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THE EFFECTS OF AUTONOMOUS MOTIVATION AND IMPLEMENTATION PLANNING ON DIETARY GOAL ADHERENCE AMONG PERSONAL TRAINING CLIENTS

Hannah Allen
hannah.allen@cwu.edu

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THE EFFECTS OF AUTONOMOUS MOTIVATION AND IMPLEMENTATION
PLANNING ON DIETARY GOAL ADHERENCE AMONG PERSONAL TRAINING
CLIENTS

A Thesis

Presented to

The Graduate Faculty

Central Washington University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

Nutrition

by

Hannah Marie Allen

June 2018

CENTRAL WASHINGTON UNIVERSITY

Graduate Studies

We hereby approve the thesis of

Hannah Marie Allen

Candidate for the degree of Master of Science

APPROVED FOR THE GRADUATE FACULTY

Dr. Susan Hawk, Committee Chair

Dr. Kelly Pritchett

Dr. David Gee

Dean of Graduate Studies

ABSTRACT

THE EFFECTS OF AUTONOMOUS MOTIVATION AND IMPLEMENTATION PLANNING ON DIETARY GOAL ADHERENCE AMONG PERSONAL TRAINING CLIENTS

by

Hannah Allen

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Personal Fitness Trainers working within their scope of practice are in a unique position to encourage client adherence to dietary changes that are aligned with the Dietary Guidelines for Americans (DGA). Some research shows that the quality of an individual's motivation may play a role in goal success, and that implementation planning may be an effective goal adherence promotion strategy for those with high quality autonomous motivation. However, little is known regarding this relationship between type of motivation, implementation planning, and goal adherence among personal training clients interested in improving their dietary habits. This 6-week mixed methods study sought out female personal training clients at a public comprehensive university who were interested in improving their dietary habits (n=19). All participants were presented with information about the DGA and asked to set a daily dietary goal to bring their diet in tighter alignment with those guidelines. They were asked to rate their source of motivation for the goal as either autonomous or controlled. Participants were randomly assigned to one of two groups: Control group (C), or (2) Implementation Planning group (IP) both of which tracked goal adherence and reasons for non-adherence on a daily basis. In addition, IP participated in weekly implementation planning sessions.

Results suggested that participants adhered to their self-selected daily dietary goals approximately 62% of the time, irrespective of group assignment. No significant correlation was found between the source of motivation, implementation planning, and adherence, although the small sample size makes it difficult to determine whether the lack of correlation was valid or due to low statistical power. In conclusion, more research needs to be conducted to determine what factors influence successful dietary change.

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CHAPTER I

LITERATURE REVIEW

Promoting adherence to healthy habits is a challenge in both the medical and fitness fields. Lack of patient adherence to prescribed medications, dietary and lifestyle changes, and other treatments may account for more than 125,000 deaths per year in the United States alone (1). Additionally, non-adherence to medical treatment regimens contributes to an increased disease risk, decreased quality of life, and a significant financial burden upon the healthcare system, as it has been correlated with increased hospital readmission and length of stay (1,2). Studies have shown that adherence rates do not appear to be correlated with factors such as socioeconomic status, education, sex, race, or ethnicity. This indicates that non-adherence is a widespread issue, and one that is not unique to the medical field (1).

In addition to low adherence to medical regimens, adherence to both physical activity and dietary recommendations is severely lacking among Americans. Of interest is the link between a lack of adherence to a healthy diet and exercise regimen in the development of chronic diseases. A 2012 study found that approximately 10% of Disability Adjusted Life Years could be attributed to dietary risk factors and sedentary behaviors (3). Furthermore, approximately 80% of cases of Type II Diabetes, cardiovascular disease, and stroke could be prevented if poor diet and lack of exercise, and other risk factors such as cigarette smoking, could be eliminated (4).

The health risks associated with poor diet alone are numerous. Diets low in whole grains, fiber, and omega-3 fatty acids are associated with an increased risk of developing

type II diabetes, colorectal cancers, and ischemic heart disease, respectively (3). Additionally, diets that do not adhere to the fruit, vegetable, and fish consumption recommendations are associated with an increased risk of obesity and mortality worldwide (5). It is estimated that upwards of 5.6 million premature deaths globally may be ascribed to a low consumption of fruit and vegetables (6). Conversely, diets that adhere more closely to fruit and vegetable intake guidelines are associated with improved weight management and a decreased risk of developing cardiovascular disease, certain cancers, and all-cause mortality (6,7). A diet rich in vegetables and fruits is also associated with improved psychological well-being as well as a decrease in BMI, waist circumference, and fasting serum insulin (8,9).

Despite the risks associated with non-adherence, Americans are failing to meet most of the dietary guidelines. The typical American only meets the dietary guidelines for meat, total grains, and beans. They tend to consume far too much saturated fat, trans fat, added sugar, and sodium (10). Cavallo et al. found that only 2% of 1197 participants regularly met the 2010 Dietary Guidelines for Americans (8). Regarding specific food groups, Krebs-Smith et al. concluded that, among men and women aged 19-30, over 80% fell short of the recommendations for fruit, vegetable, and milk consumption. Greater than 99% did not regularly consume adequate amounts of whole grains (10). Similarly, Larson et al. found that young adults only consumed approximately half of the recommended servings of produce (11). These and similar studies demonstrate the high degree of discrepancy between the DGA and actual dietary habits of Americans.

These discrepancies are not attributable to a single cause. Rather, a multitude of environmental and psychosocial factors may contribute to a lack of adherence to dietary

recommendations and healthful eating patterns. Among the environmental factors, a perceived lack of time due to family, work, and school obligations is a frequently reported hindrance to fruit and vegetable consumption and healthful eating overall (5,12–15). This has been shown to be true across ethnicities and genders. However, older adults do not tend to perceive a lack of time as a barrier to healthy eating as frequently as younger adults. Unsurprisingly, women who reported time as a perceived barrier to consuming healthful foods were more likely to eat fast food and less likely to ingest adequate amounts of fruits and vegetables (15).

Low socioeconomic status and a perceived high cost of healthy foods are additional barriers to adherence to the DGA, especially among older adults. Yet, although low socioeconomic status is associated with poorer adherence to dietary guidelines (especially regarding fruit and vegetable consumption) some people with low incomes are still able to meet the dietary guidelines. Some women who were classified as low socioeconomic status had cooking skills, adequate nutrition knowledge, high self-efficacy regarding food, and planned meals and shopping trips ahead of time. Thus, they were more likely to eat healthful diets despite their limited budgets (16).

A perceived lack of access to and unavailability of healthful foods, particularly fresh fruits and vegetables, is an additional contributing factor to a lack of adherence to a healthy diet. This has been reported across ethnic groups, but especially among Hispanic immigrants and African Americans (7,13). Additional environmental factors that are correlated with unhealthy eating habits include the political environment and food advertisements (17).

Psychosocial factors can also act as barriers to adherence to national dietary guidelines. Common psychosocial barriers among individuals include a perceived lack of motivation or lack of desire to change (12,18). Kearney et al.⁷ found that 15% of adults surveyed did not wish to change their diet, with a low level of education being a primary influencer of this attitude(12). This lack of desire to change eating habits may be due to inadequate knowledge of how typical eating habits negatively impact health, or simply due to ambivalence.

Furthermore, a perceived lack of willpower is associated with a lack of adherence to dietary recommendations (14,18). A 1999 attitudinal survey revealed that 18% of those surveyed believed a lack of willpower to be a barrier to healthful dietary behaviors(18). The results of a similar study showed that 44.6% of participants perceived a lack of willpower as a barrier to healthy eating (14). In these studies, those who perceived a lack of willpower as a barrier were more likely to consume fast food two times or more per week, consume sugar-sweetened beverages, and eat fewer fruits, vegetables, and meals cooked at home (14).

In an umbrella review, Sleddens et al. stated that dietary behaviors are in part influenced by an individual's perceptions of control and efficacy. The results of the review revealed that the psychosocial factors of self-efficacy, perceived behavioral control, motivation, and self-regulation were related to dietary behaviors (17).

Considering the low adherence to dietary recommendations among Americans, it is vital for those who are in a position to influence eating behaviors to take advantage of opportunities to promote adherence to the DGA. Approximately 70% of exercise professionals surveyed reported that their clients adhere to their recommendations at least

a quarter of the time, supporting the idea that personal trainers are perfectly poised to 1) help clients recognize and overcome barriers to healthy eating, 2) educate the population about the DGA, and 3) promote adherence to the DGA (19,20). Most personal trainers feel that, to be successful, they must provide nutrition assistance and education (21). However, recent research shows that personal trainers are venturing outside of their scope of practice in an attempt to improve client nutrition and adherence (20–24). According to Ohio's "Unauthorized Practice of Dietetics," exercise professionals should only provide general, non-medical nutrition guidance that is in line with national recommendations (24). Studies have revealed that upwards of 75% of personal trainers of various educational levels provide nutrition advice that is outside their scope of practice (21–23). Even more alarmingly, approximately half of the personal trainers surveyed in a similar study admitted to providing specific nutrition advice regarding the management of chronic diseases (25). Mckean et al. found that many exercise professionals had essentially provided medical nutrition therapy regarding heart disease (51%), diabetes and blood glucose control (48.3%), food allergies and intolerances (34.6%), and eating disorders (31.8%) (23).

Not only are a large portion of fitness professionals venturing outside of their scope of practice to provide nutritional guidance, but the advice they provide is rarely in line with the DGA. Many personal trainers consider these recommendations to be impractical or not applicable to their clients (21). For example, one personal trainer stated that "...the guidelines are incorrect in that they promote too much cereal grains and not enough fats" (21). This qualitative study found that, in general, personal fitness trainers

are not giving evidence-based nutrition advice to their clients. Rather, many are giving dietary advice based on anecdotal evidence or popular diet trends (21). Another study found that over half of personal trainers believed that recommending 1 gram of protein per kilogram of body weight per day was appropriate, and that dehydration was indicated by a loss of body mass of 10% or more (20). Taken together, these studies reveal that personal trainers are largely misinformed about basic nutrition principles and recommendations. When personal trainers step outside their scope of practice by offering dietary advice, serious consequences can arise. For example, in the case of *Capati v Crunch Fitness*, incorrect nutrition advice from a personal trainer resulted in the death of a client (24).

Despite the alarming trend of fitness professionals providing nutrition advice that breaches their scope of practice, there are several strategies that they can safely utilize to help promote adherence to healthy eating behaviors. Of these various strategies, research has shown that theory-based interventions are more successful at promoting long-term adherence to healthy behaviors than atheoretical interventions (26,27). Successful interventions for long-term maintenance of a healthy diet tend to be based on the social cognitive theory (SCT), the transtheoretical model (TTM), or the self-determination theory (SDT). Of these, the SDT appears to be the least-studied approach (26).

The TTM, established by Prochaska and DiClemente, is based on the theory that individuals experience five stages during the change process. These stages consist of precontemplation, contemplation, preparation, action, and maintenance. The process of progression from stage to stage can be described as either cognitive or behavioral, depending upon the stage. Underlying this progression are the concepts of self-efficacy,

which is the belief in one's ability to perform the desired behaviors required to meet a goal, and decisional balance, which is the process of weighing the costs and benefits of a change in behavior (26).

The SCT, developed by Bandura, explains that both personal and environmental factors interact to influence behavior change. Similar to the TTM, the SCT places high importance on self-efficacy and self-regulation in the process of behavior change³¹. The SDT proposes that behavior is the result of the type or quality of motivation. Motivation quality can range from complete amotivation to extrinsic motivation to intrinsic motivation. Intrinsic motivation is the most likely to promote autonomy and produce lasting behavior change, while extrinsic motivation is less likely to result in desirable behavioral change outcomes (26). When the human needs for relatedness, competence, and autonomy are supported, the SDT proposes that higher quality motivation can be achieved, resulting in improved goal attainment and adherence (28). Implementation planning, which is the process of developing strategies for goal achievement, often develops spontaneously among those with high quality intrinsic motivation. This may be one link between experiencing motivation to reach a goal and actually adhering to the necessary behaviors (29). In 2010, Webber et al. found that a larger ratio of autonomous (intrinsic) to controlled (extrinsic) motivation was predictive of greater adherence to self-monitoring of behaviors and greater weight loss among 66 women, supporting the claims of the SDT(30). Specific constructs of these various theoretical approaches that have been associated with long term adherence to healthful

eating patterns include a focus on self-efficacy, the quality/type of motivation, and person-centered autonomy-supportive counseling (27,31).

Within a personal trainer's scope of practice, constructs from self-determination theory may be used in conjunction with implementation planning to promote client adherence to the DGA. Personal fitness trainers can promote quality motivation by meeting the human needs of relatedness, competence, and autonomy. By forming a personal connection with their clients, they can satisfy the need for relatedness. By teaching skills and providing opportunities to succeed, they can fulfill the need for competence. Finally, by allowing clients to make their own decisions and set their own goals, personal trainers can foster a sense of autonomy within their clients.

Conclusions

Future research should focus on specific constructs of theory-based interventions and their impact on adherence to healthy eating habits. More specifically, studies should prioritize seeking out methods that can be utilized by fitness professionals to positively influence client dietary adherence while remaining within their scope of practice.

LITERATURE REVIEW REFERENCES

1. Atreja A, Bellam N, Levy S. Strategies to Enhance Patient Adherence: Making it Simple. *Medscape Gen Med*. 2005;7(1):1–7.
2. Donovan J. Patient Decision Making: The Missing Ingredient in Compliance Research. *Int J Technol Assess Health Care*. 1995;11(3):443–55.
3. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *The lancet*. 2013;380(9859):2224–2260.
4. Schuette SA, Cordero E, Slosburg K, Addington EL, Victorson D. A Scoping Review of Positive Lifestyle and Wellness Interventions to Inform the Development of a Comprehensive Health Promotion Program: “HealthPro.” *Am J Lifestyle Med*. 2017;1559827617704825.
5. Dijkstra SC, Neter JE, van Stralen MM, Knol DL, Brouwer IA, Huisman M, et al. The role of perceived barriers in explaining socio-economic status differences in adherence to the fruit, vegetable and fish guidelines in older adults: a mediation study. *Public Health Nutr*. 2015;18(5):797–808.
6. Aune D, Giovannucci E, Boffetta P, Fadnes LT, Keum N, Norat T, et al. Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality—a systematic review and dose-response meta-analysis of prospective studies. *Int J Epidemiol*. 2017;dyw319.
7. Yeh M-C, Ickes SB, Lowenstein LM, Shuval K, Ammerman AS, Farris R, et al. Understanding barriers and facilitators of fruit and vegetable consumption among a diverse multi-ethnic population in the USA. *Health Promot Int*. 2008;23(1):42–51.
8. Cavallo DN, Horino M, McCarthy WJ. Adult intake of minimally processed fruits and vegetables: associations with cardiometabolic disease risk factors. *J Acad Nutr Diet*. 2016;116(9):1387–1394.
9. Conner TS, Brookie KL, Carr AC, Mainvil LA, Vissers MC. Let them eat fruit! The effect of fruit and vegetable consumption on psychological well-being in young adults: A randomized controlled trial. *PloS One*. 2017;12(2):e0171206.
10. Krebs-Smith SM, Guenther PM, Subar AF, Kirkpatrick SI, Dodd KW. Americans do not meet federal dietary recommendations. *J Nutr*. 2010;140(10):1832–1838.
11. Larson N, Laska MN, Story M, Neumark-Sztainer D. Predictors of fruit and vegetable intake in young adulthood. *J Acad Nutr Diet*. 2012 Aug;112(8):1216–22.

12. Ashton LM, Hutchesson MJ, Rollo ME, Morgan PJ, Collins CE. Motivators and barriers to engaging in healthy eating and physical activity: A cross-sectional survey in young adult men. *Am J Mens Health*. 2017;11(2):330–343.
13. Lucan SC, Barg FK, Long JA. Promoters and barriers to fruit, vegetable, and fast-food consumption among urban, low-income African Americans—a qualitative approach. *Am J Public Health*. 2010;100(4):631–635.
14. Pinho MGM, Mackenbach JD, Charreire H, Oppert J-M, Bárdos H, Glonti K, et al. Exploring the relationship between perceived barriers to healthy eating and dietary behaviours in European adults. *Eur J Nutr*. 2017;1–10.
15. Welch N, McNaughton SA, Hunter W, Hume C, Crawford D. Is the perception of time pressure a barrier to healthy eating and physical activity among women? *Public Health Nutr*. 2009;12(7):888–895.
16. Williams L, Ball K, Crawford D. Why do some socioeconomically disadvantaged women eat better than others? An investigation of the personal, social and environmental correlates of fruit and vegetable consumption. *Appetite*. 2010;55(3):441–446.
17. Sleddens EF, Kroeze W, Kohl LF, Bolten LM, Velema E, Kaspers P, et al. Correlates of dietary behavior in adults: an umbrella review. *Nutr Rev*. 2015;73(8):477–499.
18. Kearney JM, McElhone S. Perceived barriers in trying to eat healthier—results of a pan-EU consumer attitudinal survey. *Br J Nutr*. 1999;81(S1):S133–S137.
19. Oprescu F, McKean M, Burkett B. Exercise professionals—could they be the forgotten public health resource in the war against obesity. *J Sports Med Dopng Stud*. 2012;2:e122.
20. Weissman J, Magnus M, Niyonsenga T, Sattleshight A. Sports nutrition knowledge and practices of personal trainers. *J Community Med Health Educ*. 2013;3(254):2161–2171.
21. Barnes K, Ball L, Desbrow B. Personal trainer perceptions of providing nutrition care to clients: a qualitative exploration. *Int J Sport Nutr Exerc Metab*. 2017;27(2):186–193.
22. Akerson M. Investigating Personal Fitness Trainers' Qualifications. 2014 [cited 2017 Oct 10]; Available from: <http://stars.library.ucf.edu/etd/3014/>
23. McKean MR, Slater G, Oprescu F, Burkett BJ. Do the nutrition qualifications and professional practices of registered exercise professionals align? *Int J Sport Nutr Exerc Metab*. 2015;25(2):154–162.

24. Sass C, Eickhoff-Shemek JM, Manore MM, Kruskall LJ. Crossing the line: understanding the scope of practice between registered dietitians and health/fitness professionals. *ACSMs Health Fit J.* 2007;11(3):12–19.
25. Barnes K, Desbrow B, Ball L. Personal trainers are confident in their ability to provide nutrition care: a cross-sectional investigation. *Public Health.* 2016;140:39–44.
26. Joseph RP, Daniel CL, Thind H, Benitez TJ, Pekmezi D. Applying psychological theories to promote long-term maintenance of health behaviors. *Am J Lifestyle Med.* 2016;10(6):356–368.
27. Vilaro MJ, Staub D, Xu C, Mathews AE. Theory-Based Interventions for Long-Term Adherence to Improvements in Diet Quality: An In-depth Review. *Am J Lifestyle Med.* 2016;10(6):369–376.
28. selfdeterminationtheory.org - An Approach to human motivation & personality [Internet]. [cited 2018 May 19]. Available from: <http://selfdeterminationtheory.org/>
29. Koestner R, Otis N, Powers TA, Pelletier L, Gagnon H. Autonomous motivation, controlled motivation, and goal progress. *J Pers.* 2008;76(5):1201–1230.
30. Webber KH, Tate DF, Ward DS, Bowling JM. Motivation and its relationship to adherence to self-monitoring and weight loss in a 16-week Internet behavioral weight loss intervention. *J Nutr Educ Behav.* 2010;42(3):161–167.
31. Samdal GB, Eide GE, Barth T, Williams G, Meland E. Effective behaviour change techniques for physical activity and healthy eating in overweight and obese adults; systematic review and meta-regression analyses. *Int J Behav Nutr Phys Act.* 2017;14(1):42.

CHAPTER II
JOURNAL ARTICLE

THE EFFECTS OF AUTONOMOUS MOTIVATION AND IMPLEMENTATION
PLANNING ON DIETARY GOAL ADHERENCE AMONG PERSONAL TRAINING
CLIENTS

ABSTRACT

Personal Fitness Trainers working within their scope of practice are in a unique position to encourage client adherence to dietary changes that are aligned with the Dietary Guidelines for Americans (DGA). Some research shows that the quality of an individual's motivation may play a role in goal success, and that implementation planning may be an effective goal adherence promotion strategy for those with autonomous motivation. However, little is known regarding this relationship between type of motivation, implementation planning, and goal adherence among personal training clients interested in improving their dietary habits. This 6-week mixed methods study sought out female personal training clients at a public comprehensive university who were interested in improving their dietary habits (n=19). All participants were presented with information about the DGA and asked to set a daily dietary goal to bring their diet in tighter alignment with those guidelines. They were asked to rate their source of motivation for the goal as either autonomous or controlled. Participants were randomly assigned to one of two groups: Control group (C), or (2) Implementation Planning group (IP) both of which tracked goal adherence and reasons for non-adherence on a daily basis. In addition, IP participated in weekly implementation planning sessions. Results suggested that participants adhered to their self-selected daily dietary goals approximately 62% of the time, irrespective of group assignment. No significant

correlation was found between the source of motivation, implementation planning, and adherence, although the small sample size makes it difficult to determine whether the lack of correlation was valid or due to low statistical power. In conclusion, more research needs to be conducted to determine what factors influence successful dietary change.

Key words: Adherence, autonomous motivation, implementation planning, personal fitness trainer

INTRODUCTION

There are several known health benefits of adhering to the Dietary Guidelines for Americans (DGA). Among these benefits are a decreased risk for all-cause mortality and cardiovascular disease (1–4). Conversely, non-adherence to national dietary recommendations is associated with unfavorable health outcomes such as an increased risk of certain cancers and premature death (1,5–7). Despite this, Americans tend to only meet the dietary recommendations for meat, beans, and total grains (8). In fact, over 80% of American adults fail to meet the recommendations for milk, whole grain, fruit, and vegetables (8). Research shows that environmental correlates of non-adherence include a perceived lack of time (5,9–11), a perceived high cost of healthful foods, and a perceived lack of access to healthful foods (4,12). Psychosocial factors that are detrimental to adherence include a perceived lack of will power (10,13), self-efficacy, behavioral control, motivation, and self-regulation (14).

Because of the trust that is commonly established between personal fitness trainers (PFTs) and their clients, PFTs are in an ideal position to encourage adherence to

the DGA by addressing these psychosocial barriers (15). According to the American Council on Exercise, educating clients on the following: the Dietary Guidelines for Americans, MyPlate, basic principles of healthy food and food preparation, foods that are part of a healthy diet, nutrients that are necessary for the body, and actions of those nutrients falls within the PFT's scope of practice. Personal Fitness Trainers can also provide nutrition accountability for their clients. Meal planning, nutritional assessment, specific nutrient or calorie intake recommendations, and medical nutrition therapy are examples of actions that are outside the scope of practice of a PFT. The majority of exercise professionals claim that their clients follow their nutritional advice at least 25% of the time (16). Of concern is that research shows that the nutritional advice given by PFTs often does not align with national dietary guidelines (17) and often breaches the PFT's scope of practice (16,18–21).

There are many theory-based strategies PFTs can utilize to promote adherence to dietary recommendations while functioning within their scope of practice. The Self-Determination Theory (SDT) is a promising perspective for dietary behavioral change. The SDT states that autonomy, competence, and relatedness are essential for the maintenance of psychological health and successful behavior change (22). When these needs are met, autonomous motivation, which is characterized by an individual's intrinsic approval and appreciation of a goal, is fostered. This type of motivation has been associated with greater goal achievement and adherence. When the requirements for autonomy, competence, and relatedness are not met, failure is more prevalent. Instead, controlled motivation, which is fueled by extrinsic pressure to achieve goals and is associated with poor goal adherence, predominates. Interventions based on the SDT have

been shown to improve adherence to healthy habits through the promotion of autonomous motivation and the utilization of implementation planning (22–24). By utilizing concepts from the SDT, PFTs may be able to more effectively support their clients in achieving a healthy diet in line with the DGA.

The relationship between source of motivation, implementation planning, and goal adherence among personal training clients seeking to improve their dietary habits has not been explored. Therefore, the purpose of this study is to: 1) determine the relationship between type of motivation and adherence to dietary goals among personal training clients, and 2) to explore the relationship between regular implementation planning and adherence to dietary goals. Furthermore, this study seeks to investigate personal training clients' experiences with dietary change attempts and nutritional advice from PFTs. It is hypothesized that autonomous motivation will be positively correlated with dietary goal adherence, and that autonomous motivation combined with implementation planning will be highly correlated with dietary goal adherence (22).

METHODS

Participants

Female personal training clients (n=19) were recruited for this mixed-methods study. Participants were excluded from this study if they were participating in a nutrition counseling or weight loss program. Approval for this study was obtained through Central Washington University's Human Subjects Review Committee. Participants were required to read and sign an informed consent form.

Study Procedures

Following random assignment to the Control (C) or Implementation Planning (IP) groups, the participants attended separate familiarization sessions. Initially, all participants completed a demographics questionnaire, which included questions about personal training and dieting history. Participants were then educated on the basics of the Dietary Guidelines for Americans (DGA) and MyPlate for approximately 20 minutes by an ACE Certified Personal Trainer. This session included handouts with information regarding recommended daily servings of fruit, vegetables, grains, protein, dairy, and fats/oils. Participants were also educated about appropriate serving sizes of each food group. Additionally, recommendations regarding limiting the consumption of sodium, saturated fats, and added sugars were given.

At the conclusion of the nutrition education session, participants were asked to consider discrepancies between their current diets and the DGA, and to write their most important daily dietary goal related to these guidelines. Participants then provided a Rating of Goal Motivation for this self-selected goal by following Koestner, Otis, Powers, Pelletier, and Gagnon's method of determining the source of goal motivation (22). This method assessed participants' source of motivation utilizing a 9-point Likert Scale, ranging from "not at all because of this reason," to "completely because of this reason." Participants rated the following reasons for wanting to achieve their goal using the 9-point Likert Scale:

1. Because somebody else wants you to, or because you'll get something from somebody if you do.
2. Because you would feel ashamed, guilty, or anxious if you didn't—you feel that you ought to strive for this.
3. Because you really believe that it is an important goal to have—you endorse it freely and value it whole-heartedly.
4. Because of the fun and enjoyment which the goal will provide you—the primary reason is simply your interest in the experience itself (22, p. 1206-1207).

An individual's ratings for the first and second reasons correspond with the degree of autonomous motivation, while the ratings for the third and fourth reasons correspond with the degree of controlled motivation. Controlled motivation for goal achievement was calculated by averaging the scores for reasons one and two. Autonomous motivation for goal achievement was calculated by averaging the scores for reasons three and four, listed above (22).

Next, participants were given Goal Adherence Trackers and a brief demonstration of how to properly track adherence. Goal adherence was tracked by participants on a daily basis for six weeks. To monitor adherence, participants marked on a paper tracker "Y" if they adhered to their goal that day, or "N" if they did not adhere to their goal that day. At the conclusion of the study, adherence percentages were calculated for each participant by dividing the number of days marked with a "Y" by 42 days, which was the duration of the study, and converting this to a percentage. In addition to tracking adherence, participants were asked to record perceived reasons for non-adherence, such as "lack of time" or "lack of social support". Adherence tracker hard copies were submitted to the principal investigator on a weekly basis.

Only the IP group was asked to participate in implementation planning by developing a time and place for goal achievement. Three potential barriers to achieving

their goal and three strategies to overcome these barriers were recorded by the participants (22).

The IP group also attended weekly Implementation Planning Follow-Up meetings lasting approximately 10 minutes. During these weekly meetings, participants answered questions about barriers they encountered and shared successful strategies they employed during the previous week. They were also asked to adjust their implementation plans based on barriers they expected to encounter the subsequent week.

Statistical Analysis

Pearson R Correlation was used to analyze relationships between autonomous and controlled goal motivation and goal adherence and to test the hypothesis that autonomous motivation will be positively correlated with goal adherence. Subgroup correlation analysis was conducted to analyze the relationship between goal motivation of each group and goal adherence. Reasons for non-adherence and responses regarding diet and personal training history were analyzed using qualitative thematic analysis. Excel 16.0 (Microsoft Corp., Redmond, WA) was used for all quantitative statistical analyses.

RESULTS

Nineteen women participated in this study. The mean participant age was 25.4 ± 9.8 . Most of the participants were single, white students, with five identifying as Asian/pacific islander, mixed race, or Hispanic. Of the participants, four identified as faculty/staff. The mean BMI was 25.7 with ten participants being overweight (BMI 25.0-29.9) or obese (BMI >30).

Qualitative

Prior to commencing the study, all participants (n=19) reported attempting to change their diet in the past. The most common reasons for attempting to make dietary changes included improved health (63.16%), weight loss (57.9%), and improved digestion (21.05%).

Participants were also asked to explain what contributed to their success in past attempts to change their dietary behaviors. Meal planning and meal preparation, family support, and a sense of commitment or willpower were the most common themes contributing to successful dietary change.

Commonly reported perceived contributing factors to failure in past attempts included: lack of time or knowledge, poor planning, unsupportive living situations, and setting unrealistic goals. Moreover, social events, the taste of healthy foods, not eating enough, and stress/emotional eating were reported to act as barriers to healthy eating. Approximately 65% of participants reported not receiving any nutrition advice from PFTs in the past. Of those who had received nutrition advice from a PFT, 21% were advised to follow MyPlate or to have a "balanced diet." One participant was encouraged to try "meal prepping" and given advice on how to manage food cravings. Another participant was told on separate occasions to either follow IIFYM (If It Fits Your Macros), or to eat a high protein, low carbohydrate diet. Finally, one participant had been advised by a PFT to count her macronutrients. Attempting to follow this advice led to a period of self-reported binge and disordered eating.

Throughout this six-week study, in addition to tracking their goal adherence on a daily basis, participants also indicated perceived reasons for their non-adherence. Participants marked one or more of the following reasons on days that they did not meet their goal: lack of time, lack of access to healthy foods, social situation/peer pressure, lack of social support, lack of motivation/willpower, or other. If "other" was selected, participants were asked to describe their perceived reasons for non-adherence. The most commonly reported barrier to goal adherence was a lack of motivation/willpower (133 reported instances), followed by lack of time (69 instances) and lack of access to healthy foods (66 instances). Table 1 summarizes the reported perceived barriers for dietary goal adherence.

Table 1.
Perceived barriers to self-selected dietary goal adherence

Perceived Barrier	Number of Times Reported
Lack of motivation/willpower	133
Lack of time	69
Lack of access to healthy foods	66
Social situation/pressure	45
Stress/emotional eating	35
Traveling/away from home	21
Illness	16
Lack of social support	12

Quantitative

On average, participants reported adhering to their self-selected dietary goals approximately 62% of the time, regardless of the group (C, IP). Weekly adherence rates to selected dietary goals are displayed in Figure 1.

Pearson R Correlation tests revealed no statistically significant correlation coefficients among type of motivation and adherence to dietary goals (Table 3).

Similarly, in the implementation planning condition, subgroup correlation analyses revealed no significant correlation between autonomous motivation and adherence ($r=0.029$, $p=0.907$) or between controlled motivation and adherence ($r=0.090$, $p=0.715$). There were no significant correlations between adherence, implementation planning, and type of motivation.

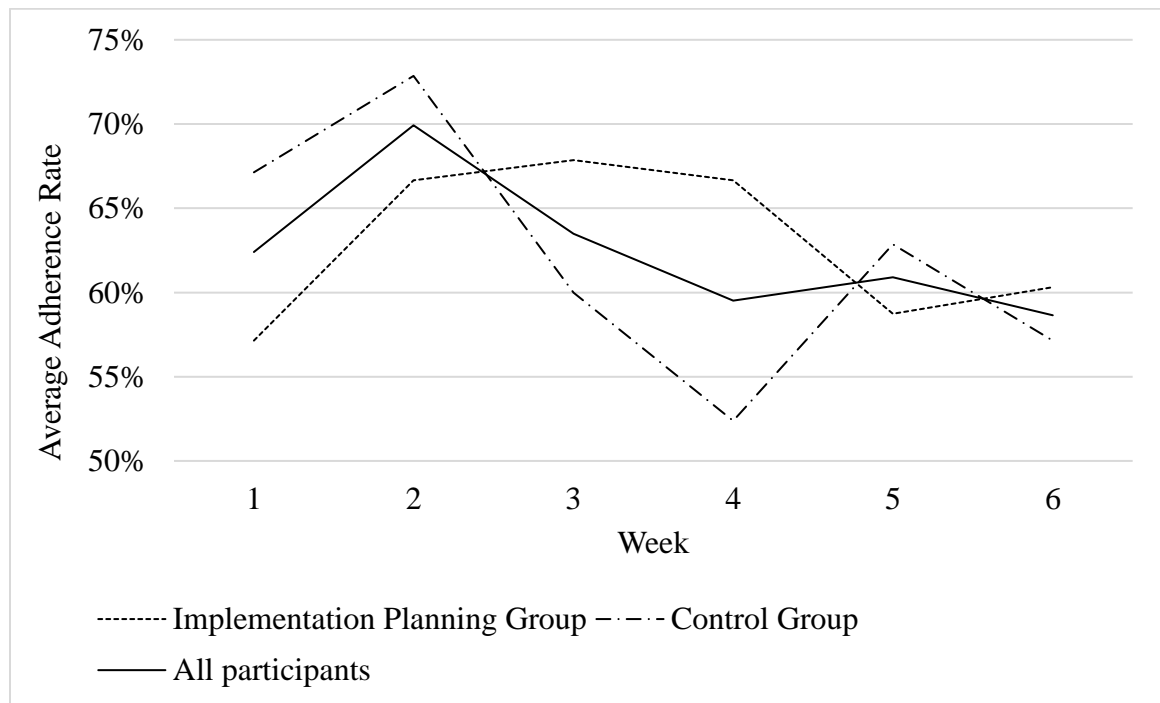


Figure 1. Weekly adherence to self-selected dietary goals

Table 2.
Correlations of autonomous motivation and controlled motivation with dietary goal adherence

	Adherence			
	Mean	SD	R	p
Autonomous Motivation	6.0	1.7	0.004	0.988
Controlled Motivation	3.7	1.7	0.201	0.409

Note: Motivation variables had 1-9 scales.
N=19

DISCUSSION

It was hypothesized that autonomous motivation combined with implementation planning would reveal a greater correlation with goal adherence than autonomous motivation alone, and that controlled motivation would not be significantly correlated with goal adherence. However, the data did not support this theory.

Findings of this study suggest that more autonomous forms of motivation are not significantly correlated with dietary goal adherence among personal training clients. A 2015 systematic review yielded results contradicting the findings of the current study, revealing that autonomous motivation was one of the top predictors of success in weight loss and physical activity changes (26). While some individuals may naturally be more predisposed to developing one type of motivation over the other, an individual's source of motivation is not static and is not entirely immune from being influenced by others. For example, by supporting a client's need for relatedness, competence, and autonomy, a PFT may be able to play a role in helping a client with more controlled motivation become more autonomously motivated. Autonomous motivation, in turn, may promote adherence and goal attainment.

This study found that weekly implementation planning was not statistically significantly correlated with dietary goal adherence. While research supports the use of implementation planning for successful behavioral change and goal achievement (27), there is also some research suggesting that implementation planning is not effective and can in fact be deleterious in certain situations and with certain types of individuals. Webb et al. (2009) and Tam et al. (2010) suggest that implementation planning may be effective in breaking unhealthy habits only when the strength of those habits is weak (28,29).

Dietary habits are often strong and deeply ingrained, which may explain the lack of positive correlation found between implementation planning and goal adherence in this study.

Furthermore, the effectiveness of implementation planning may depend partly on regulatory focus—more specifically, whether a goal and the related implementation intentions are promotion- or prevention-focused. Implementation plans for promotion-focused goals, which aim to add in beneficial behaviors, may be more effective at promoting adherence than for prevention-focused goals, which aim to avoid certain behaviors. To promote autonomy, participants in this study were allowed to self-select their dietary goals, and therefore were not directed to select goals with a certain regulatory focus. It may be that implementation planning would have been more effective if participants were instructed to follow promotion-focused goals.

Interestingly, certain aspects of an individual's personality may alter the effectiveness of implementation planning. It has been found that implementation planning can have a detrimental effect on goal attainment among socially prescribed perfectionists, a subset of perfectionists who are abnormally preoccupied with avoiding judgement and criticism from others (30). This may be because implementation plans act as a proxy for success, and when socially prescribed perfectionists do not adhere to their implementation plans, they tend to see themselves as unsuccessful. This is not conducive to goal striving and goal attainment.

Implementation planning is widely accepted as a beneficial mediator between goal setting and goal adherence. However, these studies reveal that the use of

implementation plans may be contraindicated in some scenarios. Specifically, they reveal that an individual's source of motivation, habit strength, regulatory focus, and personality can all alter the effectiveness of implementation planning.

The results of this study also revealed that a lack of motivation or willpower is the primary perceived barrier to adherence. A lack of motivation and willpower were also the predominating perceived barrier among participants in a Korean study exploring dieting and weight loss attempts (31). This is a common theme among studies about barriers to adhering to healthful habits (9,10).

At least two participants in this study were given dietary advice from a PFT that was outside the scope of practice of fitness professionals. The majority of the study participants had not received any kind of nutrition information from their PFTs. This clearly represents the polarity that is seen in the fitness industry regarding nutrition advice. Many PFTs breach their scope of practice and endanger clients by giving detailed or dangerous dietary prescriptions. An example of this was uncovered in this study, as one participant felt that the dietary advice she received from a previous PFT triggered disordered eating. Conversely, many PFTs are not addressing dietary habits with their clients at all. Whether this is due to fear of breaching their scope of practice, lack of nutrition knowledge, or lack of time to address nutrition during scheduled sessions is unknown. Regardless of the reasons for inappropriate or lack of dietary guidance, PFTs and other fitness professionals could benefit from further education and training in nutrition, as well as developing a better understanding of what fitness professionals can and cannot do and say when assisting clients with dietary behavioral change.

Weaknesses of this study include the use of solely self-reported measures and the

small sample size. Additionally, the regulatory focus of participants' dietary goals was not standardized.

CONCLUSIONS

In conclusion, this study investigated the relationships between autonomous motivation, implementation planning, and dietary habit adherence. Moreover, this study investigated the type of nutrition advice given by PFTs and the commonly perceived barriers to healthful eating. There were no statistically significant correlations found among the motivation, implementation planning, and adherence variables. Furthermore, participants revealed that few PFTs are giving sound, or any, nutritional guidance.

PFTs and other health and fitness professionals should be well-versed in coaching clients toward dietary behavioral change. This starts with a thorough knowledge of one's professional scope of practice as it relates to nutrition. Furthermore, to promote the development of high quality motivation, fitness professionals should strive to meet clients' needs for relatedness, competence, and autonomy. Finally, when working with clients to develop strategies to meet nutritional goals and adhere to dietary habits, fitness professionals must understand a clients' motivations, barriers, personality, and history. As this study shows, a strategy that has been proven effective in certain scenarios will not necessarily work for each individual.

JOURNAL ARTICLE REFERENCES

1. Aune D, Giovannucci E, Boffetta P, Fadnes LT, Keum N, Norat T, et al. Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality—a systematic review and dose-response meta-analysis of prospective studies. *Int J Epidemiol*. 2017;dyw319.
2. Cavallo DN, Horino M, McCarthy WJ. Adult intake of minimally processed fruits and vegetables: associations with cardiometabolic disease risk factors. *J Acad Nutr Diet*. 2016;116(9):1387–1394.
3. Conner TS, Brookie KL, Carr AC, Mainvil LA, Vissers MC. Let them eat fruit! The effect of fruit and vegetable consumption on psychological well-being in young adults: A randomized controlled trial. *PloS One*. 2017;12(2):e0171206.
4. Yeh M-C, Ickes SB, Lowenstein LM, Shuval K, Ammerman AS, Farris R, et al. Understanding barriers and facilitators of fruit and vegetable consumption among a diverse multi-ethnic population in the USA. *Health Promot Int*. 2008;23(1):42–51.
5. Dijkstra SC, Neter JE, van Stralen MM, Knol DL, Brouwer IA, Huisman M, et al. The role of perceived barriers in explaining socio-economic status differences in adherence to the fruit, vegetable and fish guidelines in older adults: a mediation study. *Public Health Nutr*. 2015;18(5):797–808.
6. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *The lancet*. 2013;380(9859):2224–2260.
7. Schuette SA, Cordero E, Slosburg K, Addington EL, Victorson D. A Scoping Review of Positive Lifestyle and Wellness Interventions to Inform the Development of a Comprehensive Health Promotion Program: “HealthPro.” *Am J Lifestyle Med*. 2017;1559827617704825.
8. Krebs-Smith SM, Guenther PM, Subar AF, Kirkpatrick SI, Dodd KW. Americans do not meet federal dietary recommendations. *J Nutr*. 2010;140(10):1832–1838.
9. Ashton LM, Hutchesson MJ, Rollo ME, Morgan PJ, Collins CE. Motivators and barriers to engaging in healthy eating and physical activity: A cross-sectional survey in young adult men. *Am J Mens Health*. 2017;11(2):330–343.

10. Pinho MGM, Mackenbach JD, Charreire H, Oppert J-M, Bárdos H, Glonti K, et al. Exploring the relationship between perceived barriers to healthy eating and dietary behaviours in European adults. *Eur J Nutr.* 2017;1–10.
11. Welch N, McNaughton SA, Hunter W, Hume C, Crawford D. Is the perception of time pressure a barrier to healthy eating and physical activity among women? *Public Health Nutr.* 2009;12(7):888–895.
12. Lucan SC, Barg FK, Long JA. Promoters and barriers to fruit, vegetable, and fast-food consumption among urban, low-income African Americans—a qualitative approach. *Am J Public Health.* 2010;100(4):631–635.
13. Kearney JM, McElhone S. Perceived barriers in trying to eat healthier—results of a pan-EU consumer attitudinal survey. *Br J Nutr.* 1999;81(S1):S133–S137.
14. Sleddens EF, Kroeze W, Kohl LF, Bolten LM, Velema E, Kaspers P, et al. Correlates of dietary behavior in adults: an umbrella review. *Nutr Rev.* 2015;73(8):477–499.
15. Oprescu F, McKean M, Burkett B. Exercise professionals—could they be the forgotten public health resource in the war against obesity. *J Sports Med Dopng Stud.* 2012;2:e122.
16. Weissman J, Magnus M, Niyonsenga T, Sattleshight A. Sports nutrition knowledge and practices of personal trainers. *J Community Med Health Educ.* 2013;3(254):2161–2171.
17. Barnes K, Ball L, Desbrow B. Personal trainer perceptions of providing nutrition care to clients: a qualitative exploration. *Int J Sport Nutr Exerc Metab.* 2017;27(2):186–193.
18. Akerson M. Investigating Personal Fitness Trainers’ Qualifications. 2014 [cited 2017 Oct 10]; Available from: <http://stars.library.ucf.edu/etd/3014/>
19. Barnes K, Ball L, Desbrow B. An International Comparison of Nutrition Education Standards, Occupational Standards and Scopes of Practice for Personal Trainers. *Int J Sport Nutr Exerc Metab.* 2017 Aug 3;27(6):507–19.
20. McKean MR, Slater G, Oprescu F, Burkett BJ. Do the nutrition qualifications and professional practices of registered exercise professionals align? *Int J Sport Nutr Exerc Metab.* 2015;25(2):154–162.

21. Sass C, Eickhoff-Shemek JM, Manore MM, Kruskall LJ. Crossing the line: understanding the scope of practice between registered dietitians and health/fitness professionals. *ACSMs Health Fit J.* 2007;11(3):12–19.
22. Koestner R, Otis N, Powers TA, Pelletier L, Gagnon H. Autonomous motivation, controlled motivation, and goal progress. *J Pers.* 2008;76(5):1201–1230.
23. Ryan RM, Patrick H, Deci EL, Williams GC. Facilitating health behaviour change and its maintenance: Interventions based on self-determination theory. *Eur Health Psychol.* 2008;10(1):2–5.
24. Webber KH, Tate DF, Ward DS, Bowling JM. Motivation and its relationship to adherence to self-monitoring and weight loss in a 16-week Internet behavioral weight loss intervention. *J Nutr Educ Behav.* 2010;42(3):161–167.
25. Sheldon KM, Elliot AJ. Not all personal goals are personal: Comparing autonomous and controlled reasons for goals as predictors of effort and attainment. *Pers Soc Psychol Bull.* 1998;24(5):546–557.
26. Teixeira PJ, Carraça EV, Marques MM, Rutter H, Oppert J-M, De Bourdeaudhuij I, et al. Successful behavior change in obesity interventions in adults: a systematic review of self-regulation mediators. *BMC Med.* 2015 Apr 16;13:84.
27. Gollwitzer PM, Sheeran P. Implementation Intentions and Goal Achievement: A Meta-analysis of Effects and Processes. In: *Advances in Experimental Social Psychology* [Internet]. Academic Press; 2006 [cited 2018 Apr 8]. p. 69–119. Available from: <http://www.sciencedirect.com/science/article/pii/S0065260106380021>
28. Planning to break unwanted habits: habit strength moderates implementation intention effects on behaviour change. - Semantic Scholar [Internet]. [cited 2018 Apr 8]. Available from: </paper/Planning-to-break-unwanted-habits%3A-habit-strength-Webb-Sheeran/3832e3655b7280b4d39174a33e28f6f12999f448>
29. Tam L, Bagozzi RP, Spanjol J. When planning is not enough: the self-regulatory effect of implementation intentions on changing snacking habits. *Health Psychol Off J Div Health Psychol Am Psychol Assoc.* 2010 May;29(3):284–92.
30. Powers TA, Koestner R, Topciu RA. Implementation Intentions, Perfectionism, and Goal Progress: Perhaps the Road to Hell Is Paved with Good Intentions. *Pers Soc Psychol Bull.* 2005 Jul 1;31(7):902–12.

31. Ismail TAT, Jalil RA, Wan Ishak WR, Hamid NF, Wan Nik WS, Jan Mohamed HJ, et al. Understanding Dieting and Previous Weight Loss Attempts among Overweight and Obese Participants: Insights into My Body Is Fit and Fabulous at Work Program. *Korean J Fam Med*. 2018 Jan;39(1):15–22.