities within walking and biking distances influence walkability and bikeability outcomes (Peachey & Baller, 2015).

Universities often have plentiful resources such as recreational and fitness centers, intramural and team sports, and a geographical layout designed for walking and biking. While this environment is in place, universities should focus on promoting physical activity and associated opportunities, while also making them accessible to students. Some students are unaware of recreational resources, they perceive facilities to be crowded, and they may have limited transportation to facilities. A weight management intervention that could be incorporated into universities is the introduction of facilities via a demo class with small groups of students, and a specific class for women students wanting to learn more about using gym equipment. A promotion strategy could be the creation of campus maps with routes students’ can take from various locations to get to
Institutional

One study examined physical activity and dietary intake based on institutional characteristics. The findings were hard to generalize, seeing that the data was used from multiple university settings across the U.S. More research on this area would be interesting to study to understand if characteristics, like population size, have an influence on weight management.

Policy

University level policies that promote physical activity and healthy diets seem to be scarce, or are understudied. Policies related to on campus dorms and meal plans appear to be the most influential on college students’ weight management. Dorm rooms and meal plans have a set of environmental characteristics, such as partial kitchens and all you can eat buffets, are not typically found on off campus apartments or houses. Students who are required to live in dorms or have meal plans may be disadvantaged compared to those who choose where they live the first year in college. If these policies are in effect, campus stakeholders should closely evaluate how they affect students’ health on their campus.

Implications for Practice and Research

Much work that has studied college students’ weight management has focused on biological and psychosocial characteristics such as gender, sex, age, motivation, beliefs, weight goals, and weight perceptions. Weight gain during freshman year and across semesters has also received considerable focus. While research has established that individual characteristics are significant to weight management, there is little concrete
knowledge about how the environmental characteristics influence weight gain and weight management among this population. In this review, it was found that environmental levels—institutional, community and policy interact and overlap with individual and social levels. If students have access to eat healthy food on campus and have opportunities to engage in physical activity, the individual’s motivation and self-efficacy may hinder them from engaging in these behaviors. Students’ social networks also influence whether or not they engage in physical activity and healthy eating, even when they have the environmental support and individual resources to make healthy decisions. The finding that all levels are interacting and reinforcing provide opportunities for campus departments to collaborate to effectively address multiple levels of the social ecological model. Particularly, those who could work together include recreational centers, health promotion departments, student housing, and campus food services.

Obesity research on social interactions, the built environment, and macro-level policies has been more widely studied in adolescent and adult populations. Obesity research focusing on the physical environment has investigated the role of the proximity, density, selection of healthy foods and eating facilities, and aspects of the built environment, such as “walkability”; access to exercise facilities; urbanization; and crime. Much of this work has found significant associations between characteristics of the physical environment and obesity (Kapinos & Yakusheva, 2011). Yet more research on the built environment of college student’s residencies, physical activity environments, and food environments is needed and is critical to understanding the interactions that may influence weight management and weight gain. More qualitative research should be
conducted to understand the “why” of how the environmental characteristics influence students’ weight management behaviors.

From this literature review, it is evident that several universities are lacking policies related to physical activity and nutrition outcomes for students. One study showed that across 10 universities, physical activity and nutrition advertising were the most frequent health-related advertisements found. They also found that campuses lack policies related to the content of advertising and promotion of healthy behaviors, which could be an area for further investigation. More research on the effects of dorm room and meal plan policies are needed, since studies addressed these policies, but did not study them in relation to weight related behaviors. Studying health outcomes, such as physical activity levels and healthy eating patterns, and their association with policies related to on campus housing and meal plans could provide further insight of the policies’ influences on weight management.

**Limitations**

It is important to address that this review has multiple limitations. First, several studies had differing inclusion criteria. The majority of study subjects were first-year or freshman students. Studies that did include sophomores, juniors or seniors were limited in sample sizes. Students’ individual, social and environmental characteristics may change significantly over the course of their college experience, so it would be important to include students of all years on future weight management studies. Some studies specifically included students majoring in health, wellness, and science related coursework, while others studies excluded these students. Students with a background in health related coursework may have different perspectives and behaviors than those without. The studies had a range of sample sizes and small sample sizes hinder
generalizability. A majority of students in these studies were white and differences between race/ethnicity in regards to weight management can be significant. The included studies also had varying definitions of physical activity, exercise, healthful eating, diet, and nutrition. Another limitation is that there was only one institutional level study. Thus, that area is underexplored and the findings, particularly at that level, may not be generalizable.

In addition, students and campuses have individual needs, and the unique differences between them can influence weight management strategies. Differences in geographical location, such as the climate, may influence physical activity outcomes. Thus, generalizability of findings on university campuses and their students from this study is limited. However, critical information about the social ecological influences college students’ experience has been uncovered. More research and collaboration using the social ecological model as a framework is suggested and needed to target the various levels that influence weight management.
References


SOCIOECOLOGICAL INFLUENCES OF STUDENTS’ WEIGHT


https://doi.org/10.1108/09654281211275845


Table 1. Literature Matrix

<table>
<thead>
<tr>
<th>Author, Title, Journal</th>
<th>Year</th>
<th>Study Design</th>
<th>Purpose</th>
<th>Significant Results</th>
<th>Ecological Influences</th>
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</thead>
<tbody>
<tr>
<td>Brunt &amp; Rhee. Obesity and lifestyle in U.S. college students related to living arrangements. Appetite.</td>
<td>2008</td>
<td>Cross-sectional</td>
<td>To determine if living arrangements (on campus, off campus or living with parents) influence dietary variety and other health behaviors.</td>
<td>Students who lived on campus consumed a variety of fruits, vegetables, and dairy products. There were no significant differences in variety of meats, meat alternatives, or snacks between the three groups.</td>
<td>Community</td>
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<tr>
<td>Strong et al. Weight Gain Prevention: Identifying Theory-Based Targets for Health Behavior Change in Young Adults. Journal of American Dietetic Association.</td>
<td>2008</td>
<td>Quantitative Qualitative</td>
<td>To identify potential targets to improve health behaviors in college students through investigating physical activity and dietary habits related to body weight.</td>
<td>Healthful eating and physical activity were not considered high priorities, despite having time for them. Having exercise self-efficacy, positive outcomes expectations and having the desire to eat healthfully exercise were facilitators. Social support was important to physical activity and healthful eating. Students reported significant differences between high school and college environment.</td>
<td>Individual Interpersonal Community</td>
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<tr>
<td>Walsh et al. Using focus</td>
<td>2009</td>
<td>Qualitative</td>
<td>To explore how men view weight</td>
<td>Mainly individual and</td>
<td>Individual Interpersonal</td>
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<td>Reference</td>
<td>Methodology</td>
<td>Study Design</td>
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<tr>
<td>Greaney et al. College Students’ Barriers and Enablers for Healthful Weight Management: A Qualitative Study. Journal of Nutrition Education Behavior. 2009</td>
<td>Qualitative Focus groups</td>
<td>To identify barriers and enablers for healthful weight management among college students.</td>
<td>Men and women cited the same barriers to weight management. Similar enablers were also identified. More barriers than enablers were given, indicating that these college students were more sensitive to barriers than the enablers for weight management.</td>
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<tr>
<td>Boyle &amp; LaRose. Personal Beliefs, the Environment and College Students’ Exercise and Eating Behaviors. American Journal of Health Studies. 2009</td>
<td>Quantitative</td>
<td>To examine the roles of personal beliefs and environmental perceptions in determining students’ levels of physical activity and dietary behaviors.</td>
<td>Students who were overweight tended to be older, live off-campus, and more likely to be male. Greater confidence was associated with higher levels of physical activity and dietary wellness.</td>
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<tr>
<td>Nelson et al. Understanding the Perceived Determinants of Weight-related Behaviors in Late Adolescence: A Qualitative Analysis among College Youth. Journal of</td>
<td>Qualitative</td>
<td>To understand weight, dietary intake, and physical activity among college students and to identify key modifiable factors underlying these health behaviors.</td>
<td>Key themes related to barriers of healthy eating and physical activity were revealed such as availability of unhealthy foods on campus, the buffet style dining halls, dorm room</td>
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<tr>
<td>Title</td>
<td>Year</td>
<td>Study Design</td>
<td>Methodology</td>
<td>Findings</td>
<td>Context</td>
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<tr>
<td>Cluskey, M. &amp; Grobe, D. <em>College Weight Gain and Behavior Transitions: Male and Female Differences.</em> Journal of the American Dietetic Association.</td>
<td>2009</td>
<td>Quantitative Qualitative</td>
<td>To explore sex differences in the perceived influences of eating and exercise behaviors in the transition during college to identify relationships and behavior patterns.</td>
<td>Students enter college with established eating and exercise patterns, making the transition to college environment difficult. Most agreed intrinsic motivation was needed for both behaviors. Peers both help and hinder behaviors. Males were less concerned about weight and detailed fewer weight management strategies.</td>
<td>Individual Interpersonal Community</td>
</tr>
<tr>
<td>Keating et al. <em>Health-Related Fitness Knowledge and Its Relation to College Student Physical Activity.</em> Journal of Research in Health, Physical Education.</td>
<td>2010</td>
<td>Quantitative Correlational</td>
<td>To examine health-related fitness (HRF) knowledge and its relationship to physical activity.</td>
<td>Students did not have an adequate amount of HRF knowledge and this was not correlated to physical activity. There were no gender differences in HRF or class standing, but race differences did appear.</td>
<td>Individual</td>
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<tr>
<td>Yakusheva et al. <em>Peer effects and the</em></td>
<td>2011</td>
<td>Quantitative Observational</td>
<td>To investigate the importance of peer effects in</td>
<td>The amount of weight gained is strongly and</td>
<td>Interpersonal Community</td>
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<td>Source</td>
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<td>Design</td>
<td>Description</td>
<td>Findings</td>
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<tr>
<td>Kapinos &amp; Yakusheva. Environmental Influences on Young Adult Weight Gain: Evidence From a Natural Experiment. Journal of Adolescent Health.</td>
<td>To examine whether there were weight-related behavior and weight gain differences among first year students randomly assigned to dormitories and whether these differences were linked to three dormitory characteristics.</td>
<td>Students assigned to dorms with on-site dining halls gained more weight compared to students assigned to dorms without on-site dining halls. Gender differences were observed.</td>
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<tr>
<td>Childers et al. Insights into University Freshman Weight Issues and How They Make Decisions About Eating. The Journal of Consumer Affairs.</td>
<td>To understand the day-to-day lives of freshmen and how freshmen make food decisions within the context of their daily lives, looking at internal and external factors.</td>
<td>Students are generally knowledgeable about unhealthy and healthy foods. Eating behaviors are influenced by students’ emotions and beliefs, social networks, and physical environment. There are gender differences for weight goals.</td>
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<tr>
<td>LaCaille, et al. Psychosocial and Environmental Determinants of Eating Behaviors, Physical Activity, and Weight Change</td>
<td>To identify factors that college students perceived as contributing to healthy and unhealthy eating patterns, physical activity levels, and weight change.</td>
<td>The focus groups revealed that eating and physical activity behaviors appear to be determined by a complex interaction between the individual and</td>
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Community Policy

Individual Interpersonal Community Policy
<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Study Design</th>
<th>Research Question</th>
<th>Findings</th>
<th>Type</th>
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<tbody>
<tr>
<td>Among College Students: A Qualitative Analysis. Journal of American College Health.</td>
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<td>the social and physical environment comprising college life. Moreover, there appear to be gender differences in how these determinants impact behavior.</td>
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<tr>
<td>Egli et al.</td>
<td>2011</td>
<td>Cross-sectional</td>
<td>To examine differences in exercise motivation between age, sex, and race for college students.</td>
<td>Significant differences between demographics were found.</td>
<td>Individual</td>
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<tr>
<td>Szymona et al.</td>
<td>2012</td>
<td>Quantitative</td>
<td>To assess the health-related advertising environment and associated policies on university campuses.</td>
<td>Majority of health-related advertisements were focused on nutrition/diet and physical activity/exercise messages. Majority of universities lack policies related to physical activity and nutrition such as foods served at campus functions and point of purchase food labeling.</td>
<td>Community Policy</td>
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<tr>
<td>Nehl et al.</td>
<td>2012</td>
<td>Quantitative Correlational</td>
<td>To evaluate constructs from Social Cognitive Theory (SCT) by ethnicity and gender to explain differences in physical activity.</td>
<td>Self-efficacy and self-regulation were significant predictors of physical activity for both ethnic groups and both genders. Physical activity was</td>
<td>Individual</td>
</tr>
</tbody>
</table>
### Cognitive Theory


Statistically moderated by gender, but not by ethnicity, for perceptions of available physical activity facilities, with a stronger association for females.

### Pauline, J.

*Physical Activity Behaviors, Motivation, and Self-Efficacy among College Students.*

*College Student Journal.*

To attain baseline physical activity behaviors, motivation factors, and self-efficacy levels of college students.

Women were more motivated by factors such as appearance, positive health, and stress management. Males were more motivated by challenge, strength, and social recognition. Males also reported higher levels of coping and scheduling self-efficacy for physical activity.

### Small et al.

*Changes in Eating and Physical Activity Behaviors Across Seven Semesters of College: Living On or Off Campus Matters.*

*Health Education & Behavior.*

To describe key eating and physical activity behaviors among college students across seven semesters, explore changes in these behaviors, and explore how living on or off campus is associated with these patterns.

Few college students consumed fruits and vegetables or exercised at optimal levels during the seven semesters. Consumption and activity patterns declined from the first to seventh semester, and living off campus exacerbated this pattern.

### Das & Evans.

*Understanding Weight Management Perceptions in College Students.*

To examine weight management barriers using the

College students recognize benefits to weight management beyond physical

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
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<th>Objective</th>
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<td>Cognitive Theory</td>
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<td>Pauline, J.</td>
<td>2013</td>
<td>Cross-sectional</td>
<td>To attain baseline physical activity behaviors, motivation factors, and self-efficacy levels of college students.</td>
<td>Women were more motivated by factors such as appearance, positive health, and stress management. Males were more motivated by challenge, strength, and social recognition. Males also reported higher levels of coping and scheduling self-efficacy for physical activity.</td>
<td>Individual</td>
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<tr>
<td>Small et al.</td>
<td>2013</td>
<td>Cross-sectional</td>
<td>To describe key eating and physical activity behaviors among college students across seven semesters, explore changes in these behaviors, and explore how living on or off campus is associated with these patterns.</td>
<td>Few college students consumed fruits and vegetables or exercised at optimal levels during the seven semesters. Consumption and activity patterns declined from the first to seventh semester, and living off campus exacerbated this pattern.</td>
<td>Individual Community Policy</td>
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<tr>
<td>Das &amp; Evans.</td>
<td>2014</td>
<td>Qualitative</td>
<td>To examine weight management barriers using the</td>
<td>College students recognize benefits to weight management beyond physical</td>
<td>Individual Interpersonal Community</td>
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<tr>
<td><strong>First-Year College Students Using the Health Belief Model (HBM).</strong></td>
<td><strong>Health Belief Model (HBM).</strong></td>
<td><strong>attractiveness, including social and mental health. Men believed they had external barriers and women tended to believe their barriers were internal.</strong></td>
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<tr>
<td>Kapinos et al.</td>
<td>Cross-sectional</td>
<td>To investigate the influence of obesogenic environments on weight gain and physical activity.</td>
<td>Significant effects in weight changes were found in regards to the food environment for females.</td>
<td>Community</td>
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<td>2014</td>
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<tr>
<td>Yahia et al.</td>
<td>Cross-sectional</td>
<td>To assess weight status, dietary habits, physical activity, dietary beliefs, and nutrition knowledge among college students.</td>
<td>Student’s knowledge of healthy and unhealthy diets, nutritional knowledge and physical activity are areas needing improvements.</td>
<td>Individual</td>
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<tr>
<td>Oswalt et al.</td>
<td>Cross-sectional</td>
<td>To examine whether 6 institutional characteristics were associated with health behavior and outcomes.</td>
<td>Weight status, fruit and vegetable intake, and physical activity levels differed among characteristics.</td>
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<tr>
<td>Peachey &amp; Baller.</td>
<td>Cross-sectional</td>
<td>To identify differences in neighborhood</td>
<td>The on campus environment promotes</td>
<td>Community</td>
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<td>Lauderdale et al. Gender Differences Regarding Motivation for Physical Activity Among College Students: A Self-Determination Approach. The Physical Educator.</td>
<td>2015</td>
<td>Correlational</td>
<td>To investigate the relationships between college students’ exercise motivation and weekly physical activity participation</td>
<td>Males reported higher levels of intrinsic motivation associated with physical activity than females. Students who were more physically active had higher rates of intrinsic motivation.</td>
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<tr>
<td>Shaffer et al. The Relationship of Living Environment with Behavioral and Fitness Outcomes by Sex: an Exploratory Study in College-aged Students. International Journal of Exercise Science.</td>
<td>2017</td>
<td>Quantitative</td>
<td>To examine the relationship of neighborhood and living environment with behavioral (physical activity and sedentary behavior) and fitness outcomes by sex.</td>
<td>Among participants environment was significantly related to physical activity and fitness, with noted differences by sex.</td>
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