Self-Efficacy and Dietary Behaviors in University Students With High and Low Perceived Stress

Jerome Kotecki, HSD[1*], Maurita Greene, BS[2], Jay Kandiah, PhD, RD[3], Jagdish Khubchandani, PhD[4*]

[*1]Professor of Health Science, Department of Nutrition and Health Science, College of Health, Ball State University, Muncie, IN 47306, United States of America (USA).

[2]Health Education and Promotion Intern, Employee Wellness Program, College of Health, Ball State University, Muncie, IN 47306, USA.

[3]Professor of Nutrition and Dietetics, Department of Nutrition and Health Science, College of Health, Ball State University, Muncie, IN 47306, USA.

[*4]Professor of Health Science, Department of Nutrition and Health Science, College of Health, Ball State University, Muncie, IN 47306, USA.

RESEARCH

Please cite this paper as: Kotecki J, Greene M, Kandiah J, Khubchandani J. Self-efficacy and dietary behaviors in university students with high and low perceived stress. Journal of Food & Nutritional Sciences [2020] 2(1): 19-28.

***Corresponding Author:**

Dr. Jerome Kotecki, HSD,

Professor of Health Science, Department of Nutrition and Health Science, College of Health, Ball State University, Muncie, IN 47306, USA, E-mail: jkotecki@bsu.edu

ABSTRACT

Objective: Given the rise in noncommunicable chronic diseases, understanding the relationship between stress, self-efficacy, and dietary behaviors in young adults may have implications for preventing negative health outcomes later in life that stem from poor eating habits. The current study examined whether stress levels and self-efficacy may be associated with unhealthy eating habits in young adults.

Methods: A cross-sectional online survey with undergraduate university students (N=1,170) was conducted using a valid and reliable questionnaire assessing demographics, perceived stress (PS), self-efficacy (SE), added sugar (AS), and diet quality (DQ). It was hypothesized that PS and SE would be associated with AS and DQ.

Results: Overall, the regressions, ANOVAs, and ANCOVAs all agreed that there were main effects for perceived stress and self-efficacy. Those who have low PS have healthier AS and DQ scores as compared to high PS individuals. Those with higher SE have healthier scores on both measures as well compared to the low SE group.

Conclusions: This study provides preliminary evidence that self-efficacy and perceived stress levels relate to added sugar and diet quality intake in young adults, and that increasing self-efficacy and reducing stress in young adults may lead to reductions in added sugar consumption and poor diet quality, thus leading to healthier eating habits.

Key Words: Self-Efficacy; Perceived stress; Added sugar; Diet quality; University students.

INTRODUCTION

Consuming an unhealthy diet is a major risk factor for noncommunicable chronic diseases globally, including type 2 diabetes mellitus, cardiovascular disease, and many

cancers (1). In the United States, poor diet is estimated to be the leading cause of premature death and the third leading cause of disability-adjusted life-years lost (2). High intakes of added sugar and low diet quality have been expressly implicated in increased risk in many chronic diseases (3).

Research has shown that perceived stress is a significant factor leading to poor eating behaviors, especially in young adult populations (4). Likewise, excessive and continuous stress on university students is well established (5). Young adults attending a university or college may experience increased levels of stress due to the many lifestyle changes and additional lifestyle choices they face. In addition to academic expectations and requirements, associations with faculty members and time pressures may also be sources of stress in student's lives (6). Relationships with family and friends, eating and sleeping habits, and loneliness may also adversely impact students (7). The experience of chronic stress is likely to be a common occurrence in the lives of college students, given the nature of this developmental transitional stage (6).

Chronic stress is any general response of the body that either warns or threatens to overwhelm the body and its ability to sustain homeostasis (8). Cortisol levels typically rise during episodes of chronic stress. Cortisol is a hormone that is produced in the adrenal gland and is referred to as the stress hormone because it is involved in the body's reaction to stress. In general, chronic stress occurs when there are demands on an individual that exceeds his or her coping capabilities. The reaction to stress may vary depending on the nature of the events that are occurring and the characteristics of the individual (9).

Chronic stress may also affect food preferences (10). Numerous studies have shown that physical or emotional distress can increase the intake of foods high in sugar, fat, or both (11, 12). High cortisol levels, in addition to high insulin levels, may be responsible (9). Research suggests that ghrelin, a "hunger hormone," may play a role as well. Once ingested, sugary and fatty foods seem to have a feedback effect that dampens stress-related and emotional responses. These "comfort" foods appear to counteract stress and may contribute to people's stress-induced craving for those foods (9).

The connection between nutrition and stress is intriguing because ordinarily, healthy food choices may be the last thing on college student's minds when they perceive a stressor (12). Additionally, nutritional deficiencies are rarely the cause of stress. It is well established that nutritional needs change when one is experiencing stress, and one can help the body "cope" with stress by providing enough of the nutrients which are in greater demand or are more difficult to acquire when one perceives stress (9). Finally, college-age years are a critical period in the young adult's life where many health habits develop and become lifelong behaviors, including nutrition and food choices.

A potential mediating factor to consider in the relationship between stress and food intake is self-efficacy (13). Self-efficacy is freely defined as an individual's confidence in their ability to manage a demand in the presence of obstacles (14). Self-efficacy scales are used to measure an individual's confidence in executing a myriad of health behaviors. Research suggests that self-efficacy affects the perceptive appraisal of a potential stressor and the ensuing stress response (13).

Self-efficacy may decrease stress and thus may moderate the association between stress and unhealthy dietary behaviors (10). In other words, although stress levels may be heightened in a given situation, a higher self-efficacy may reduce one's tendency to use unhealthy food intake as a way to reduce stress. An example of a valid and reliable self-efficacy scale is the health self-efficacy scale developed by Lee, Hwang, Hankins, & Pingree (15).

Given the prominence of nutrition-related chronic diseases, understanding the relationship between stress, self-efficacy, and dietary patterns during young adulthood may have implications for preventing adverse health outcomes later in life resultant from unhealthy dietary patterns established in college. The current study examined whether stress levels and self-efficacy may be associated with added sugar intake and low diet quality in young adults.

METHODS

Participants and Procedures

A cross-sectional online survey of undergraduate university students attending a large midwestern university was conducted in fall 2018. Students were recruited from four university-wide general health classes consisting of 20 sections. Students were provided with an online survey link that directed them to Qualtrics, an anonymous online survey platform. Participants read the informed consent, and if accepted, completed the questionnaire.

To be eligible, participants had to be at least 18 years of age. All subjects gave their informed consent for inclusion before participating. The study was approved in advance by the University's Institutional Committee on Investigations Involving Human Subjects.

Questionnaire Design

A 30-item self-report questionnaire was developed by the researchers to measure demographics and levels of perceived stress (PS), self-efficacy (SE), added sugar (AS), and diet quality (DQ).

A nine-item demographics questionnaire was used to gain general demographic information from the participants, including age, sex, race, ethnicity, year in school, major, work status, and self-reported anthropometrics (height & weight). Reported height and weight were collected to calculate body mass index (BMI).

Cohen's Perceived Stress Scale (PSS-10) questionnaire was used to measure perceived stress. The PSS-10 employs a 10-item 4-point Likert scale ranging from 'never' to 'very often" to assess an individual's perception of stress over a 1-month period. This scale has been deemed reliable and has been validated in this population (16). This scale has a measured reliability of Cronbach's alpha of 0.9 (17).

Health self-efficacy was measured employing a validated and reliable 5-item scale (15). The scale employs a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree" to assess an individual's confidence. This questionnaire has been validated in the target population for this study (18) and deemed reliable with a Cronbach's alpha ranging from 0.8-0.9 (19).

A 16-item dietary questionnaire that utilized the Alternative Healthy Eating Index (AHEI) research model as a reference was used to develop the diet quality questions. The AEHI is one of the best predictive measures of chronic disease risk and measures diet quality using nine dietary components (3). The participants were asked about their typical weekly eating habits. This set of questions employed a 5-point Likert scale ranging from 'never' to 'always' measuring the consumption of vegetables, fruits, whole grains, refined grains, red meat, processed meat, fish, chicken, nuts, sodium and added sugar. Added sugar intake was assessed using three separate questions measuring sweets, soft drinks, and specialty drinks containing sugar and employed a 5-point Likert scale ranging from 'never' to 'always". Validity for the dietary questionnaire was assessed by 10 dietetic professionals. Since the scale items measure distinctly different aspects of eating behavior, they were not expected to intercorrelate; thus, measures of scale reliability were not calculated.

STATISTICAL ANALYSIS

SPSS Statistics Version 25 was used in data analysis. The entire questionnaire was tested for face, content, and constructs validity, and internal reliability for the perceived stress and health self-efficacy subscales was conducted with the final sample of respondents. All variables were assessed for normality and outliers. Descriptive statistics were computed for all demographic and health questions. Analyses of variances followed by post-hoc group comparisons were performed to test group differences among the effects of PS and SE on AS and DQ. In order to assess and visualize the interaction between stress and self-efficacy on added sugar and diet quality intake, a median split was created for perceived stress (HighPS-LowPS) and self-efficacy (HighSE-LowSE), which then enabled the creation of four groups: LowSE-LowPS, LowSE-HighPS, HighSE-LowPS, HighSE-HighPS.

Analyses of variances followed by post-hoc group comparisons were performed to test group differences in

the combined effects of PS and SE on added sugar and diet quality. To access the association between PS, SE, AS, and DQ intake, separate hierarchical regression analyses were performed. In each model, age, sex, and race were entered into step one; PS and SE was entered into step two; and PSxSE interaction term was entered into step three. This model was conducted for both AS and DQ intake as the outcome variables of interest. All analyses were performed using SPSS, and results were considered statistically significant at the .05 alpha level.

RESULTS

Participant Demographics

A total of 1,170 undergraduate students out of 1,251 sampled from four university-wide general health classes consisting of 20 sections completed the questionnaire providing a response rate of 93.5%. Table 1 shows the majority of respondents were between 18–24 years (97.8%) White (82.3%), non-Hispanic (87.5%), in the first two years of college (71.2%), and female (67.5%).

Scale Measures

In order to measure and test the relationships, participants completed four scales, including Cohen's perceived stress scale (PS), health self-efficacy scale (SE), added sugar scale (AS) (3 questions measuring sugary foods, sugary drinks, and sugar added to coffee or tea consumption), and diet quality scale (DQ) (16 questions using the Alternative Healthy Eating Index as a reference). The added sugar questions were taken from the diet quality scale. The AS and DQ scores were based on self-report food intake questions. The scale measure summary statistics and sample results from this study are provided in Table 2. Both the PS (alpha = .87) and SE (alpha = .84) scales were deemed highly reliable measures for this study.

Effects of stress and self-efficacy on reported added sugar intake

The ANOVA, ANCOVAs, and regression analyses all agree that there were main effects for perceived stress and self-efficacy for added sugar intake. Those who had low perceived stress had healthier added sugar scores (adj. M=9.88, SE=0.10) as compared to high stressed individuals (adj. M=9.45, SE=0.11). Those who had high self-efficacy had healthier added sugar scores (adj. M =9.96, SE =0.09) as compared to the low self-efficacy group (adj. M=9.37, SE=0.19). The mean differences were significant at the .05 level.

Effects of stress and self-efficacy on reported diet quality

The ANOVA, ANCOVAs, and regression analyses all agree that there were main effects for perceived stress and self-efficacy for diet quality. Those who had low perceived stress had healthier diet quality scores (adj. M=51.32, SE=0.27) as compared to high stressed individuals (adj. M=50.17, SE=0.29). Those who had high self-efficacy had healthier diet quality scores (adj. M=52.92, SE=0.30) as compared to the low self-efficacy group (adj. M=48.57, SE=0.26). The mean differences were significant at the .05 level.

Interactions of stress and self-efficacy on reported added sugar and diet quality

No statistically significant interactions were found between PS and SE with regard to AS and DQ. However, when regressed on DQ score, SE was a stronger predictor (alpha=0.37) than PS (alpha = – 0.07). Table 3 shows the combination of HighSE-LowPS group accounted for the healthiest sugar score (adj. M =10.20, SE =0.13) while the LowSE-HighPS group accounted for the unhealthiest sugar score (adj. M =9.18, SE 0=.12). Table 4 shows that the combination of HighSE-LowPS group accounted for the highest diet quality score (adj. M =53.31, SE=0.36) while the LowSE-HighPS group accounted for the lowest diet quality score (adj. M =47.81, SE=0.33). Figure 1 displays the adjusted mean added sugar score (and standard errors) based on high and low perceived stress and self-efficacy. Figure 2 illustrates the adjusted mean diet quality score (and standard errors) based on high and low perceived stress and self-efficacy.

DISCUSSION

To our knowledge, this study is the first to investigate the relationship between perceived stress, health self-efficacy, diet quality, and added sugar consumption in young adults attending a midwestern university. The mean perceived stress score of participants was 20.42 (SD=6.4), indicating that university students are facing moderate to high chronic stress levels in this midwestern environment. This chronic condition may hinder academic progress. Moreover, a significant association ($p < .05$) exists between higher levels of perceived stress and increased added sugar intake and lower diet quality consumption, suggesting that unhealthy food consumption is a common coping strategy implemented in response to stress in undergraduate students (10). Because of the growing obesity prevalence and an increase in the amount of chronic stress being reported among college students, research suggests that stress-induced consumption of added sugar and consuming a low-quality diet may be contributing factors to the development of obesity (12). These dietary patterns of high sugar consumption and low diet quality intake are also shown to be associated with a vast number of other chronic health problems (2). Previous studies have established an increase in food intake as a result of increased reported stress (10, 11, 12) but have failed to focus on overall diet quality.

However, based on the present results, stress alone is not the only contributing factor in regard to dietary behaviors. This study found that the effects of self-efficacy play a role as well. A robust significant association ($p < .05$) exists between higher levels of self-efficacy and decreased sugar intake and a higher diet quality intake. Considering that self-efficacy is a strong predictor of health behaviors (20, 21), this was not surprising. What was interesting was that the present findings do support the vital role of self-efficacy in behavior change and its carry-over effects. From an applied perspective, intervention programs focused on the self-efficacy of one health behavior could be developed and implemented, and thus may increase positive changes in other health behaviors, which is a promising practice for changes in multiple health behaviors (22).

While the present findings did not support that self-efficacy moderated the relationship between stress as it relates to nutrient intake, self-efficacy was found to be a stronger predictor than perceived stress. This distinction should be considered in future research that examines other health outcomes, such as the moderating effect of other health behaviors related to chronic disease prevention.

An important implication that can be made from this study, and others like it, is when college students are under stress, they need to be aware of how they can cope with this stress and of their temptation to cope by choosing unhealthy foods. We conclude that more research needs to be pursued in this area to determine what social and environmental factors contribute to unhealthy eating habits and presumed weight gain in college and how to reduce or mitigate those factors for young college adults so that they can develop healthier lifelong habits, resulting in better health outcomes. Because research also shows that college students will tend to eat unhealthier foods and foods high in added sugar content when stressed, universities should offer healthier food options for students, especially in those times when they are likely to be very stressed (23).

In this study, self-efficacy was found to be a strong predictor of healthy eating. Thus, results from this study lend support to the fact that wellness-based university programs focusing on lifestyle modifications through nutrition education are beneficial in increasing university students' level of self-efficacy toward healthy eating behaviors (24) and are in fact, worthwhile. These types of programs could help university students overcome the barriers of making poor dietary choices.

Finally, the emerging field of nutritional psychiatry or the interaction between food and brain function is relatively new. There are new observational studies regarding the association between diet quality and mental health outcomes across countries, cultures, and age groups as it relates to stress (25). Today, the growing field of nutritional psychiatry is finding that there are many

consequences and correlations between not only what you eat and how you feel, but also how you ultimately behave.

CONCLUSIONS

If young adults continue to consume large amounts of added sugar and consume low-quality diets as a result of poor coping skills or low self-efficacy, their risk for developing many chronic diseases including heart disease, stroke, high blood pressure, type 2 diabetes, obesity, mental health problems, and many cancers also rises. The findings of this study have important implications for the prevention of the aforementioned detrimental health conditions. These findings provide insight into the theoretical notion that improvements in self-efficacy and reductions in perceived stress levels may reduce added sugar intake and improve diet quality, thus reducing young adults' risk of developing poor health outcomes later in life. Finally, educational interventions by health educators and dietitians are needed to improve self-efficacy and lower perceived stress in young adults and decrease the risk of nutrition-related chronic diseases in adulthood. Health educators should consider resources to help build healthful, lifelong habits, with the primary goal of sustained behavior change. For interventions to be successful and for young adults to make lasting behavioral changes, these interventions will need to be engaging, compelling, and seamlessly integrated into daily life.

REFERENCES

1. Afshin, A., Sur, P.J., Fay, K.A., et al. (2019). Health effects of dietary risks in 195 countries, 1990-2017: A systematic analysis for the global burden of disease study 2017. Lancet, 393, (10184), 1958-1972.
2. Mokdad, A.H., Ballestros, K., Echko, M., et al. (2018). US burden of disease collaborators. The state of US health, 1990-2016; burden of diseases, injuries, and risk factors among US states. Journal of the American Medical Association, 319(14), 1444-1472.
3. Chiuve, S.E., Fung, T.T. Rimm, E.B., et al. (2012). Alternative dietary indices both strongly predict risk of chronic disease, The Journal of Nutrition, 142, 1009-1018.
4. Wichianson, J.R., Bughi, S.A., Unger J.B., et al. (2009). Perceived stress, coping and night-eating in college students. Stress and Health, 25(3), 235-240.
5. Ribeiro, Í.J.S., Pereira, R., Freire, I.V., et al. (2018). Stress and quality of life among university students: A systematic literature review. Health Professions Education, 4(2), 70-77.
6. Ross, S., Neibling, B., & Heckert, T. (2009). Sources of stress among college students. College Student Journal, 33(2), 312-317.
7. Dyson, R., & Renk, K. (2006). Freshmen adaptation to university life: depressive symptoms, stress and coping. Journal of Clinical Psychology, 62(10), 1231-1244.
8. The American Institute of Stress. 50 common Signs of Stress. (2011).
9. Adam, T., & Epel, E. (2007). Stress, eating, and the reward system. Physiology and Behavior, 91, 449-458.
10. O'Connor, D.B., Jones, F., Conner, M., McMillian, B.(2008). Effects of daily hassles and eating style on eating behavior, Health Psychology, 27, 20-31.
11. Zellner, D., Loaiza, S., Gonalez, Z., Pita, J., Morales, J., Pecora, D., & Wolf, A. (2006). Food selection changes under stress. Psychology and Behavior, 87, 789-793.
12. Torres, S.J. & Nowson, C.A. (2007). Relationship between stress, eating behavior, and obesity. Nutrition, 23, 887-894.
13. Jerusalem, M. & Schwarzer, R. (1992). Self-efficacy as a resource factor in stress appraisal. In Schwarzer, R, editor, Self-efficacy: Thought control of action, (pp. 195-216). Washington, DC: Hemisphere.
14. Bandura, A. Self-efficacy. (1997). The exercise of control. New York: Freeman publisher.
15. Lee, S.Y., Hwang, H., Hawkins, & Pingree, S. (2008). Interplay of negative emotion and health self-efficacy on the use of health information and its outcomes. Communication Research, 35(3), 358-381.
16. Roberti, J.W., Harrington, L.N., et al. (2006). Further psychometric support for the 10-item version of the

perceived stress scale. Journal of College Counseling; 9, 135-147.

17. Andreou, E., Alexopoulos, E.C, Lionis, C., Varvogli, L., Gnardelliss, C., Chrousos, G.P., et al. (2011). Perceived stress scale: reliability and validity study in Greece. International Journal of Environmental Research Public Health, 8, 3287-3298.
18. Schwarzer, R., & Jerusalem, M. (1995). Self-efficacy scale. IN" Weinman, J., Wright, S., Johnston, M, editors. Measures in health psychology: A user's portfolio. Casual and control beliefs. Windsor, UK: NFER-NELSON, p. 35-37.
19. Luszczynska, A., Scholz, U., & Sxhsarzer, R. (2005). The general self-efficacy scale: multicultural validation studies. Journal of Psychology, 139, 439-457.
20. Blanchard, C., Arthur, H. M., & Gunn, E. (2015). Self-efficacy and outcome expectations in cardiac rehabilitation: Associations with women's physical activity. Rehabilitation Psychology, 60, 59–66.
21. van Stralen, M., Bolman, C., De Vries, H., Lechner, L., & Mudde, A. (2009). Determinants of initiation and maintenance of physical activity among older adults: A literature review. Health Psychology Review, 3, 147–207.
22. Prochaska, J. J., Spring, B., & Nigg, C. R. (2008). Multiple health behavior change research: An introduction and overview. Preventive Medicine, 46, 181–188.
23. Sogari, G., Velez-Argumedo, C., Gomez, M., & Mora, C. (2018). College students and eating habits: A study using an ecological model for healthy behavior. Nutrients, 10, 1823.
24. Miao, M., Gan, Y., Gan, T., et al. (2017). Carry-over effect between diet and physical activity: The bottom-up and top-down hypotheses of hierarchical self-efficacy. Psychology, Health & Medicine, 22(3), 266-274.
25. Sarris, J., Logan, A.C., Akbaraly, T., et al., (2015), Nutritional medicine as mainstream in psychiatry. The Lancet, 2(3), 271-274.

Tables

Table 1. Participant Demographics (n=1,170).

Variable		**Mean (SD) or %**
Age	Years	19.84 (2.84)
		18-24 (97.8%)
Sex	Male	n = 380 (32.5%)
	Female	n = 790 (67.5%)
Race	White	n = 963 (82.3%)
	Black	n = 133 (11.4%)
	Multiracial	n = 59 (5.0%)
	Asian	n = 11 (0.9%)
	American Indian	n = 4 (0.3%)
Ethnicity	Non-Hispanic	n = 1024 (87.5%)
	Hispanic	n = 146 (12.5%)
Year	1st year	n = 323 (27.6%)
	2nd year	n = 510 (43.6%)
	3rd year	n = 192 (16.4%)
	4th year	n = 115 (9.8%)
	5th or more	n = 30 (2.6%)
Major	Health Education & Promotion	n = 44 (3.8%)
	Nutrition & Dietetics	n = 9 (0.8%)
	Exercise Science	n = 37 (3.2%)
	Health & Physical Education	n = 29 (2.5%)
	Nursing or Pre-Nursing	n = 283 (24.2%)
	Other	n = 708 (60.5%)
	Undeclared	n = 60 (5.1%)
Job outside of being a student		
	Yes	n = 589 (50.3%)
	No	n = 581 (49.7%)
BMI	<25	n = 701 (59.9%)
	25 – 29.99	n = 300 (25.6%)
	>30	n = 169 (14.4%)

Table 2. Scale Measure Summary Statistics.

Perceived Stress Scale	**Sample Results**	
10 (4-point) questions	Min score = 0	Mean = 20.42
Scale score range 0-40	Max score = 40	SD = 6.40
Higher scores –> Higher stress	Cronbach's a = .87	
Health Self-Efficacy Scale	Min score = 5	Mean = 18.65
5 (5-point) questions	Max score = 25	SD = 3.40
Scale score range 0-25	Cronbach's α = .84	
Higher scores –> Higher self-efficacy		
Added Sugar Scale+	Min score = 3	Mean = 9.64
3 (5-point) questions	Max score = 15	SD = 2.38
Scale score range 0-15		
Higher scores –> Healthier		
Diet Quality Scale+	Min score = 29	Mean = 20.42
16 (5-point) questions	Max score = 76	SD = 6.96
Scale score range 16-80		
Higher scores –> Healthier		

+ The added sugar questions were taken from the diet quality scale. Since the scale items measure distinctly different aspects of eating behavior they were not expected to intercorrelate significantly; thus measures of scale reliability were not calculated.

Table 3. Adjusted means+ from Self-Efficacy (SE) x Perceived Stress (PS) interactions for Added Sugar (AS).

Group	**Adjusted AS mean**	**Standard Error**
Low SE x Low PS	9.56	0.15
Low SE x High PS	9.18	0.12
High SE x Low PS	10.2	0.13
High SE x High PS	9.72	0.17

+Covariates include age, sex, & race.

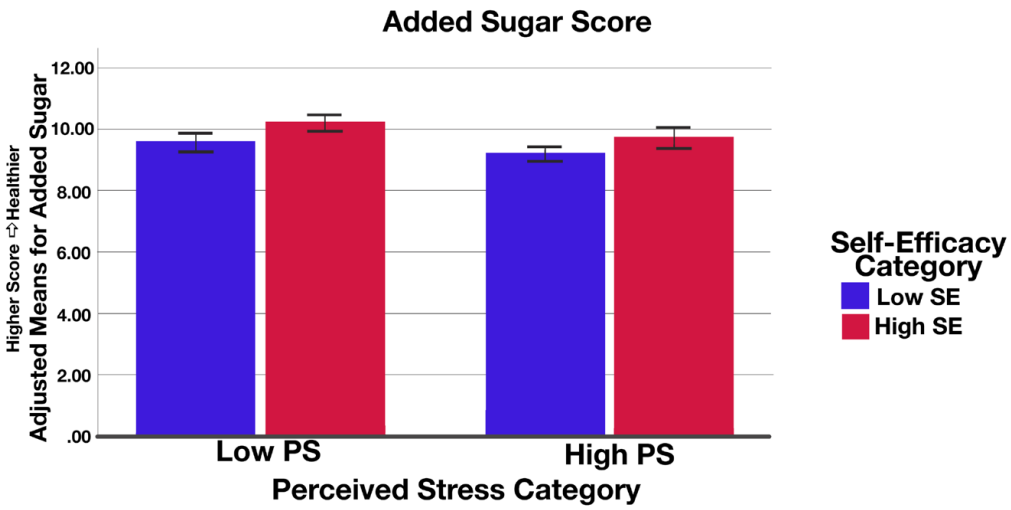
Table 4. Adjusted means+ from Self-Efficacy (SE) x Perceived Stress (PS) interactions for Diet Quality (DQ).

Group	**Adjusted DQ mean**	**Standard Error**
Low SE x Low PS	49.33	0.41
Low SE x High PS	47.81	0.33
High SE x Low PS	53.31	0.36
High SE x High PS	52.53	0.48

+Covariates include age, sex, & race.

Figures

Figure 1 Adjusted mean added sugar score (and standard errors) based on high and low perceived stress and self-efficacy.



Covariates appearing in the model include age, sex and race.
Error bars: +/- 2 SE

Figure 2 Adjusted mean diet quality score (and standard errors) based on high and low perceived stress and self-efficacy.

Covariates appearing in the model include age, sex and race.
Error bars: +/- 2 SE

PEER REVIEW

Not commissioned. Externally peer reviewed.